Exploration of prescribing patterns of benzodiazepine and non-benzodiazepine (Z-drugs) medications in the management of primary insomnia in adults in Saudi Arabia

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Dedication

I dedicate this adventure to my parents (Mohamed and Aminah) who have been the fuel behind my development in everything. I will always be indebted to my parents for their supreme prayer, guidance, and above all their love. I also dedicate this to my sincere wife (Rabab Nahari) who has always provided me with the necessary support during the entire period to achieve my ambitions, and also to my lovely children (Ghady, Hanadi, Mohammed and Abdullah) who have always put a big smile on my face every time. Finally, I dedicate this to my brother and sisters for the limitless support and motivation they have provided during my study.

Abstract

Background: Despite the increasing use of benzodiazepines and Z-drugs for insomnia, there are no guidelines for their use nor data on prescribing patterns in the Kingdom of Saudi Arabia (KSA).

Aim: To explore the prescribing practices for treating insomnia in the KSA and begin the development of national guidelines, taking into account patients' perspectives.

Method: A mixed methods design was used in four phases. First, a retrospective audit of patients prescribed benzodiazepines or Z-drugs for insomnia (April 2012–March 2017) in King Fahad Central Hospital, Jazan, KSA, based on two US guidelines, was performed. Descriptive statistics, using Stata, were used to report findings. Second, a qualitative study, using NVivo, of physicians' knowledge, perceptions and attitudes regarding treating primary insomnia and using US guidelines was performed. Third, an e-Delphi technique was used for guideline development. Twenty-seven insomnia experts participated in developing the consensus (≥ 80% agreement) around future national guidelines. Fourth, a cross-sectional survey (unrestricted, self-selected online survey) was utilised to explore patients' knowledge, experiences and perceptions about using hypnotics to manage primary insomnia in the KSA. The data were encoded and analysed using Stata.

Results: Of the 504 records reviewed, 379 patients (75%) were prescribed benzodiazepines or Z-drugs; only 182 (48%) had documented diagnoses. Of the 307 patients (60%) diagnosed with insomnia, none received cognitive behavioural therapy for insomnia (CBT-I). No patients were reviewed by physicians for long-term use. No records met all criteria. Physicians' perceptions and attitudes in KSA toward using US or other international guidelines were based on knowledge, resistance and the presence of barriers and facilitators. In the Delphi study, sixteen

statements achieved the consensus to be included in future KSA guidelines. The survey study revealed that patients have limited knowledge of insomnia and its treatment. Patients are often prescribed hypnotics for insomnia, do not receive CBT-I as first-line treatment, and are rarely involved in treatment decisions. Most patients are on long-term hypnotics use and are not reviewed regularly by their doctors or provided with a plan for discontinuation. There is considerable resistance among patients to using nonpharmacological treatment options for insomnia.

Conclusion: The Ministry of Health should enhance public awareness of insomnia, provide training for physicians on prescribing hypnotics and CBT-I, improve hospital administration and encourage documentation. The produced consensus statements can be used, taking into consideration patients' perspectives, in the development of national guidelines that will standardise the use of benzodiazepines and Z-drugs for the treatment of primary insomnia in adults in the KSA.

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I am also thankful for the financial support I received from the Saudi Cultural Bureau in London and the General Directorate for Medical Services in the Saudi Ministry of Interior, without whom the PhD Programme would have been difficult to undertake and complete.

Declaration

I, Ali Dobia, certify that:

This is my own work and the use of all material from other sources has been acknowledged.

This thesis has not been submitted, either in full or in part, for the award of any other degree in my name, at this University or any other institution.

This thesis contains published work and work prepared for publication, contributed by other co-authors.

Signature: [Ali Mohamed A Dobia]

Date: August 2019

Publications

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Ethical Approvals

The following approvals were obtained prior to commencing the relevant work described in this thesis:

- Ethical guidance and approval (number 17/15) were obtained from the University of Reading Ethics Committee (UREC) on 8 March 2017, and amended on 24 July 2019 (see Appendices 2A, 2B & 2C).
- Research Ethics Committee (REC) at the General Directorate of Jazan Health Affairs, Ministry of Health, KSA on 19 March 2017 (see Appendix 3A).
- Ethical approval from the Director General of Jazan Health Affairs for Planning and Transformation was obtained for the fourth study on 21 May 2019 (see Appendix 3B).

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Abbreviations

KSA	Kingdom of Saudi Arabia
CBT-I	Cognitive Behavioral Therapy for Insomnia
GABA	Gamma Amino Butyric Acid
KFCH	King Fahad Central Hospital
FDA	Food and Drug Administration
BNF	British National Formulary
US	United States
UK	United Kingdom
NICE	National Institute of Clinical Excellence
AASM	American Academy of Sleep Medicine
ICSD-2	International Classification of Sleep Disorders - second edition
ACP	American College of Physicians
CPGs	Clinical Practice Guidelines
COREQ	COnsolidated criteria for REporting Qualitative research
UREC	University of Reading Ethics Committee
REC	Research Ethics Committee
MOH	Ministry Of Health
BOS	Bristol Online Survey
GP	General Practitioner
IPA	Interpretative Phenomenological Analysis

CHAPTER ONE

1 Introduction

This thesis investigates the use of hypnotics for managing primary insomnia by physicians in Saudi Arabia, as well as their perceptions of and attitudes to international guidelines and whether they believe that Saudi Arabia should develop its own domestic guidelines. It also uses an e-Delphi study to obtain consensus statements required to develop clinical guidelines for treating primary insomnia with benzodiazepines and Z-drugs in Saudi Arabia. Finally, it uses a cross-sectional survey to explore patients' knowledge, experiences and perceptions about using hypnotics to manage primary insomnia in Saudi Arabia. Before discussing the literature, it is necessary to provide some background information about insomnia, insomnia types, their prognosis, and treatment, to provide an understanding of the importance of treating the condition and to understand the development and use of hypnotics in the West and Saudi Arabia. Prescribing practices in the Kingdom of Saudi Arabia (KSA) for treating insomnia differ from those in the West, due in part to tradition, culture and religion. This thesis will also consider the safety of hypnotic drugs used to treat insomnia, their potential side effects, and alternative remedies for treating the condition. The chapter begins by considering the importance of managing primary insomnia, and present the study's aims, objectives, and methodology.

1.1 Background on insomnia and its management

1.1.1 Insomnia

Sleep disorders are common in most countries, being not just the amount of sleep people have but also its quality (Walia and Mehra, 2016). Of all sleep disorders, and there are many, the most common is insomnia (Basta, Chrousos, Vela-Bueno et al., 2007), although it is one of least effectively treated conditions in clinical medicine (Bhaskar, Hemavathy, and Prasad, 2016). The simplest description of insomnia is insufficient sleep or sleep of a poor-quality (Bhaskar, Hemavathy, and Prasad, 2016). Clinically, it is identified subjectively as dissatisfaction with the quality and/or amount of sleep (Mellinger, Balter, and Uhlenhuth, 1985; Saddichha, 2010), but there is no objective measure: different people require different sleep times of different quality. We cannot, therefore, define insomnia by giving a specific figure for the amount or type of sleep people need.

Currently, insomnia affects between 10-30% of people worldwide (Bhaskar, Hemavathy, and Prasad, 2016). Not only does it reduce cognitive performance but it also increases healthcare use (Hayward, Jordan, and Croft, 2010) and costs (Ozminkowski, Wang, and Walsh, 2007). To seek relief, many sufferers see a physician or health-care professional quite often, and at least once in the calendar year (Simon and VonKorff, 1997). What is more, people with insomnia tend to recover less quickly from acute illness than people with normal sleep patterns, are more often hospitalized (Leger, Guilleminault, Bader et al., 2002), and have higher risks of mortality (Cappuccio, D'Elia, Strazzullo et al., 2010). Insomnia is not limited to any demographic group; it is common amongst the widowed, those who are separated or divorced, the elderly, female, and those with co-morbid psychiatric or medical conditions (Bhaskar, Hemavathy, and Prasad, 2016; Saddichha, 2010).

Still, despite its high incidence, there is evidence to show that gaps exist in the clinical skills needed for recognizing, diagnosing and managing insomnia (Almeneessier, Alamri, Alzahrani et al., 2018). Often, because it is so poorly treated, this leads to insomnia being a persistent condition, involving continual follow-up over the years. There is thus a need to diagnose and treat insomnia, as well as identify its cause or causes, in an effective and timely manner (Morin, Bélanger, LeBlanc et al., 2009).

1.1.2 Chronic Primary Insomnia

Insomnia can be short-term (acute) or persistent (chronic) (Cunnington and Junge, 2016), triggered by family pressures, work-related stress, trauma, or some underlying environmental or physical conditions (Cunnington and Junge, 2016). It may last for a day or two, a week or two, or seem to be never-ending (Cunnington and Junge, 2016). Insomnia comes in two forms, primary and secondary. As its name suggests, primary insomnia is not attributable to a clinical, psychiatric or environmental cause, whereas secondary insomnia has one or more contributory causes (Singh, 2016). Secondary insomnia usually indicates an underlying and perhaps unrelated medical condition or that the sufferer is using certain drugs (Singh, 2016). Unlike secondary insomnia, primary insomnia is usually idiopathic, occurring without an identifiable cause (Schutte-Rodin, Broch, Buysse et al., 2008; Singh, 2016). It is characterized by difficulty or slowness in getting to sleep or maintaining sleep, which leads to impaired functioning (Singh, 2016). Several factors contribute to or are suspected of triggering primary insomnia, among which are stress, emotional distress, excessive work routines (which interfere with sleep patterns or circadian rhythms) and any travel crossing international time zones (Singh, 2016). Insomnia can be made worse by patients themselves, some of whom develop coping strategies to mask their condition but such strategies often exacerbate their symptoms (Williams, Roth, Vatthauer et al., 2013).

1.1.3 Prognosis

Insomnia is not a trivial condition. It has significant consequences for patients, including poor work performance, vehicle or work-related accidents, reduced cognitive skills and lower quality of life (Cunnington, Junge, and Fernando, 2013). It is also known to increase the onset of depression, anxiety, and hypertension (Cunnington, Junge, and Fernando, 2013). In the presence of psychiatric comorbidity, insomnia can exacerbate the condition's prognosis and is known to increase the risk of suicide (Krystal, 2012). Insomnia may also be linked to other medical conditions, increasing the likelihood of obesity, metabolic syndrome, and Type 2 diabetes (Knutson and Van Cauter, 2008). Despite its prevalence, there is insufficient literature on recognizing, diagnosing, managing and treating insomnia, particularly in Saudi Arabia (Almeneessier et al., 2018).

1.1.4 Management of Chronic Primary Insomnia

Generally, insomnia is managed by using two treatment options: 1) Cognitive Behavioral Therapy for Insomnia (CBT-I) and 2) hypnotic medications (Asnis, Thomas, and Henderson, 2015).

1.1.4.1 Cognitive Behavioural Therapy for Insomnia (CBT-I)

CBT-I is a treatment method using a behavioral modification approach such as sleep restrictions, sleep hygiene, cognitive therapies, stimulus control, and relaxation to manage the condition (Trauer, Qian, Doyle et al., 2015). The evidence suggests that CBT-I is effective for some patients suffering from chronic primary insomnia (Schutte-Rodin et al., 2008; Qaseem, Kansagara, Forciea et al., 2016; Medalie and Cifu, 2017) but not necessarily all. In many countries, CBT-I is used as a first option for managing insomnia because it can achieve the same results as medication with no observable side effects and far less risk. Indeed, CBT-I is

often more lasting for treating long-term insomnia than the use of medications (Mitchell, Gehrman, Perlis et al., 2012). Before using CBT-I, however, physicians should ensure its suitability for the patient since its effectiveness often depends on the patient's attitude and preparedness. The two principal factors to consider are the degree and type of sleep disorder from which the patient suffers and the patient's personality (Williams et al., 2013). For the first factor, the physician needs to assess whether the condition is primary insomnia or a symptom of another, possibly unrelated condition (Williams et al., 2013). An investigation into comorbidities and the use of other sleeping aids is needed to determine how CBT-I can be integrated into the overall treatment plan (Williams et al., 2013).

Perhaps most importantly, the physician should assess the patient's commitment to trying CBT-I and to determine whether he or she is willing to adhere to the treatment regimen (Matthews, Arnedt, McCarthy et al., 2013). One of the components of CBT-I is sleep restriction, which is contraindicated in patients with seizure disorders or who have a history of mania, either of which can be worsened by sleep reduction (Pigeon, 2010). In such instances, the approach would require modifying CBT-I in some way although, again, there is no one-size-fits all regimen. It is imperative, in any case, that sleep studies be conducted before starting sleep restriction. The principal advantage of CBT-I is that it has none of the adverse side effects that often arise from treating insomnia with medication (Pigeon, 2010). Furthermore, CBT-I is safe to use with pregnant women and nursing mothers, two groups known to experience short-term insomnia. There is, however, a shortage of CBT-I services in many countries and such services are considerably more expensive than prescription drugs (Asnis, Thomas, and Henderson, 2015).

1.1.4.2 Hypnotics

Because hypnotic drugs provide faster relief for insomnia than CBT-I, they are often used by many physicians as a first-tier treatment for the condition (Mitchell et al., 2012). The drugs most often prescribed for insomnia are either benzodiazepines or non-benzodiazepines (Z-drugs), which work by binding to gamma amino butyric acid (GABA) receptors in the brain (Olson, 2008). Benzodiazepines and Z-drugs are classified as hypnotics because of their sedating effect, inducing drowsiness and muscle relaxation, which usually occur simultaneously and result in a partial loss of consciousness. They are the most common prescription drugs for insomnia (Mahowald, 2012).

A) Benzodiazepines

In the late 1980s, benzodiazepine medications replaced barbiturates for treating insomnia because they are effective in treating insomnia, anxiety, and certain other behavioural disorders (Weaver, 2015) and safer than barbiturates. Currently, the Food and Drug Administration (FDA) approves five benzodiazepines for treating chronic insomnia: estazolam, flurazepam, quazepam, temazepam and triazolam (Asnis, Thomas, and Henderson, 2015; Riemann, Baglioni, Bassetti et al., 2017; Krystal, 2009).

For sleep onset and maintenance, quazepam, flurazepam, estazolam, and triazolam are known to be effective, but temazepam is effective only with sleep-onset issues in adults aged 18-65 (Asnis, Thomas, and Henderson, 2015). For adults aged 65 and over, flurazepam and triazolam are recommended for sleep onset and maintenance, while temazepam is effective only for maintenance (Krystal, 2009; Asnis, Thomas, and Henderson, 2015).

The British National Formulary (BNF), a pharmaceutical reference book, lists flurazepam and nitrazepam as long-acting hypnotics but they are likely to have residual effects, usually the

following day. While loprazolam, temazepam and lormetazepam can be used as short-acting hypnotics with little or no residual effect, they are more likely than flurazepam and nitrazepam to result in withdrawal symptoms. To treat insomnia associated with daytime anxiety, long-acting benzodiazepine anxiolytics, such as diazepam, can be taken orally at night as a single dose (National Institute for Health and Care Excellence, 2018).

B) Z-drugs

It was because benzodiazepines often had undesirable side effects that Z-drugs were developed in 1989. FDA approval followed swiftly, in 1993 (Sanna, Busonero, Talani et al., 2002; Greenblatt and Roth, 2012; Asnis, Thomas, and Henderson, 2015). The principal agents in Z-drugs do not share the same chemical structure as benzodiazepines, although they do show agonistic activity on binding to benzodiazepine receptors. Zolpidem, a Z-drug as its name suggests, was the first of its type to be developed and was soon followed by zaleplon. The molecular agent within these drugs attaches to the alpha-1 subunit of the benzodiazepine recognition site on the GABA-A receptor (Sanna et al., 2002; Asnis, Thomas, and Henderson, 2015), to induce sleep.

Eszopiclone, also a Z-drug, is rather more selective, preferring the alpha-2 and alpha-3 subunits and has a negligible affinity for the alpha-1 subtype. In contrast, benzodiazepines are non-selective about the alpha subunits (Sanna et al., 2002; Asnis, Thomas, and Henderson, 2015).

The UK currently licenses Zolpidem, Zaleplon and Zopiclone (National Institute for Health and Care Excellence, 2018) for short-term use for treating insomnia. The principal advantage of Z-drugs is that they not only induce sleep quickly, but also lengthen the time of sleep, and generally its quality. A further advantage is that, owing to their relatively short half-life, Z-drugs are less likely than benzodiazepines to lead to tolerance, dependency and diminished

daytime activity. Their disadvantage, however, is that they may have serious side effects, especially if used over the long term (National Institute for Health and Care Excellence, 2018).

C) The safety of hypnotic drugs

Because both benzodiazepines and Z-drugs have similar side effects, they should be prescribed for short periods using the lowest effective dose (Mahowald, 2012). Common side effects include drowsiness, next-day light-headedness, confusion, and depression (National Institute for Health and Care Excellence, 2018). More seriously, recent research suggests a link between exposure to Z-drugs and benzodiazepine and adverse effects such as cancer, pancreatitis, dementia, infections, and disease exacerbation (Brandt and Leong, 2017).

The primary difference between benzodiazepines and Z-drugs is that many physicians see the latter having fewer side effects than the former, with better treatment outcomes (Hoffmann, 2013a; Hoffmann, 2013b). A meta-analysis comparing the therapeutic effect of Z-drugs with a placebo found that Z-drugs are better at reducing sleep latency (how long it takes to fall asleep) (Huedo-Medina, Kirsch, Middlemass et al., 2012), and Z-drugs are the preferred medication because they are less likely to be misused than benzodiazepines (Asnis, Thomas, and Henderson, 2015). Even so, Daugherty et al. (2014) caution that the risk of abuse, dependence and withdrawal is not absent with Z-drugs (Daugherty, Hendricks, and Simpson, 2014).

The evidence shows that while benzodiazepines and Z-drugs have a high risk of patient abuse, which might result in addiction, dependence, falls, accidents, cognitive impairment and withdrawal symptoms (National Institute of Clinical Excellence, 2015; Agravat, 2018), their therapeutic benefit outweighs the risk - but only when properly prescribed and used.

In many countries, including the United States and the United Kingdom, the known risks and side effects of using benzodiazepines and Z-drugs have led to the development of clinical

practice guidelines to help physicians prescribe these drugs in such a way to minimize the risk of addiction and/or accidental or deliberate abuse. At present, no such guidelines exist in Saudi Arabia, even though insomnia is no less prevalent there than elsewhere. This project seeks to understand how and why physicians in Saudi Arabia prescribe these drugs and, when they do, whether they consult international guidelines. It is also explores patients' knowledge, experiences and perceptions of using hypnotics and asks: Does Saudi Arabia need its own specific guidelines for prescribing benzodiazepines and Z-drugs? And how can practice be improved?

1.2 Aims and objectives

1.2.1 Research aims

The purpose of the research is to describe and explore current clinical practice for prescribing benzodiazepines and Z-drugs for treating primary insomnia in Saudi Arabia, and to obtain consensus statements to aid the development of the national guidelines for treating primary insomnia in adults that include an understanding of Saudi patients' perspectives on insomnia and its management.

1.2.2 Specific objectives

- To gather data about the current clinical practice of using benzodiazepines and Z-drugs in the management of primary insomnia in Saudi Arabia, using an audit of medical records at KFCH, Jazan, and to assess whether prescriptions for and treatment of insomnia conform to US guidelines. This objective is addressed in the first paper, *Current clinical practice*

for the use of hypnotics to manage primary insomnia in adults in a tertiary hospital in Saudi Arabia: An audit study (Chapter 4).

- Using in-depth interviews, to explore the knowledge, perceptions and attitudes of Saudi physicians (authorized to prescribe benzodiazepines and Z-drugs) toward international guidelines. This objective is addressed in the second paper, *Perceptions of physicians in Saudi Arabia on the use of international clinical guidelines for managing primary insomnia* (Chapter 5).
- To use an e-Delphi study to find consensus statements required to develop clinical guidelines for treating primary insomnia with benzodiazepines and Z-drugs in Saudi Arabia. This objective is addressed in the third paper, *Using benzodiazepines and Z-Drugs for managing primary insomnia in adults in Saudi Arabia: An e-Delphi study to aid the development of clinical guidelines* (Chapter 6).

- Using self-administered cross-sectional online survey to investigate the knowledge, experiences and perceptions of patients about using hypnotics for primary insomnia in Saudi Arabia. This objective is addressed in the fourth paper, *The use of hypnotics for primary insomnia in Saudi Arabia: a survey of patients' experiences and perceptions* (Chapter 7).

1.2.3 Research questions

What are the current clinical practices in Saudi Arabia for using benzodiazepines and Z-drugs for treating primary insomnia? How can they be improved?

1.2.4 Supplementary questions

- In the absence of national guidelines, what is the current basis in clinical practice for using benzodiazepines and Z-drugs to treat primary insomnia in Saudi Arabia?
- How different are current practices in Saudi Arabia from American clinical guidelines for using benzodiazepines and Z-drugs in treating primary insomnia? The US guidelines are: "Management of Chronic Insomnia Disorder in Adults: A Clinical Practice Guideline from the American College of Physicians" (Qaseem et al., 2016) and "Clinical Guideline for the Evaluation and Management of Chronic Insomnia in Adults" (Schutte-Rodin et al., 2008).
- If differences are observed between Saudi practice and US guidelines, what are the reasons and justifications for them?
- What are the experiences, perceptions, and knowledge of Saudi patients towards using hypnotics for managing primary insomnia?

1.3 Significance of the research

The unnecessary use of prescription drugs is common. Medication is always inappropriate when the risk of adverse events outweighs the benefit. Moreover, prescribing drugs for

prolonged periods increases the risk of drug-drug interactions that may lead to serious side effects (Spinewine, Schmader, Barber et al., 2007). There is also evidence to suggest that health care practitioners are increasingly aware that failing to prescribe appropriate medications not only contravenes the best practice protocols but may also carry risks of its own, such as causing drug-drug interactions or adverse effects (Spinewine et al., 2007). Still, inappropriate prescribing remains the more serious problem in healthcare and often leads to adverse drug reactions (O'mahony and Gallagher, 2008).

While taking hypnotic drugs might help people with sleeping difficulties, there is evidence to show that many hypnotics have adverse side effects. As well as being increasingly ineffective (the longer patients take drugs, the less effective they are), there are increased risks of serious adverse effects such as cancer, dementia, pneumonia, daytime fatigue, traffic accidents, falls and ataxia, and infections (Weich, Pearce, Croft et al., 2014; Brandt and Leong, 2017). According to Weich et al. (2014), prescriptions in England for benzodiazepines account for 62% of medications for insomnia while Zaleplon, Zopiclone and Zolpidem (Z-drugs) account for 32%.

There is, however, little data on treating insomnia, particularly with medications, in Saudi Arabia (Almeneessier and BaHammam, 2017), despite the condition being as prevalent there as elsewhere. With little literature there is a focus on using benzodiazepines for psychiatric disorders. This study is aimed to help correct this by providing researchers not only with baseline information for further research, but also consensus statements to assist the development of Saudi-specific guidelines for the best use of sleep medicine remedies in Saudi Arabia.

1.4 Self-disclosure

I work as a pharmacist for the General Directorate of Medical Services at the Saudi Ministry of Interior. The department is responsible for several sectors, including military personnel and prisoners. Realising that prescribing hypnotics is increasing, I began researching this area, discovering that insomnia is not only prevalent in Saudi Arabia but also that its treatment is haphazard. Since then, I set out to complete my professional training in pharmacy research and specifically in the management of insomnia. This area not only interests me because we all feel the benefits of optimal sleep, but also because people with sleep disorders are currently underserved in Saudi Arabia. Because insomnia is now so widespread in Saudi Arabia, affecting 33 - 78% of the population (measured as sleep duration of fewer than 7 hours per night (Ahmed, Al-Jahdali, AlALwan et al., 2017), the condition and epidemiology of related problems, which now contribute to high mortality and morbidity rates, are placing an increasing burden on healthcare expenditure. Through this work, I have come to believe that a priority in healthcare in Saudi Arabia should be for policymakers to consider developing national guidelines for physicians and other healthcare workers to better improve management of patients with insomnia, with the goal of restoring healthy, happy and productive lives.

1.5 Structure of the thesis

This thesis is written in the form of a collection of papers and consists of eight chapters. Chapter 1 offers background information about insomnia and its treatment, introduces main research aims, the key questions, the significance of the research, and the structure of the thesis.

Chapter 2 extensively reviews the literature about the current use of hypnotics in the United States (US), the United Kingdom (UK) and KSA and reveals differences in practice in Saudi Arabia and Western countries. Rather than being a systematic review, the literature review

provides an argument for the research's rationale, based on a literature gap concerning insomnia treatment in KSA. Chapter 3 explains the project's methodology, its theoretical framework and discusses relevant ethical issues.

The following four chapters were a collection of already published or publishable papers. Chapter 4 presents the first publication titled, *Current clinical practice for the use of hypnotics to manage primary insomnia in adults in a tertiary hospital in Saudi Arabia: An audit study*. The paper assesses current practice in the use of hypnotics to manage insomnia in Saudi Arabia and to assesses whether it conforms to the US guidelines. The article was published in *Pharmacy*, January 2019.

Chapter 5 comprises the second publication titled, *Perceptions of physicians in Saudi Arabia on the use of international clinical guidelines for managing primary insomnia*. It explores the knowledge, perceptions, and attitudes of physicians practicing in Saudi Arabia concerning the use of international guidelines for managing insomnia. The manuscript was published in *PLOS ONE*, August 2019.

Chapter 6 includes the third publication which was titled as *Using Benzodiazepines and Z-Drugs for Managing Primary Insomnia in Adults in Saudi Arabia: An e-Delphi study to aid the development of clinical guidelines.* The purpose of this study was to obtain consensus statements from Saudi sleep experts to aid the development of clinical practice guidelines in Saudi Arabia for using benzodiazepines and Z-drugs for managing primary insomnia in adults. This paper was also published in *Sleep and Breathing*, February 2019.

Chapter 7 presents the fourth publication titled: *The use of hypnotics for primary insomnia in Saudi Arabia: a survey of patients' experiences and perceptions.* The study's purpose was to explore knowledge, experiences and perceptions of patients about using hypnotics to manage

primary insomnia in Saudi Arabia. The manuscript of this study was submitted to the *Sleep and Breathing* in August 2019, and still under review.

The final chapter, Chapter 8, discusses the overall findings of the programme of this research work, debates the strength and limitations, and wrap up with the conclusion and recommendations.

1.6 Conclusion

Thus far, the research purpose, types of insomnia, its prognosis, and management have been introduced. The aims and objectives of the research have been discussed and the significance of the research and methodological structure of the thesis have also been outlined. In the next chapter, the literature concerning the use of hypnotics in the Kingdom of Saudi Arabia and western countries including the US and the UK will be reviewed.

CHAPTER TWO

2 Literature review

2.1 Introduction

This chapter explains the project's rationale and offers a review of the literature regarding the use of hypnotics in western countries, in general, and the United States and the United Kingdom in particular. The chapter also discusses what has been published on insomnia in Saudi Arabia. Although the researcher used a variety of sources, the literature review does not claim to be a systematic academic review. Rather, it argues for the thesis' purpose, based on information published from different sources. This is because there is no published data regarding the use of hypnotics for managing primary insomnia in Saudi Arabia to be considered as primary resources for systematic review. Using a range of terms, including *insomnia*, *hypnotics, benzodiazepines*, *Z-drugs*, *patients' perspectives, patients' knowledge, patients' experiences, US*, *UK* and *Saudi Arabia*, a broad-based literature search of online databases was undertaken but limited to papers published in English since 1998. The search period was chosen because most innovations in the treatment of primary insomnia have occurred since the start of the new millennium. The search generated a number of references that addressed the prevalence of insomnia, the prescribing of hypnotics, their misuse, their long-term use, the risks and adverse effects of hypnotics, clinical guidelines for managing insomnia, and adherence to guidelines. References in key journals were also searched and citations checked. The subsections outline the literature's principal themes, and focus chiefly on the use of hypnotics in the United States and the United Kingdom (considered to represent the best practice because these countries have their own guidelines). What is available in Saudi Arabia in this regard provides a contrast for comparing practices between them.

2.2 Prevalence of Insomnia

In the West, many people suffer from insomnia (Leger, Poursain, Neubauer et al., 2008). In the United States, for example, the prevalence of sleep disorders is estimated to be 56% (over 1:2). In Western Europe (France, Germany, Italy, Spain and the UK), the estimate is 31% (Leger et al., 2008). Between 30-50% of adults in America have symptoms of insomnia, according to Sateia, Buysse, Krystal, Neubauer, and Heald (2017). Of these, 9-15% have symptoms sufficiently severe that the consequences affect the sufferer during the day (Ohayon, 2002). Moreover, 50% of the US & UK population are likely to have chronic insomnia and use prescription medication (Leger et al., 2008). In the United Kingdom, the number of people who self-report insomnia is approximately 36% of the adult population, almost 18 million people (Leger et al., 2008).

Recent data from the UK indicates a rise in insomnia and other sleep disorders -although the reason (or reasons) is not yet clear (Calem, Bisla, Begum et al., 2012; Riemann et al., 2017). Many people with insomnia seek professional help, and a majority of those are prescribed hypnotic medication (Kaufmann, Spira, Alexander et al., 2016; Hughes, Raitt, Riaz et al., 2016). Research indicates that about 10% of adults aged 16 and over take some form of sleep medication three or more times a week, with women slightly outnumbering men. What is more, the incidence of taking hypnotics tends to increase with age and varies by gender (McFall and Garrington, 2011; Hughes et al., 2016; Kaufmann et al., 2016; Gabe, Williams, and Coveney, 2017). One recent study showed that 25% of women and 15% of men (both groups aged 85 and over) said they used hypnotics on three or more occasions each week (Gabe, Williams, and Coveney, 2017).

Using keywords *insomnia, hypnotics* and *Saudi* as keywords, a literature search was ran using EMBASE and PubMed databases. This yielded 16 studies. Two of these were related to restless

leg syndrome and insomnia in patients on dialysis (Al-Jahdali, Al-Qadhi, Khogeer et al., 2009; Al-Jahdali, Khogeer, Al-Qadhi et al., 2010), four to sleep apnoea (Alotair and Bahammam, 2008; Alharbi, Almutairi, Alotaibi et al., 2009; Al-Jahdali, 2011; Al-Jahdali, 2012), and two to insomnia in cancer patients (Almutairi, Alhelih, Al-Ajlan et al., 2016; Almutairi, Mansour, and Vinluan, 2016). Others were related to stress, back pain and miscellaneous conditions (Wali, Krayem, Samman et al., 1999; BaHammam, 2006; Ahmed, 2014; Al-Eisa, Buragadda, and Melam, 2014; Alsaadi, McAuley, Hush et al., 2014; Alsaggaf, Wali, Merdad et al., 2016). Two recent papers were related to the prevalence of insomnia in Saudi Arabia (Ahmed, Al-Jahdali, Fatani et al., 2017) and in a primary care setting (Almeneessier et al., 2018).

Although attempts have been made to investigate the prevalence of insomnia and other sleep disorders in Saudi Arabia, the studies thus far have been limited. They nonetheless show that sleep disorders are prevalent among the Saudi population (Almeneessier et al., 2018; Bahammam, Alsaeed, Alahmari et al., 2014). Two groups in Saudi Arabia that seem to be particularly vulnerable are women and older adults (Ahmed, Al-Jahdali, Fatani, et al., 2017). It is not surprising, then, that current projections are for the use of sleep medications and related remedies to increase. Despite this, sleep medicine in Saudi Arabia remains a relatively new discipline and well behind that in developed countries (Bahammam et al., 2014).

2.3 Prescribing Practice of Hypnotics

In the US, prescribing hypnotics has followed a similar trend to that in the UK. One US study investigated the trend between 1993 and 2010 and showed increased prescriptions for both benzodiazepine and non-benzodiazepine receptor agonists such as Z-drugs (Kaufmann et al., 2016). Although there has been a recent drop in benzodiazepine prescriptions for patients with sleep disorders, particularly insomnia, this has coincided with an increase in Z-drug prescriptions for the same conditions (Kaufmann et al., 2016). This indicates that one drug has

been substituted for the other - but did not adversely affect the overall rise in benzodiazepine prescriptions in 2012 (Ruhm, 2016). Hypnotics are among the most commonly prescribed medicines in the United States (Hong and Bishop, 2014), increasing from 2.8% of prescriptions for 1988-1994 to 4.7% for 2007-2010. For 2011 alone, the American Association of Poison Control revealed that hypnotics were involved in 6.1% of human exposure to identified medicine (Hong and Bishop, 2014; Bronstein, Spyker, Cantilena et al., 2012). In numbers rather than percentages, there were 9 million people using hypnotic agents, chiefly benzodiazepines and Z-drugs, for insomnia or insomnia-related illness, in the US since 2013 (Kaufmann et al., 2016).

There has also been an increase in benzodiazepine and Z-drug use for managing insomnia in the United Kingdom (Hughes et al., 2016). Frequently, these drugs are prescribed for adults aged 65 and older (Johnson, Frei, Downes et al., 2016) although the National Institute of Clinical Excellence (NICE) in the United Kingdom has found no benefit of Z-drugs over benzodiazepines, rendering the choice of prescription either a subjective option or an issue of cost (National Institute for Care Excellence, 2004; Hughes et al., 2016). While current rates for hypnotic drug prescriptions are lower than they were 30 years ago, there has nevertheless been a rise in the incidence of insomnia. There was a significant increase in the use of hypnotics between 1993 and 2000, but the rate stabilized between 2000 and 2007 (Calem et al., 2012). Current prescription trends point to a decline in hypnotics use over the past few years (Gabe, Williams, and Coveney, 2017).

Of the literature studied, none investigated prescribing patterns of either benzodiazepines or Z-drugs for treating insomnia in Saudi Arabia. Studies investigating the prevalence of benzodiazepine use for other conditions in KSA are rare. For example, Aljawadi, et al. (2018) investigated the prevalence of benzodiazepine use and its association with falls among Saudi

older adults (Aljawadi, Khoja, Alhammad et al., 2018). Koenig et al. (2014), tracing the history of psychiatric medicines in Saudi Arabia, have explained how physicians think of benzodiazepines as safe psychiatric drugs for anxiety and other psychiatric disorders compared to the alternatives (Koenig, Al Zaben, Sehlo et al., 2014). Presumably, therefore, they needed little study. A literature review by Neyaz et al. (2011) investigated various prescribing practices of physicians in Riyadh city and found that data is insufficient; further studies are needed (Neyaz, Qureshi, Khoja et al., 2011). To date, no publication has discussed the use of Z-drugs in Saudi Arabia.

The reason there is very little literature about using benzodiazepines and Z-drugs for treating chronic primary insomnia in Saudi Arabia is because these drugs are classified as controlled and narcotic medications. They are available only on prescriptions and usually in hospitals (Almeneessier and BaHammam, 2017). According to Almeneessier and BaHammam (2017), sleep specialists in Saudi Arabia face difficulties in accessing drugs such as Eszopiclone, a non-benzodiazepine hypnotic agent, which is commonly indicated for managing insomnia. Why this is so is complicated but one plausible reason is that the manufacturers of hypnotics lack distributors in Saudi Arabia (Almeneessier and BaHammam, 2017) and the only way to obtain these medicines is to submit requests to hospitals. As a result, patients suffering from insomnia and sleep disorders often go without treatment (Almeneessier and BaHammam, 2017). Because the above sources were the only references found in the literature concerning the use of hypnotics in Saudi Arabia, further work on prescribing practices and access to Z-drugs is needed.

2.4 Misuse of Hypnotics

In the United States, among the most commonly misused hypnotics are the benzodiazepines because of their tranquilizing effect (Blanco, Han, Jones et al., 2018). Some of these drugs

include diazepam, lorazepam, alprazolam, and clonazepam. Of these, alprazolam, which is marketed under the trade name xanax, is well known, partly because of its widespread misuse (Ait-Daoud, Hamby, Sharma et al., 2018). Many users combine benzodiazepines with other drugs such as cocaine to reduce side effects such as agitation or to increase euphoria by using them with alcohol (Schmitz, 2016). Some research also indicates that hypnotics are often misused by combining them with alcohol, to enhance memory loss and because of its strong sedative properties (Madea and Mußhoff, 2009; Schmitz, 2016). Such combinations can be used to aid the commission of sexual assault and rape (Madea and Mußhoff, 2009). Although the drugs are available only on prescription, they can be obtained by forgery and by bribing doctors. Intentional self-harm can result in the provision of legitimate prescriptions (Bouland, Fine, Withers et al., 2015).

There have been concerns about the addictive potential of hypnotic drugs, including the consequences of and social issues stemming from the chronic legal use of these medicines (Jones and Sullivan, 1998; Lader, 2011). In the UK, benzodiazepines and Z-drugs have been implicated in many instances of substance-misuse-related mortality (Corkery, Claridge, Loi et al., 2013). It has been suggested that benzodiazepines and Z-drugs increase the risk of death, although this is controversial since few prescription medicines are completely safe. Nevertheless, evidence from a UK cohort study indicates that the sporadic use of benzodiazepines is causally linked to a rise in mortality risk (Palmaro, Dupouy, and Lapeyre-Mestre, 2015).

Kapil, Green, Lait, Wood, and Dargan (2014) suggested that about 8% of the UK population had misused hypnotic medications. Some of the primary reasons for this were coping with stress, inducing sleep, and producing euphoria (Kapil, Green, Le Lait et al., 2014). The study

revealed that users of hypnotic medications often obtained them from multiple sources such as family, friends, and most commonly healthcare professionals (Kapil et al., 2014).

It is clear, also, that hypnotic medications are increasingly used in Saudi Arabia for managing anxiety and insomnia. Currently, benzodiazepine use among older Saudi adults is about 4% (Aljawadi et al., 2018), usually the result of their being prescribed for insomnia or anxiety management (Aljawadi et al., 2018). There is no data, however, on how these medicines are currently prescribed in Saudi Arabia, despite the risks of being misused, which is well documented in the UK and US.

2.5 Long Term Use of Hypnotics

In many countries, **t**he pressing issue with using hypnotics is long-term use (Siriwardena, Qureshi, Dyas et al., 2008; Singh and Bhardwaj, 2010; Cadogan and Ryder, 2015; Jacob, Rapp, and Kostev, 2017). In the UK and other European countries, using hypnotics over the long-term is discouraged because of their side effects. Because dependence and tolerance with long-term use are well-documented risks of using hypnotics (Ohayon and Lader, 2002), many countries recommend using them for short periods only, anywhere from 4-5 weeks with regular monitoring and evaluation (National Institute for Care Excellence, 2004; Schutte-Rodin et al., 2008; Riemann et al., 2017; Sateia, Buysse, Krystal et al., 2017). While there are exceptions in which long-term use is appropriate, such as refractory chronic insomnia, such exceptions require careful patient monitoring by a physician and, if necessary, a diagnostic re-evaluation concerning the therapy's effectiveness (Schutte-Rodin et al., 2008). Long-term use carries a risk of death, either from excessive doses or from combining benzodiazepines with other drugs or alcohol (Patorno, Glynn, Levin et al., 2017). In the UK, more than 296,000 people currently take (or are likely taking) hypnotic medications for periods longer than the recommended time and are dependent or at risk of becoming dependent on their medications (Davies, Rae, and

Montagu, 2017). Long-term use of these drugs carries the likelihood of patients having high levels of physiological and neurological side effects, and extended periods of withdrawal (Davies, Rae, and Montagu, 2017).

A study in the United States showed that long-term use of hypnotic drugs has a serious economic effect on medical costs, exceeding the cost of all other sleep medicine combined (Kripke, 2006). The study correlated the chronic use of hypnotics with poor sleep, poor health, and reduced survival rates and concluded that long-term use of hypnotics - that is, primarily benzodiazepines and Z-drugs may be associated with impaired daytime performance, additional sleep problems, vehicle accidents, falls, and memory loss (Kripke, 2006). Kripke stated that there is no documented evidence to show that using hypnotics over the long term improves the patient's health or functioning. In fact, an earlier study by the same author claims that using hypnotics over the long-term is as damaging to human health as smoking two packets of cigarettes a day (Kripke, 2000).

While the incidence of insomnia is rising in Saudi Arabia, healthcare providers lack adequate awareness regarding the disorder and its management. Poor knowledge has been associated with a lack of emphasis on sleep medicine during medical training (Almohaya, Qrmli, Almagal et al., 2013). This acute lack of awareness also manifests among the general Saudi population (Almeneessier and BaHammam, 2017). If the long-term use of hypnotics is an international problem (Jacob, Rapp, and Kostev, 2017), it is even more so in Saudi Arabia, which lacks its own specific guidelines that could help to improve the practice for managing this condition. Therefore, research to explore current clinical practice for using hypnotics to manage primary insomnia in Saudi Arabia is deemed urgent.

2.6 Risks and adverse effects

Benzodiazepines have been associated with dependence, that is, the development of withdrawal symptoms or drug-seeking actions and maladaptive behaviours (Kripke, 2006; Brandt and Leong, 2017). Dependence on these drugs has been documented. Even at low doses, long-term use is known to lead to dependence for many patients (Kripke, 2006; Jacob, Rapp, and Kostev, 2017), induce euphoric effects and craving experiences (Brandt and Leong, 2017), but carries minimal risk of death (Patorno et al., 2017).

Z-drugs are viewed by many physicians as having fewer side effects than benzodiazepines, with better results (Hoffmann, 2013a). A meta-analysis by Huedo-Medina et al. (2012), comparing the therapeutic effect of Z-drugs with placebos and other sleep medications, demonstrated that Z-drugs are better at reducing sleep latency. This makes Z-drugs the preferred medication since they cannot be misused as easily as drugs such as benzodiazepines (Huedo-Medina et al., 2012). Different studies, however, have shown that the risks of abuse, dependence and withdrawal are still present in Z-drugs (Siriwardena et al., 2008; Daugherty, Hendricks, and Simpson, 2014).

In Saudi Arabia, benzodiazepines and other sedatives and hypnotics have been heavily implicated in contributing to falls among geriatric patients because of their adverse effects on cognitive function (Aljawadi et al., 2018). While evidence suggests that sensitivity to benzodiazepines is directly proportional to age, the drugs continue to be prescribed to the elderly in Saudi Arabia, contrary to evidence-based clinical practice recommendations (Bartlett, Abrahamowicz, Grad et al., 2009; Aljawadi et al., 2018). Studies have shown that, while both benzodiazepines and Z-drugs are known for having a risk of patient-abuse, resulting in addiction, dependence, falls, accidents, cognitive impairment and withdrawal symptoms (Kripke, 2006; Gunja, 2013; Olfson, King, and Schoenbaum, 2015; Brandt and Leong, 2017),

their therapeutic effect outweighs their disadvantages, but only if they are properly prescribed. The known risks and side effects of hypnotics encourage the development of clinical practice guidelines in different countries, to help physicians to prescribe these drugs properly and to reduce the risk of dependence and abuse but this is not the case in Saudi Arabia.

2.7 Clinical Guidelines for Management of Insomnia

There are several clinical guidelines that are used for the management of insomnia in many countries. The main clinical guideline used in the United States, for example, is that provided by the American Academy of Sleep Medicine (AASM): *Clinical Guideline for the Evaluation and Management of Chronic Insomnia in Adults*. It provides a practical system to clinicians for the assessment and treatment of insomnia in adults using criteria based on evidence where available. It also contains consensus-based recommendations where evidence-based parameters do not exist (Schutte-Rodin et al., 2008). The guideline stipulates that the diagnosis of insomnia should be conducted through the International Classification of Sleep Disorders: Second Edition (ICSD-2) diagnosis criteria. The condition should be diagnosed primarily through the use of clinical evaluation. The goals of treatment should include the improvement of the quality of sleep and improvement of the daytime impairments that are related to insomnia (Schutte-Rodin et al., 2008).

According to the AASM criteria, insomnia is initially diagnosed by clinical evaluation through taking a thorough sleep history and details of any medical, substance, and psychiatric history (Schutte-Rodin et al., 2008). The guideline also recommends clinical reassessment every few weeks or months until the insomnia appears to have resolved or to be stable. The use of behavioural therapies as the first line treatment in the management of insomnia is also recommended (Schutte-Rodin et al., 2008). The recommended sequence for the use of medication is to start with the short-acting benzodiazepines or Z-drugs such as zolpidem and

zaleplon. The next type of drugs that can be used include the sedating antidepressants followed by a combination of benzodiazepines and antidepressants. It is also recommended not to use anti-histamines or anti-histamine analgesics for chronic insomnia (Schutte-Rodin et al., 2008). There is also the *Clinical Practice Guideline for the Pharmacologic Treatment of Chronic Insomnia in Adults* (Sateia et al., 2017). This meta-analysis focused on specific medications used to treat insomnia when pharmacological treatments should be considered. In all cases, this guideline should be used in conjunction with other AASM guidelines (Sateia et al., 2017).

Another set of clinical guidelines in the US has been provided by the American College of Physicians (ACP). They are based on the systematic review of randomized controlled trials conducted between 2004 and 2015, and target clinicians who manage patients presenting with chronic insomnia (Qaseem et al., 2016). These guidelines emphasize the use of CBT-I as a first line treatment and recommend the use of pharmacological treatment only when CBT-I is unsuccessful. The treatment decision should be taken by physicians in conjunction with patients accounting for benefits, harms and cost-effectiveness (Qaseem et al., 2016).

In the UK, clinical guidelines for the management of insomnia are provided by the National Institute for health and Care Excellence, and provide specific recommendations on the use of benzodiazepines and Z-drugs for the management of chronic insomnia (National Institute for Care Excellence, 2004; National Institute of Clinical Excellence, 2015). Another guideline was published by the British Association for Psychopharmacology which provided consensus statements on evidence-based treatment for insomnia, parasomnia, and circadian rhythm disorders (Wilson, Nutt, Alford et al., 2010). These guidelines shared features of other guidelines including the preferred length of prescription (2-4 weeks), non-pharmacological treatment prior to hypnotic prescription, use of the lowest cost drug, and a recommendation that new drugs are not given if the prescribed hypnotics are unsuccessful except if the patient

experiences adverse effects from a specific drug, and that physicians include a withdrawal plan for their patients (National Institute for Care Excellence, 2004; Wilson et al., 2010; National Institute of Clinical Excellence, 2015).

Another guideline, used by the Royal College of Physicians (Morgan, Kucharczyk, and Gregory, 2011), outlines stepwise management for chronic insomnia. The first step before beginning treatment entails making sure that the sleep issues meet severity and chronicity criteria. The next step is to resolve any comorbidity but this may not necessarily resolve insomnia (Morgan, Kucharczyk, and Gregory, 2011). Advice on sleep hygiene is then provided to ensure that behavioral problems associated with the loss of sleep are managed. Cognitive behavioral therapy for insomnia is the next step, then initiation of pharmacological treatment follows. The guidelines state that there is no compelling evidence that distinguishes Z-drugs from short-acting benzodiazepines, and for this reason, the drug with the lowest purchase cost should be given (Morgan, Kucharczyk, and Gregory, 2011).

In Saudi Arabia, The Saudi Centre for Evidence-Based Healthcare under the Ministry of Health is responsible for the creation of clinical guidelines for evidence-based practice across the country (The Saudi Center for Evidence Based Healthcare, 2015). At present, there are 22 Clinical Practice Guidelines (CPGs) in Saudi Arabia for the management and treatment of various disorders but nothing available related to sleep disorders or the use of hypnotics (see Appendix 1). Therefore, the need to develop consensus-based clinical practice guidelines for insomnia management and hypnotic use is paramount.

2.8 Adherence to Clinical Guidelines

Healthcare providers generally report high satisfaction with clinical guidelines in the management of insomnia (Farquhar, Kofa, and Slutsky, 2002). There are, though, concerns,

about their practicality across cultures, the possibility of litigation, and their part in restricting clinicians' autonomy. Despite the guidelines, the literature reveals that patient misuse of benzodiazepines and Z-drugs still occurs and that long-term hypnotic use is an issue, which suggests that many physicians are not adhering to guidelines (Siriwardena et al., 2008; Singh and Bhardwaj, 2010; Kapil et al., 2014; Cadogan and Ryder, 2015).

Saudi Arabia has no national clinical guidelines for using benzodiazepines and Z-drugs to treat insomnia. There is no knowledge about the perceptions and attitudes of Saudi physicians towards using international guidelines. In some cases, social, cultural and religious differences might affect and even determine physicians' behaviours and practices. It is, therefore, important to understand knowledge, perceptions and attitudes before developing country-specific guidelines for using benzodiazepines and Z-drugs to manage insomnia.

2.9 Knowledge, experiences and perceptions of patients on using hypnotics

Patients with insomnia often ignore their sleep difficulties or wait to see how the condition progresses. While this suggests a reluctance by patients to make changes in their behaviour (Sandberg, Suerken, Quandt et al., 2014), conducting more studies to examine the experiences and attitudes of patients about insomnia or their understanding of its treatment will support appropriate prescribing (Sirdifield, Anthierens, Creupelandt et al., 2013).

A Swedish qualitative focus-group study of patients who received a nurse-led treatment program for insomnia revealed that patients' knowledge of insomnia is an essential component of effective treatment (Sandlund, Kane, Ekstedt et al., 2018). Better knowledge changed behaviour, expelled negative attitudes about sleep problems and improved sleeping patterns (Sandlund et al., 2018).

In the United States, however, many patients with sleep disorders report using household remedies (food and drink), relaxing in bed, praying, foregoing activity or using over-the-counter medications to alleviate insomnia (Sandberg et al., 2014). Although a survey of two groups (those living with insomnia and good sleepers) revealed that people with insomnia know more about sleep hygiene than others (Lacks and Rotert, 1986), an online survey in Romania revealed that patients were poorly informed about the importance of sleep hygiene—despite recent campaigns about sleep quality (Voinescu and Szentagotai-Tatar, 2015). In the United Kingdom and other countries, there is also a lack of knowledge about the availability of cognitive behavioural therapy for insomnia (CBT-I), leading to unnecessary use of hypnotics (Anderson, 2018).

A systematic review of studies in Europe, the U.S., Australia and New Zealand found a lack of knowledge and concern among patients about the long-term use and side effects of hypnotics (Sirdifield et al., 2013). Most patients using benzodiazepines and Z-drugs admitted to taking them habitually without trying to fall asleep naturally. What is more, the psychological dependence, denial or lack of knowledge about side effects perpetuates their use (Mokhar, Kuhn, Topp et al., 2019).

Previous studies have similarly noted the belief of patients in the efficacy and safety of benzodiazepines. A cross-sectional study in Germany highlighted attitudes to benzodiazepines, including the perception that the use of the drugs is vital especially for long-term users (Mokhar, Tillenburg, Dirmaier et al., 2018), A qualitative study in Zurich, identifying the beliefs of patients about the safety of high-dose benzodiazepines, concluded that patients considered them less dangerous than other substances (Liebrenz, Schneider, Buadze et al., 2015). The most common reasons for taking benzodiazepines were to manage symptoms of physical, psychological or substance use that resulted in insomnia. Recreational reasons, such

as ‘enhancing or alleviating the effects of other psychotropic substances, reducing withdrawal symptoms or seeking a euphoric effect by using high doses’ (p. 2), were also acknowledged (Liebrenz et al., 2015). Benzodiazepines are also used for reducing withdrawal symptoms from alcohol and cocaine (Liebrenz et al., 2015).

Little has been reported about the experiences of patients using Z-drugs, either alone or in combination with benzodiazepines. Despite recent public information leaflets and media reports in many countries about the side effects of benzodiazepines, such as confusion, vision problems and depression, many patients believe that Z-drugs are a better option (Agravat, 2018). In their view, they are safer than benzodiazepines in the management of insomnia, a view not supported by clinical evidence (Agravat, 2018). Even though benzodiazepines and Z-drugs have been associated with adverse psychomotor and cognitive effects, as well as daytime somnolence (Pollmann, Murphy, Bergman et al., 2015), patients often considered them safe because their doctors prescribed them (Sirdifield et al., 2013).

While CBT-I is recommended by many clinical guidelines as initial therapy for insomnia (Schutte-Rodin et al., 2008; Morgan, Kucharczyk, and Gregory, 2011; Qaseem et al., 2016), there are very few studies about patients’ perceptions of this method of treating insomnia. In Australia, a recent qualitative semi-structured interview study found that patients had generally favourable opinions of CBT-I and preferred face-to-face CBT-I over electronic CBT-I (Cheung, Bartlett, Armour et al., 2019). Before physicians recommend CBT-I, however, it is important to assess the patient’s commitment to the treatment and to determine whether he or she will adhere to the treatment regimen (Matthews et al., 2013), which is time-consuming. Without such determination, however, CBT-I is rarely effective—although it carries none of the risks associated with pharmacological remedies.

According to a systematic review by Sirdifield et al. (2017), patients know little about the risks of pharmacological remedies, particularly the risks associated with the prolonged use of hypnotics. Seldom informed of the side effects and potential risks of benzodiazepines and Z-drugs, most patients do not know what to do when drug use extends past the recommended period (Sirdifield, Chipchase, Owen et al., 2017). Researchers have also found that many physicians prescribe benzodiazepines and Z-drugs without fully discussing their side effects with patients (Brown and Bussell, 2011; Makoul, Arntson, and Schofield, 1995; Sirdifield et al., 2013). Some patients reported that they were prescribed these drugs for years and then suddenly urged to stop using them without explanation. For many patients, being excluded from the decision-making process leads to suboptimal treatment outcomes and adverse drug events.

For their part, many doctors report difficulties in discussing such treatments with their patients (Sirdifield et al., 2013), particularly when explaining the short- and long-term consequences of using benzodiazepines and Z-drugs. Complex drug interactions and side effects are not easily explained to patients who may leave the consultation room more confused than they were initially. Mokhar et al. (2019) revealed that some patients do not consider the risks and side effects of hypnotic drugs at all. Other patients demand prescriptions for benzodiazepines or Z-drugs without knowing—or wanting to know—about possible harm (Mokhar et al., 2019). In a Swiss study, most patients said that they gave little thought to the drugs' side effects (Liebrenz et al., 2015), which partly explains why, although benzodiazepines are prescription-only medicines, patients sometimes buy them from drug stores without prescriptions, borrow them from friends or forge prescriptions (Liebrenz et al., 2015). Some even share hypnotic medications with their spouses (Sirdifield et al., 2013).

In Saudi Arabia, the prevalence of insomnia is 33-78% (Ahmed, Al-Jahdali, AlALwan, et al., 2017; Ahmed, Al-Jahdali, Fatani, et al., 2017), much higher than in many countries, where it is generally about 23-56% of the population (Ohayon, 1996; Sutton, Moldofsky, and Badley, 2001; Leger and Poursain, 2005; Cho, Shin, Yun et al., 2009; Ohayon and Bader, 2010; Wong and Fielding, 2011; Leger et al., 2008; Roth, 2007). Although there are no figures for the prevalence of primary insomnia in Saudi Arabia, other countries report it to be about 6% of all insomnia (Ohayon, 2002; M. Ohayon, Caulet, and Guilleminault, 1997; Roth, 2007; Ohayon, 1997).

In many ways, treating insomnia in Saudi Arabia is more complicated than in other countries, because there are no country-specific guidelines. Despite the prevalence of chronic primary insomnia and other sleep disorders in Saudi Arabia, no study has explored the patients' knowledge of the condition and its treatment. The views of those who take the medicines—the patients themselves— are seldom considered during decisions making. This is an area in our understanding of treatment modalities that needs investigation, so I propose to undertake a survey to explore the patients' knowledge, experience and perceptions of hypnotics for managing primary insomnia in Saudi Arabia.

2.10 Conclusion

Despite the high prevalence of chronic primary insomnia and other sleep disorders, the conditions are often under-diagnosed and under-treated in Saudi Arabia. Whether treated or not, it is clear that insomnia can lead to consequences that affect a person's overall quality of life. Prompt treatment, either with CBT-I or hypnotic medications, is a necessary first step for helping patients with insomnia. The drugs most often used, benzodiazepines and Z-drugs, are known to be effective first-line pharmacological treatments but they can have significant adverse effects, particularly with long-term use. For this reason, physicians should follow

evidence-based guidelines, whether international or domestic, to safeguard patients. Saudi Arabia currently lacks guidelines of its own for using benzodiazepines and Z-drugs for managing chronic primary insomnia, leaving physicians with a choice of following international guidelines or none at all. Research need to document current practice, and understand the attitudes and opinions of Saudi physicians, not only to the use of international guidelines but also to the need for developing country specific guidelines. How, when and whether to use benzodiazepines and Z-drugs for treating chronic primary insomnia is now an urgent clinical issue in Saudi Arabia.

This chapter has provided a rationale for the project via a review of the literature surrounding the prevalence of insomnia, the prescribing of hypnotics, their misuse, their long-term use, the risks and adverse effects of hypnotics, clinical guidelines for managing insomnia, adherence to guidelines and knowledge, experiences and perceptions of patients on using hypnotics**.** The following chapter will detail the theoretical framework, design, research methodologies and methods used in this project.

CHAPTER THREE

3 Research context and methodology

The purpose of this chapter is to explain the context and methodologies used in this thesis. It is important to explain the theoretical framework upon which the project is based and to offer a justification for it. In addition, the research design and methods used to answer the research questions and fulfil the research aims and objectives will be described. The chapter also considers the results from pilot studies that tested the practicality and suitability of the project's methods. Analysis of both quantitative and qualitative data and ethical considerations are presented. Finally, techniques used to increase the reliability, validity and rigour/trustworthiness (credibility, transferability, dependability, confirmability, and reflexivity) of this research are discussed.

3.1 Theoretical framework

The thesis's theoretical framework provides a set of justifications for the research methods used. The philosophical assumptions upon which the methodology is based and the views of the researcher on epistemology and ontology related to this thesis are presented (Creswell, Plano Clark, Gutmann et al., 2003; Bryman, 2012). Practically, the theoretical framework influenced the project design, setting, the collection of data for analysis, and the interpretation of findings (Gerhard, 2008).

3.2 Epistemology and ontology

Epistemology investigates the difference between what we know and what we believe. More practically, it concerns what we know about the social world, providing a philosophical ground for what it means to know. There are various epistemological positions, including *objectivism*,

which assumes that all knowledge is 'out there' and that it needs only to be discovered; *constructionism*, which discards *objectivism*, seeing social interactions between subject and object as a source of knowledge; and *subjectivism* which sees knowledge as an attribute imposed on the objects we perceive (Crotty, 1998; Hofer and Pintrich, 2012).

Ontology, on the other hand, is concerned with whether the social world is external to us or exists as a construct of perception (Bryman, 2012). According to some researchers (Bryman, 2012), ontological positions can be either objectivist (social factors have no influence on social phenomena and their meaning) or constructivist (social factors construct social phenomena and their meaning). Ontology asks: Is there a physical reality that exists independently of our perceiving it? This thesis adopts *constructionism* as its theoretical framework as social factors and views are constructing participants' knowledge and influencing their practices. Where a theoretical framework is interpreted epistemologically (Creswell et al., 2003), it is usually referred to as a paradigm, a set of concepts, beliefs, postulates, and research methods that constitute a legitimate contribution to the area of study.

3.3 Theoretical Paradigms

Theoretical paradigms consist of a set of practices and beliefs shared by different researchers and are used to regulate inquiry within different disciplines (Bunniss and Kelly, 2010). There are different paradigms which are characterized by epistemological, ontological and methodological differences in the approaches that they take in conceptualizing and conducting research. They also differ in the contribution that they have towards the disciplinary construction of knowledge (Bunniss and Kelly, 2010). Theoretical paradigms include such schools of thought as positivism, post-positivism, constructivism, interpretivism, transformative, pragmatism, and deconstructivism (Crotty, 1998; Mackenzie and Knipe, 2006; Creswell, 2009; Bowling, 2014). Briefly, positivism, which is essentially deduction, considers

quantitative methods the most reliable methods for empirical research and relies principally on experimental observation to test hypotheses. Constructivism and interpretivism, on the other hand, are inductive approaches, using qualitative methods to yield results; they are based on the belief that reality is a construct of experience. The transformative paradigm contradicts the aforementioned paradigms, reveals what is hidden in research among a variety of populations and uses mixed methodologies to collect and assess data to gain multiple viewpoints regarding the research problem. Finally, pragmatism uses multiple approaches and concentrates on the research problem, actions and situations by using both qualitative and quantitative methods (Crotty, 1998; Mackenzie and Knipe, 2006; Creswell, 2009; Bowling, 2014).

The framework of this thesis was developed taking into consideration the ability to investigate the research problem. This project uses both quantitative and qualitative methods to formulate a framework to answer the research questions and achieve the aim and objectives (Crotty, 1998; Mackenzie and Knipe, 2006; Creswell, 2009; Bowling, 2014). More specifically, it uses mixed methods to address a gap in the literature concerning the prescribing patterns of physicians in Saudi Arabia for treating insomnia using benzodiazepines and Z-drugs and to understand patients' knowledge, experiences and perceptions of using these medicines. Although a few studies have looked at the use of benzodiazepines for treating psychiatric disorders (Al Ghamdy, Qureshi, Abdel Ghadir et al., 1999; Qureshi, Al-Ghamdy, Al-Haddad et al., 2001), none has considered their use for treating primary insomnia. Indeed, there are no national guidelines in Saudi Arabia for using these drugs to treat chronic insomnia.

To address this limitation and close the gap in the literature, the thesis uses a pragmatic paradigm involving a mixed methods approach (Creswell, 2009). To this end, a quantitative study (audit) was retrospectively conducted using the medical records of patients treated for primary insomnia at King Fahd Central Hospital in Jazan, Saudi Arabia. The audit was

exploratory in nature and aimed to identify the current prescribing practices in Saudi Arabia and the extent of their compliance with US guidelines. Then a qualitative approach, which was exploratory and explanatory in nature, involving in-depth interviews with prescribers, was conducted to complement the quantitative study by providing more information about the practitioners' prescribing behaviour and to explore their knowledge, perceptions, and attitudes towards using international guidelines. This data was expected to highlight the need for developing specific national guidelines for treating primary insomnia in Saudi Arabia. Consequently, these studies were followed by an e-Delphi study to obtain consensus statements required for the development of clinical guidelines for the use of benzodiazepines and Z-drugs for the management of primary insomnia in adults in Saudi Arabia. Finally, a cross-sectional survey of patients who have primary insomnia in Saudi Arabia was conducted to understand their perspectives toward using hypnotics for primary insomnia to be taken into consideration when developing the country specific guidelines.

The framework of the thesis is pragmatic. It adopts a mixed methods approach with the aim of investigating the research problem. Pragmatism is best suited to underpin mixed methods research because it is based on a problem-oriented philosophy that employs methods that are most effective in answering the research questions (Rallis and Rossman, 2003). Pragmatism can serve as a programme for philosophy in social research regardless of whether the research uses quantitative, qualitative or mixed methods. This is because it replaces the older approaches of the philosophy of knowledge which understood research in terms of epistemology, ontology, and methodology (Morgan, 2014). A pragmatic approach demonstrates its value by showing the immediate practicality of issues such as the design of the study and treats differences in research methods as social contexts for inquiry rather than as abstract systems of philosophy (Morgan, 2014). In other words, pragmatism offers an alternative epistemological paradigm

since knowledge is constructed from practical action and outcomes. Figure 1 shows the research design for this project.

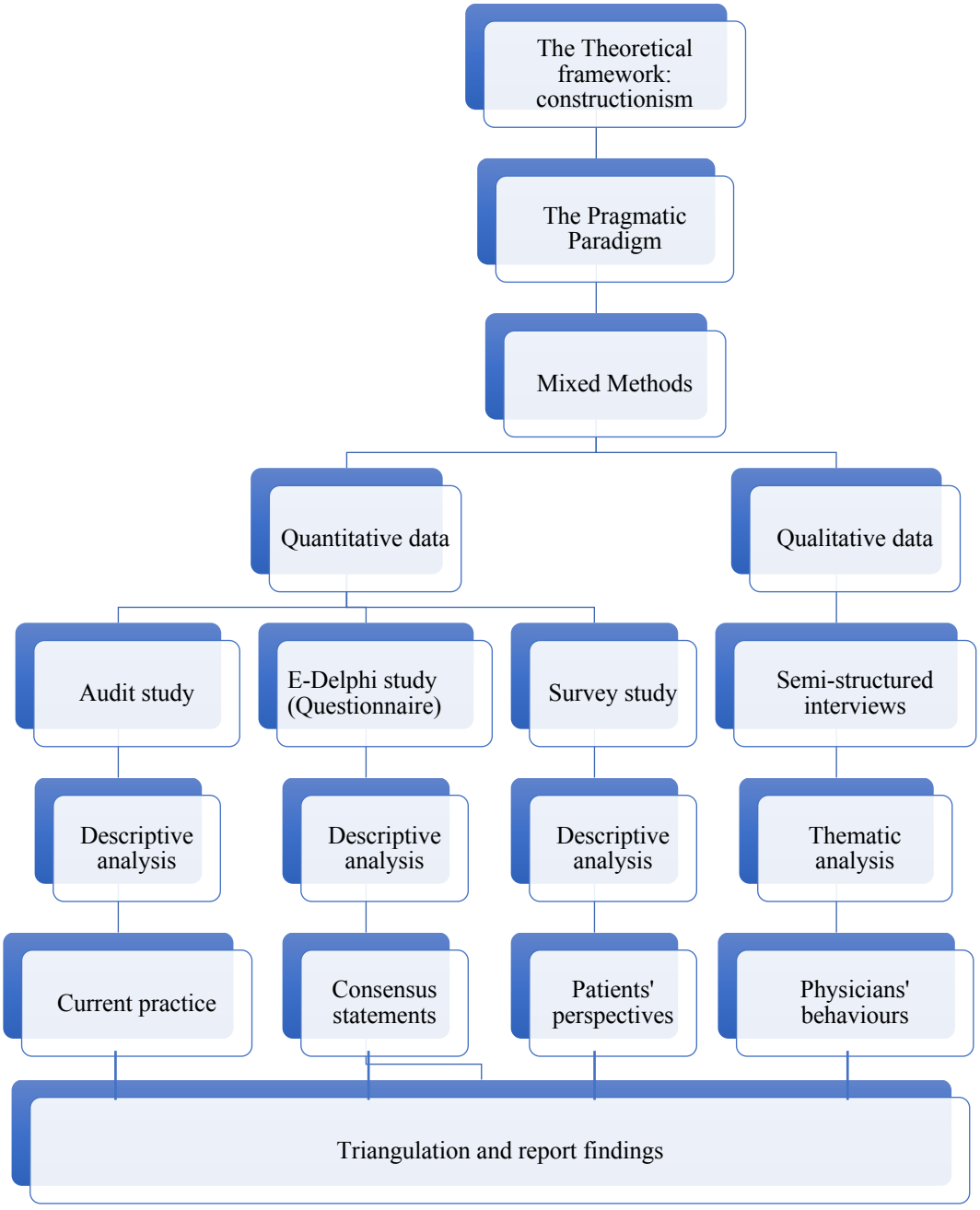

Figure 1: Research design

3.4 Mixed Methods Approach

Mixed methods research collects, analyses and integrates quantitative and qualitative data, to provide a better understanding of a research problem than can be achieved by either quantitative or qualitative methods alone (Morse, 2016). It is suitable for use when there is a need to validate results obtained from different methods and when one method is being used to inform another (Zohrabi, 2013). While quantitative research collects close-ended information by measuring such things as behaviour, attitudes, and performance, qualitative research collects open-ended information using observations, interviews and focus groups (Morse, 2016). Although mixed methods are suitable when the researcher needs to validate results from various sources, such methods are not without their critics. Researchers recommend the use of mixed methods when there is a need to clarify unexpected findings and potential contradictions or when there is a need to consider a research question from a different perspective (Terrell, 2012).

The use of mixed methods research confers several other advantages, offsetting weaknesses of both quantitative and qualitative research when used alone (Terrell, 2012). Quantitative research is weak if used to understand the setting of how people behave, and qualitative research makes up for this. On the other hand, the qualitative researcher might generalize his or her findings without sufficient cause, a tendency not associated with quantitative research. Another advantage of mixed methods research is that it provides a more comprehensive understanding of the research problem and helps to explain the findings of how causal processes work (Morse, 2016).

Some scholars are concerned about combining methods based on different philosophical assumptions (i.e., positivist and realist) and within the theoretical framework of a single thesis (Smith, 1999). Furthermore, the mixed methods approach

is a relatively new methodology and therefore any verdict about its general utility is still debated (Creswell and Clark, 2011). Mixed methods research also has a wide range of designs, which might confuse unfamiliar researchers when they want to select an ideal design for their study (Leech and Onwuegbuzie, 2009). Previous mixed methods studies are also difficult to locate in the literature because the term 'mixed methods' has only been recently included in titles, abstracts, and keywords (Creswell and Clark, 2011). In addition, such studies can require greater skill and knowledge of a project's qualitative and quantitative components, needing greater time, resources, and more researchers than qualitative or quantitative studies conducted alone (Doyle, Brady, and Byrne, 2009; Creswell and Clark, 2011; Hadi, Alldred, Closs et al., 2014).

For this research, the mixed methods design was chosen because it enabled the researcher to collect a variety of data on a particular situation from different perspectives, a technique known as triangulation, and to synthesize the findings into a body of knowledge with practical recommendations. The researcher gathered data on current practices for using hypnotics to manage insomnia, explored physicians' knowledge and attitudes toward using international guidelines to identify the need for developing country specific guidelines, obtained consensus statements that can be used for the development of clinical guidelines for using benzodiazepines and Z-drugs for managing primary insomnia and explored patients' knowledge, experiences and perceptions of using hypnotics to be considered when developing country specific guidelines. This mixed methods project consisted of four studies conducted to investigate the prescribing patterns of benzodiazepines and Z-drugs for treating insomnia in Saudi Arabia and developing country specific guidelines. For this project, a retrospective audit was used in the first phase, the second phase used a qualitative interview, and the third phase was an e-Delphi study, and a cross-sectional survey was

used for the fourth phase.

3.5 Ethical considerations

For all studies, ethical guidance (approval number 17/15) was obtained from the University of Reading Ethics Committee (UREC), Appendix (2 A, B &C), and from the Research Ethics Committee (REC) at the General Directorate of Jazan Health Affairs, Ministry Of Health (MOH), KSA, Appendix (3A &B). Further details about the project's ethical considerations are provided in Chapter 4, 5,6, and 7.

Many audits, perhaps most, do not require ethical approval, however, because this audit is part of the requirements for a PhD qualification at the University of Reading, ethical approval was obtained from the UREC. Furthermore, because of the nature of the patient cases involved in this study, the sensitive issue of drug use in Saudi Arabia, and because the interviews were conducted at a hospital in Jazan, Saudi Arabia, further ethical approval was sought from the Research Ethics Committee of the General Directorate of Health Affairs (Jazan), Ministry of Health, Saudi Arabia.

During the project, all patient records and personal information were anonymised and all protocols of patient confidentiality strictly observed. A locked office was used by the researcher for storing data and the researcher's password-protected laptop. Any information saved on external drives such a USB drive was encrypted. Information was accessed only by the researcher and his supervisors. According to the University's regulations, the data will be kept for up to five years, after which it will be destroyed.

3.6 Validity and reliability

Audit study

One way to enhance the reliability and validity of audit findings is to ensure that standards are rigorously developed. In addition, using a mixed methods approach helps maintain the reliability and validity of the results because of alternate forms of gathering data and evaluating data (Creswell et al., 2003). In this study, the standards/criteria were developed and incorporated using US guidelines, which means that the criteria had already been validated. The data collection tool was checked by a clinical audit expert (Dr. Daniel Grant) and the researcher's supervisors before the study began.

Data reliability can be improved by training the researcher in data collection (Morrell and Harvey, 1999). In this case, the researcher had prior training by medical record technicians at KFCH on how to use such records and how to collect the required data. The data collection tool was piloted using 10 medical records to check its suitability for the required information.

Using a mixed methods research design helped to ensure the validity of the retrospective audit study since the data collected from the former could be confirmed using physician interviews in the second phase and questionnaires in the third and fourth phases of data gathering. Physicians' practices could be verified through the interviews, the first-round e-Delphi questionnaire and the survey study with patients who discussed their experiences with prescribed hypnotics. The reliability of the findings was addressed by following a structured and documented process of data collection and analysis, a technique known as creating an audit trail. Their validity was

addressed by having multiple researchers inspect the data collected at the different stages.

E-Delphi study

In Delphi studies, it is by no means clear how validity and reliability should be established (Keeney, McKenna, and Hasson, 2010). Even though the Delphi method might overlap both positivist/quantitative and interpretive/qualitative data (Day and Bobeva, 2005), some researchers tend to disregard positivist standards to measure rigour and instead adopt strategies that are used by qualitative researchers to ensure credibility (Krefting, 1991). It is believed that the term 'trustworthiness' is more convenient than reliability and validity to measure the effectiveness and appropriateness of a Delphi study (Day and Bobeva, 2005).

Patients' survey

The questionnaire was validated by three people who are experts in the field of either sleep medicine or questionnaire methodology. They were provided with the aim and objectives of the study and asked a) if the questionnaire will address these, and b) if the responses to the questions are likely to provide the required information (Heale and Twycross, 2015; Murphy, Staffileno, and Foreman, 2018; Taherdoost, 2016; Tsang, Royse, and Terkawi, 2017). In addition, they were asked to review all of the questionnaire items for readability, clarity and comprehensiveness (Taherdoost, 2016). This method of content validation has been chosen because it was important to ensure that each of the items on the questionnaire is representative of the desired information (i.e. knowledge, experiences and perceptions of patients). We were not comparing the questionnaire results with results of a known criterion measure or with results of another

questionnaire which has already been validated because none have been found to exist (Murphy, Staffileno, and Foreman, 2018).

The reliability of the questionnaire was checked using the test-retest method, which enabled me to ensure that same results are obtained when used consecutively for two or more times (Taherdoost, 2016; Tsang, Royse, and Terkawi, 2017; Murphy, Staffileno, and Foreman, 2018; Heale and Twycross, 2015). Professor Ahmed BaHammam, Director of the King Saud University Sleep Centre in Saudi Arabia, was asked to present the questionnaire to 10 people in Saudi Arabia who are using sleep medicines. They were asked to complete the questionnaire and then one week later they were asked to complete it again (Taherdoost, 2016; Tsang, Royse, and Terkawi, 2017; Murphy, Staffileno, and Foreman, 2018; Heale and Twycross, 2015). Respondents were asked to add their email addresses when testing ensuring reliability when making comparisons between answers, then this item was removed from the main survey. The responses were checked item by item to see if they were the same. A consistency of 70-90% per question would have considered as highly reliable, 50-70% moderate and 50% or below would have reflected low reliability (Taherdoost, 2016). Any questions with reliability of 50% or less would have rejected and questions with reliability between 50 and 70% would have rephrased and tested again. All 10 people were consistent in their answers apart from one person who changed one answer from (definitely agree) to (agree) and another who added three choices instead of two to a question. These differences were not considered to make a difference to the analysis by the research team, so the questionnaire was deemed reliable.

Translation and validation of the Arabic versions of the questionnaires

Two senior bilingual speakers independently translated the questionnaire from the English version into Arabic. They met, discussed differences and agreed the Arabic translation. The Arabic draft then was back-translated into English by two other bilingual speakers, who had no knowledge of the original English version of the questionnaire (Tsang, Royse, and Terkawi, 2017). Doing this ensured that the questionnaire was properly translated into both English and Arabic. In collaboration with the translators, the translations were reviewed by the research team to assess the back-translations for equivalence with the original English version. Discrepancies between the two versions of translation were discussed by the research team and resolved to produce the final Arabic version (Tsang, Royse, and Terkawi, 2017) (see Appendix 4 for a diagram of the process).

3.7 Trustworthiness: Credibility, transferability, dependability, confirmability, and reflexivity

Credibility, transferability, dependability, and confirmability are the quality criteria considered for all qualitative research. Furthermore, reflexivity is an essential part to guarantee the transparency and quality of the research (Korstjens and Moser, 2018). Credibility can be considered as the equivalent of internal validity used for measuring quality in quantitative research and is concerned with truth-values. There are different strategies that can be used to ensure credibility: 1) prolonged engagement 2) persistent observation 3) triangulation 4) member check (Korstjens and Moser, 2018). Transferability means the extent to which the findings of qualitative research can be transferred to other contexts or settings with different respondents. “The researcher facilitates the transferability judgment by a potential user through ‘thick description’”

(Korstjens and Moser, 2018). While 'dependability' includes consistency (Korstjens and Moser, 2018), which ensures that the analysis process aligns with accepted design standards. 'Confirmability' concerns neutrality (Korstjens and Moser, 2018), which secures the inter-subjectivity of the data so that any interpretations are not based on personal perspectives but rather originated from the data. In this case, the interpretation process embedded in the analysis was the focus of the researcher. Audit trail is the common strategy used to ensure dependability and confirmability (Korstjens and Moser, 2018). It is important for the qualitative researcher to be reflexive and self-aware about his/her role during the process of data collection, analysis and interpretation, and any pre-conceived assumptions that he or she brings to the research (Korstjens and Moser, 2018). Therefore, qualitative method discussions and all analytical data should be accompanied by reflexive notes (Korstjens and Moser, 2018).

Interview study

Within the interview study, credibility was guaranteed by triangulating the information with findings from the first phase (the audit) since participants talked about their practices and then were told about the findings of Phase 1 and could reflect upon them. A second way to ensure credibility is member check, which involves feeding data, analytical themes, interpretations and conclusions back to some of the participants in the study. This increases the strength of the data as researchers and respondents can look at the data with different perspectives (Korstjens and Moser, 2018). Although they were permitted to, no participants requested a copy of the transcript, the analytical categories or data interpretations. In fact, findings from Phase 1 and 2 were fed back to a panel of experts in Phase 3 when they were incorporated and used to construct the Round 1 e-Delphi questionnaire. What is more, prolonged engagement was used to

enhance credibility. Participants were encouraged to give examples to support their statements, after which the interviewer probed their responses with follow-up questions.

Transferability is guaranteed by providing details of the study design process, data collection and analysis, to ensure that readers can decide if findings are applicable to other contexts and settings. In addition, the study was conducted in a hospital belonging to the Ministry of Health, which reflects practices for more than 60% of the population country-wide. This enhances the transferability of findings to similar settings.

Dependability and confirmability were enhanced by keeping an audit trail, affirmed by co-authors this to confirm the believability of the results and to ensure that the data supports the findings. In addition, this study was written in the form of manuscript based on the COREQ (COnsolidated criteria for REporting Qualitative research) Checklist and submitted for publication (Tong, Sainsbury, and Craig, 2007). This process enhanced confirmability.

Interview notes for this study described the setting in detail and any manifestations, such as surprise, laughter or gesticulations, that were observed during conduction and/or while transcribing and analysing the data, were noted to affirm reflexivity.

E-Delphi study

The credibility of the e-Delphi study was guaranteed by the continuing iteration and feedback provided to the panellists, which is known as a member checks strategy (Engels and Kennedy, 2007; Korstjens and Moser, 2018). Transferability was established through the use of confirmation of the applicability of the study findings (Kennedy, 2004). For this study, a consensus was achieved for most of the

recommendations with a significant agreement between rounds. Maintaining a detailed description of the data collection and analysis process was used to gauge confirmability.

In general, in a Delphi study, using of an audit trail is considered to be the key theoretical and methodological decision made to justify trustworthiness (Skulmoski, Hartman, and Krahn, 2007). Researchers therefore, are regularly recommended to use journals dedicated to capturing this information. Thus, methodological rigor can contribute to a successful Delphi study, either qualitative or quantitative (Skulmoski, Hartman, and Krahn, 2007). This study was written rigorously, in accordance with guidance on conducting and reporting Delphi studies and sent to an appropriate journal for publication.

3.8 Project Phases

3.8.1 Phase One: Audit Study

A clinical audit attempts to improve patient care by using a systematic review using explicit criteria applicable to the study area (National Institute for Care Excellence, 2002). The purpose is to provide quality improvements to benefit patient healthcare. Clinical audits can investigate care nationwide (national clinical audits) or in local trusts, hospitals or General practices at any healthcare setting (National Institute for Care Excellence, 2002). Such data can be reviewed to produce both audit and research outcomes.

Healthcare quality has advanced to being an unconditional prerequisite with a critical role in healthcare delivery, and audits are one of the most important aspects of quality healthcare assurance. There are, however, several misconceptions about the applicability and limitations of audits compared to clinical research (Gould, 2008). The

existing literature has attempted to distinguish between the two by identifying similarities and differences. For example, the definition of research is a careful search; investigation; systematic investigation towards increasing the stock of knowledge. On the other hand, Russel and Wilson (1992) describe an audit as a "systematic, critical analysis of the quality of medical care, including the procedures used for diagnosis and treatment, the use of resources and the resulting outcome for the patient" (Russell and Wilson, 1992).

Standards of practice form a link between an audit and research. While research aims to define good practice, audits assess the extent of good practice adoption. Essentially, both processes start with a question whose answer is expected to change clinical practice for the better (Twycross and Shorten, 2014). Furthermore, because they both entail formal data collection and the use of appropriate and systematic methods and designs to reach comprehensive conclusions (Wade, 2005), it is often difficult to distinguish between them (Wade, 2005). Accordingly, the standards of an audit with regards to the collection and analysis of data, as well as design, should be as high or higher as those expected for research (Wade, 2005). This is because an audit leads more frequently than research does to changes in practice (Wade, 2005).

Notably, the language of audits and research is the same, differing only in syntax. An audit entails making comparisons, noting differences, assessing protocols, and recording findings. Researchers do the same but not at the same level of resolution (Smith, 1992). Research is applicable to audits and audits often contribute to research (Smith, 1992). The principal contributions of an audit are to raise questions that must be addressed by research and to provide data that might be helpful to researchers. As such, audits and research are closely related and function best together (Smith, 1992).

They are both invaluable as quality assessment approaches and should be treated as equivalents and complementary for improvements in healthcare (Smith, 1992).

The belief by some that audits are not research originated in the choice of what comprises ethical research. In most cases, audits do not require ethical approval by ethics committees (Wade, 2005). In the context of ethical reviews, researchers evaluate what research should include and exclude under ethical procedures. In addition, in countries such as the US and the UK, the way that an audit is not viewed as research deserving ethical endorsement does not imply that it is not considered by the ethics committees of other nations. According to Wade (2005), research and audits cannot be distinguished reliably or validly and that the primary distinction of the two is essentially bureaucratic. Over time, various confounding bases have been used to differentiate these two approaches. Besides the issue of ethical approval, it has been argued that whereas research aims to determine what should be done, the audit centers on comparing current practice with a predetermined standard (Wade, 2005).

Because there is no published data on how hypnotics are currently prescribed, it was imperative to conduct an audit study of patients' medical records to assess current clinical practice in Saudi Arabia and compare it with US guidelines.

This researcher believes that an audit is a valid way to investigate the prescribing patterns of hypnotics to treat primary insomnia in Saudi Arabia. It contributes new information, closes a knowledge gap, and thus improves the practice of sleep medicine. This study shows that anecdotal evidence about poor practice with respect to hypnotics-use in Saudi Arabia was authentic and contributes to our understanding of how, when and why Saudi physicians prescribe benzodiazepines and Z-drugs for patients with insomnia and in turn its findings underpin the whole thesis.

3.8.1.1 Aim

The study aim was to gather data about the current clinical use of benzodiazepines and Z-drugs in the management of primary insomnia through an audit of medical records at KFCH in Jazan and to assess if they follow US guidelines. This aim is addressed in Chapter 4.

3.8.1.2 Study Design

Two approaches can be used for an audit: (1) prospective observation of data or (2) using retrospective data collection. Prospective studies are observational in nature. They have the advantage of creating a relationship between observed variables and any results generated (Koop and Strang, 2002). The prospective approach looks at data which is collected over time, beginning when the study starts. No data is available before the study is started. The researcher, therefore, exposes study participants to the risk of intervention. For example, randomized controlled trials are always prospective; case-control studies are not (Smith, 2002). A retrospective study is used when a prospective study is not applicable (Koop and Strang, 2002). Data in such a study becomes available when the study commences.

Sources used for a retrospective study often include administrative records, medical databases, and interviews with patients who have been diagnosed with a condition/disease (Weinger, Slagle, Jain et al., 2003). The documented information in such studies is assumed to be correct although it may be incomplete. Table 1 shows the advantages of a retrospective study versus a prospective study.

Table 1: The advantages of a retrospective study versus a prospective study.

Minimum or no intervention with human participants
No consent by participants
A larger number of subjects can be selected
Duration of data collection is relatively short
Relatively less expensive than prospective studies

Research procedures can, of course, affect the choice of study, whether prospective or retrospective (Beckmann, Bohringer, Carless et al., 2003). Within this study, the retrospective approach was chosen for several reasons. Data was readily available in medical records, including diagnosis, treatment, prescriptions, dosage duration, and counselling. A prospective study would have risked having missing data, which might have resulted from partial documentation, lost charts and/or unrecoverable/unrecorded data (Dworkin, 1987; Hess, 2004). This, in turn, might have affected the accuracy of identifying the criteria that were set, especially when the work was to be undertaken by one researcher. A prospective audit would also have taken a lot longer than a retrospective audit and, since this work was part of a PhD thesis, the researcher did not have the luxury of unbounded time.

A retrospective audit, then, was the best approach for this type of study. Because the data was already available, there was no need to pay for resources, staff or facility access. Furthermore, complex factors for adult patients with insomnia might have made it difficult to use a prospective observational design. Patients with multiple diseases or who felt stigmatized by their condition might prefer not to be known by anyone other than their doctors. Even so, for this study to succeed, there were a few methodological barriers that needed to be surmounted (Beckmann et al., 2003). These included:

- Understanding the design of the existing medical/health records.

- Lack of control over data quality in relation to information accuracy obtained through medical records; i.e., incorrect/incomplete data.
- Weighing information obtained through emergency notes, diagnostic data, counselling, and discharge notes.
- Examining information to avoid vital missing data.
- Accounting for time as a critical factor since the data was already completed in the past but its collection was in the future.

Thus, the present study, conducted at King Fahd Central Hospital, Jazan, Saudi Arabia, adopted a retrospective design for the audit, using 504 medical records collected over three months and covering a five years period.

3.8.1.3 Study Settings

King Fahd Central Hospital is a 500-bed tertiary hospital in the city of Jazan, Saudi Arabia. The hospital serves 20 other hospitals with a regional population of approximately 1.5 million. A tertiary hospital provides specialized care and highly advanced procedures performed by medical specialists. Such facilities usually deal with patients referred from primary or secondary care physicians. The present study used the MedicaPlus electronic information system, which has been in use at KFCH since 2009. Connecting different hospital departments, the system contains all patient data pertaining to diagnoses, treatments and prescribed medications.

3.8.1.4 Study Sample

The retrospective medical record audit used 504 medical records at KFCH for the period between April 2012 and March 2017. The sample size calculation was advised by the Statistical Service Centre, Advisory Team, University of Reading.

Sample size justification: To estimate the percentage of compliance concerning the criteria for this study, a sample size of 271 resulted in a margin of error of 5% or less, with 95% confidence. To allow for the possibility of incomplete records the sample was increased to 300. To speak of a 95% confidence level is to mean a range that has a 95% chance of containing the true percentage of compliance. When the researcher performed an electronic search, 517 records were found to be appropriate for the dataset collection process. There were 13 medical records excluded because of missing data. The researcher decided to use all of the available data (504 records) for the defined period, meaning that this was all data rather than a sample.

3.8.1.5 Recruitment

The researcher selected the sample according to the study's criteria (see Table 1, Chapter 4) for those patients who had used benzodiazepine or Z-drugs for insomnia or had been diagnosed and treated for primary insomnia at KFCH during the defined period. Further details are available in Chapter 4.

3.8.1.6 Data Collection

The audit criteria were developed based on the AASM and ACP clinical guidelines. These are the most commonly used guidelines, standards and consensus recommendations for benzodiazepines and Z-drugs. Any standards or consensus recommendations that were not relevant to the treatment of primary insomnia were excluded. All data was anonymized by substituting the last four digits of the patients' hospital ID with letters. No names, addresses or personal information were included. The information was collected from the patients' medical records and entered into the data collection tool for comparison with the audit criteria.

3.8.1.7 Data Analysis

The data was coded by one of the main investigator (AD) as Yes or No to indicate whether each criterion had been met. From the collection sheet entered into MS Word, the data was moved to an MS Excel file for analysis. For this study, the analysis tool was STATA 14, a general purpose statistics software programme often used in biomedicine. All variables had a Yes/No response. A 'Yes' response was recorded as '1' and no responses were recorded as 'null'. The information was tabulated and summarized through commands provided by the analysis tool, which indicated the number of records meeting each criterion.

3.8.1.8 Pilot study and its implication for the research

This study consisted primarily of patients diagnosed with insomnia who were prescribed benzodiazepines or Z-drugs. Several factors were considered: a clear indication of using benzodiazepines or Z-drugs, using CBT-I as a first-line treatment, the lowest effective prescribed dose, short-term use of hypnotics, reviewing patients on long-term use, and avoiding the use of antihistamines and/or their combination with analgesics. A pilot study tested the tool's ability to gather information that concerned prescribing practices in relation to criteria recommended in the US guidelines (Schutte-Rodin et al., 2008; Qaseem et al., 2016) (see Chapter 4).

Aim

The pilot study was aimed to test the usefulness and applicability of the data collection tool and to ensure that the researcher gathered all possible relevant information from the medical records about the prescribing practices of physicians for managing primary insomnia.

Method

The pilot used a retrospective medical records audit, for which ten records were viewed. The study population involved adult patients, all of whom were 18 years of age or over and were living with insomnia during the five-year period of this study. They had been prescribed drugs to treat their condition and/or the diagnosis of insomnia was documented in their record. If any patients were prescribed these drugs for reasons other than insomnia, including add-on therapies for epilepsy, dementia, psychosis or other psychiatric disorders, or even as a withdrawal treatment (e.g., methadone or alcohol withdrawal), for terminal illness or because they were in intensive care, they were excluded. No demographic data were collected.

Implications of the pilot study

The feasibility of the pilot study for identifying current clinical practice for using benzodiazepines and Z-drugs in the treatment of insomnia in adults in KSA was assessed according to the criteria cited above. The data collection tool was useful and there was no need for it to be changed. The reliability of studies like this improves if they are carried out by the same researcher (Morrell and Harvey, 1999), and this was particularly applicable to the present study because of the researcher's experience in KSA. If multiple auditors had been employed, this would have increased the risk of bias due to conflicting opinions or differing decisions about how to use the audit tool. In addition, a supervisory team validated the data collection tool after they had considered the pilot study's results.

3.8.2 Phase Two: Qualitative interview study

Qualitative research, using words rather than numbers, considers the qualities of social phenomena that are gathered through direct and reactive observations (Rice and Ezzy, 1999; Creswell, 2009). Interviews, focus groups, direct observation and textual or visual data are several methods used for collecting qualitative data (Silverman, 2013). One advantage of these methods is that they can be used when the researcher has little knowledge of the subject under investigation. Qualitative methods also deal with complicated or sensitive issues to formulate an inductive or explorative hypothesis, instead of generalizing the findings to a larger population (Bowling, 2014). It is essential to note that this type of research is often used at the exploratory stage and is particularly useful in public health research (Rice and Ezzy, 1999). In other words, qualitative research attempts to answer questions such as *how* and *why*, making it a proper method for studying the behaviour and attitudes of people (Sutton and Austin, 2015).

Qualitative data can be gathered through interviews, which can be structured, unstructured or semi-structured (Bowling and Ebrahim, 2005). Structured interviews attempt to answer specific questions, asking the same questions of each participant. Unstructured interviews are usually led by the participants themselves, who often provide their own narratives and expand freely on the questions they are asked. Semi-structured interviews use both open and closed questions, developed by the researcher before the interview, and are sufficiently flexible that they can be adjusted according to the participants' answers (Qu and Dumay, 2011).

Interviews can be conducted in one of two ways: either face-to-face or by telephone. The advantage of a face-to-face interview is that the researcher can probe for

amplifications and clarifications. Such interviews offer fewer opportunities for error and can involve multi-part questions. Their disadvantage, however, is that face-to-face interviews can be expensive, time-consuming, contain interviewer bias, and yield data that is difficult to analyse. Telephone interviews, on the other hand, can be efficient with respect to time although they are often restricted to brief questionnaires and non-sensitive topics. The response rate to telephone interviews is typically low (Bowling, 2014).

A number of methods for qualitative sampling include 1) convenience sampling, which involves the sampling of subjects for reasons of convenience easy to recruit, likely to respond, are close by etc., 2) purposive sampling, which occurs when a group of people has particular characteristics, such as knowledge valuable to the study, 3) the 'snowballing' technique which allows a group of participants to recruit additional participants, and 4) a theoretical sampling where categories are developed during the research process (Bowling, 2014).

Several research methods/approaches are considered qualitative in nature: for example, interpretative phenomenological analysis (IPA), thematic analysis, grounded theory, discourse analysis and narrative analysis (Lyons and Coyle, 2016). Briefly, the purpose of an IPA is to explore the subjects' personal experiences and to see how they make sense of their social world. The main factor in an IPA study is the meaning that participants attach to a particular experience, event, or state of mind (Lyons and Coyle, 2016). 'Thematic analysis' is a technique or method that accentuates and examines patterns of meaning (or 'themes') in qualitative data. 'Grounded theory' refers to a systematic methodology for constructing theories from data using explicit analytic strategies and implicit guidelines for collecting data (Charmaz, 2001), while 'discourse

analysis' explores the meanings produced by written, vocal or sign languages used in communication, together with the context and processes (Taylor and Ussher, 2001). **'**Narrative analysis' is a broad term for a family of methods that focus on stories (Riessman, 2008; Lyons and Coyle, 2016).

Depending on the aim/objectives of the study and the available previous knowledge on the subject, analysing qualitative data can be inductive or deductive. When using an inductive approach, the researcher identifies themes that are firmly related to the data. The identified themes may afford little relationship to the specific question that was asked of the participants, if data have been collected specifically for the research (e.g., via interviews or focus groups) and themes would not be guided by the researcher's theoretical interest in the area or topic (Braun and Clarke, 2006). In contrast, a deductive/theoretical approach is more explicitly analyst-driven. This is because it would tend to be driven by the researcher's theoretical or analytic interest in the area. This approach of thematic analysis tends to provide a less rich description of the data overall, but a more detailed analysis of some aspects of it (Braun and Clarke, 2006).

For this study, a thematic analysis was chosen because it is suitable when the intention of the research is to describe a set of behaviours, perceptions or experiences, as in this case. Thematic analysis can produce explanatory as well as descriptive research (Riessman, 2008; Lyons and Coyle, 2016). Interviews were face-to-face, conducted with physicians prescribing benzodiazepines and Z-drugs for treating insomnia in KFCH, and they were informed by the findings from Phase 1.

3.8.2.1 Aim

The study was aimed to explore the knowledge, perceptions, and attitudes of physicians who are authorized to prescribe benzodiazepines and Z-drugs and to see if they complied with international guidelines. For this purpose, we used in-depth interviews. The aim and objectives are addressed in Chapter 5: "Perceptions of physicians in Saudi Arabia on the use of international clinical guidelines for managing primary insomnia".

3.8.2.2 Study Design

The design of this study involved in-depth, face-to-face interviews with selected respondents. The interviews were semi-structured since this allowed the collection of data from a small number of participants. The study proceeded with the consent of all respondents.

3.8.2.3 Study Settings

The setting of this study was the same as in Phase 1, a public tertiary-care hospital in Jazan, Saudi Arabia. The hospital has no specialized clinic for managing of insomnia, although there are several physicians who participate in the management of this condition in inpatient, outpatient, and ambulatory settings.

3.8.2.4 Study Sample

All the physicians identified from the medical records in Phase 1, the audit, as caring for patients with insomnia were qualified for interview.

3.8.2.5 Sampling and sample size:

The study used a purposive sampling method to interview physicians who were

prescribing benzodiazepines and Z-drugs. This sampling method was used because only physicians with legal authority to prescribe benzodiazepines or Z-drugs would participate in the interviews. We based the selection criterion on the qualifications of the participants. Those so identified were experts in their field, which was crucial for this research. The interviews had a single interviewer, and how the 15 interviewees were chosen is outlined in the section below (Britten, 1995; Mays and Pope, 1995). For this study, there were three principal reasons for not having a large sample size. First, if the data was properly collected and analysed, data saturation would be achieved. Accordingly, very little new evidence or information would be obtained from each additional participant. Second, it was known that the type of information that qualitative studies produce is detail-rich. Third, although qualitative research can shed light on how incidence or prevalence might be measured in further studies, definitive statements about incidence or prevalence are irrelevant to qualitative research. There is therefore no requirement to ensure that the sample is of sufficient scale to provide estimates, or to determine statistically significant discriminatory variables. As a result, sample sizes needed to be kept on a reasonably small scale.

3.8.2.6 Recruitment

Depending on the first phase, the physicians were divided into 3 classes, 1- those who followed the guidelines and their practice fit the criteria, 2- those who fit some criteria but not others, 3- those whose practice did not fit the criteria. Five physicians from each class were chosen because they were able to prescribe benzodiazepines and Z-drugs. The participants were identified with the help of the lead pharmacists and most came from different departments. Two physicians chose not to participate, believing they had insufficient expertise, so others were invited. The number of participants was 15.

Targeted participants were given an invitation pack containing an invitation letter and information sheet (see Appendices 5 and 6) and were asked to sign a consent form (see Appendix 7). The physicians did not expect, nor did they receive compensation. This information was provided on the information sheet to those participating in the interviews.

3.8.2.7 Data Collection

Data was collected through semi-structured face-to-face interviews that were audio-recorded. The researcher conducted the interviews in the physician rooms at the hospital where the physicians worked. All interviews were conducted in English with questions constructed to encourage conversations between the participants and the researcher. Many questions were open-ended, with neither right nor wrong answers, see interview schedule (Appendix 8). The researcher was more interested in the physicians' opinions concerning the questions asked. Further details are provided in Chapter 5.

3.8.2.8 Data Analysis

The recordings were moved to a password-protected computer, transcribed verbatim into Microsoft Word and labelled with each participant's reference number. The transcribed interviews were uploaded into NVivo 11, which yields insights from qualitative and mixed methods data, for initial coding. Using an inductive approach, the data were coded and analysed with thematic analysis. Material relevant to each code was collated and relevant codes combined into potential themes and subthemes. A thematic map was then generated. The codes were read against each theme to ensure a coherent pattern and the same process was used for the whole data set (see Chapter 5).

3.8.3 Phase Three: E-Delphi study

The Delphi technique is a structured interview process designed to reach a consensus or judgment following responses by a panel of experts to several questionnaires on a topic for which there is little empirical evidence (Avella, 2016). There are several rounds in a Delphi process. Each stage of the questionnaire builds on the findings of the previous stage (Sumsion, 1998). In the first round of the study, participants are usually sent invitations including open-ended and/or close-ended questions to generate ideas. An anonymized summary of the previous results is presented to the participants who are encouraged to reconsider their responses. Participants reflect on generated ideas from the group's feedback, and the process is repeated until there is agreement on an appropriate set of ideas. The use of the Delphi technique has become widely used to develop consensus on experts' opinion (Trevelyan and Robinson, 2015).

The main advantages of the Delphi technique are idea generation, the anonymity of individual responses, and that the process is structured, which allows for controlled feedback. In addition, the Delphi method is not restricted to a particular geographical area (Avella, 2016). The main limitation of the method is that it lacks the advantages of face-to-face group meetings, which can encourage idea generation. There is also the fact that the technique is labour-intensive, time-consuming and requires highly motivated participants, which itself requires time and effort to find (Keeney, McKenna, and Hasson, 2010).

There are two main designs of Delphi listed in the literature "Delphi/Conventional Delphi" or "Modified Delphi". Conventional/Delphi is a process during which a panel of experts initiates alternative statements in response to the researcher's question(s). On the other hand, in the Modified Delphi, the initial alternatives will be carefully selected

before being given to the panel (Custer, Scarcella, and Stewart, 1999). Typically, this design does not use an expert panel to generate answers to Round 1 question(s). Instead, the researcher collects answers to question(s) by another method and provides them to the panel to start the consensus-seeking process (Avella, 2016).

At first, the Delphi Method employed typed and mailed/faxed documents, which limited its worthiness and ultimately hindered the opportunity for international participation. The ease of electronic communications, however, notably email has significantly addressed those issues. Nevertheless, emails have created issues of their own, particularly concerning the maintenance of participant anonymity (Avella, 2016). For this study, the researchers recruited sleep medicine experts in Saudi Arabia to find a consensus concerning the use of benzodiazepines and Z-drugs for treating insomnia (see Chapter 6).

3.8.3.1 Aim

To obtain consensus statements required to develop clinical guidelines for using benzodiazepines and Z-drugs in the management of primary insomnia in adults in Saudi Arabia.

3.8.3.2 Objectives

- To develop the criteria generated from previous research and expert suggestions.
- To rank the agreed criteria from expert opinions.
- To find agreement on overall ranked statements.

3.8.3.3 Selection of the method

The Delphi method is suitable for these objectives, which are to find a consensus around statements suitable for the development of clinical guidelines for using benzodiazepines and Z-drugs for treating primary insomnia in adults in Saudi Arabia. First, statements were subjective and required value judgments because the results could not be strictly analysed statistically. Second, because sleep medicine specialists were dispersed geographically, this method allowed for their input without the researcher having to travel considerable distances. Finally, participants, could communicate their ideas in different ways and, as hospital practitioners and researchers, would be motivated by personal commitment to share their thoughts on the topic. For these reasons, the Delphi technique is frequently used for healthcare studies. It is particularly applicable for finding a clinical consensus concerning guidelines for managing and diagnoses of diseases where an evidence-base is non-existent (Van der Linde, Hofstad, van Limbeek et al., 2005; Maher, Whyte, Hoyles et al., 2015; Eubank, Mohtadi, Lafave et al., 2016; Lee, McGrath, and Yiu, 2016).

3.8.3.4 Selection of experts

Every Delphi study, according to its aims and objectives, has different criteria for identifying experts (Fink, Kosecoff, Chassin et al., 1984). Narrowing the definition of 'expert', however, might reduce the size of the pool of potential participants (Baker, Lovell, and Harris, 2006). Conversely, having a wide definition might lead to including non-experts.

3.8.3.5 Inclusion criteria

- Physicians who have been accredited as sleep medicine specialists in Saudi

Arabia.

- Physicians who have worked in sleep clinics or practiced sleep disorder management in Saudi Arabia. Due to the limited number of specialized physicians in sleep medicine, the definition of experts was expanded. From these participants the required knowledge could be obtained.

3.8.3.6 Study Design

The design for this study was to use the Delphi technique for the consensus process, using the Bristol Online Survey (BOS), which incorporated three rounds between May and August 2018.

3.8.3.7 Developing an online questionnaire

An online Delphi questionnaire was designed using the following steps:

- Preparing an invitation letter and information sheet.
- Designing an appropriateness scale.
- Selecting the online survey programme.
- Testing the first round and procedure in a piloting process with a group of PhD students.
- Identifying areas of the questionnaire that needed improvement.

3.8.3.8 Recruitment

We selected a purposive sample of those identified as experts in the field of sleep medicine. Consultations and collaboration were sought from the Director of the Saudi Sleep Medicine Group to reach out to experts in this field to constitute a panel. All experts were sent invitation letters and an information sheet by email, (Appendix 9),

and asked to reply if they agreed to participate. A ‘snowballing’ technique was used to forward invitation emails, information sheets and the survey to sleep medicine experts and/or interested physicians in Saudi Arabia.

3.8.3.9 Study Sample

There is no ideal panel size for a Delphi study since it has not been determined what shapes a large or small panel. Panels of varying sizes, large, medium and small have been used in various studies, however, panels of fewer than 10 or over 1000 members are rare. Typical sizes range between 10 and 100 members (Avella, 2016). Nor is there evidence that a large panel provides greater reliability than a small panel (Avella, 2016). In this study, a total of 27 experts participated in the three rounds; 15, 17 and 11, in Rounds 1, 2 and 3, respectively, with 8 experts completing all rounds.

To improve the response rate, several approaches were considered:

- Participants were selected because they were specialists in sleep medicine or worked in sleep clinics.
- Reminders were sent to non-respondents in each round.
- The reason for the invitation, the value of their participation and the potential outcomes of the national guideline in health quality improvement were stated in the information sheet.
- The questionnaires were sent on work days, that is, national holidays or celebration periods during which physicians might be out of work were avoided (Aljamal, Ashcroft, and Tully, 2016).

3.8.3.10 Designing online questionnaires

This study used the BOS to administer the e-Delphi process because it is easy to use and works with different browsers, system configurations, and internet services. Furthermore, BOS uses high-level data protection (Geist, 2010; Gill, Leslie, Grech et al., 2013). The questions were written using Microsoft Word and then copied and pasted into an online questionnaire. The question type, response option allocation, and a mandatory response for each question were selected to ensure that all questions would be ranked. Additional fields for comments or suggestions were also available.

For Round 1, instructions were given about how to complete the questionnaire, terminology or abbreviations were defined, and the appropriateness of the scale was explained. Some demographic questions (gender, age, years of experience and specialty), open-ended questions, and the provision for giving comments or suggestions on each statement was also provided.

For Rounds 2, a five-point Likert scale (see Figure 2) was used for all responses and ranged from (1=strongly disagree) to (5=strongly agree) to identify the level of appropriateness of each statement.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Figure 2. Sample scale used in Likert scale questions

3.8.3.11 Data Collection and Analysis

Round 1

To solicit information from participants about their current practices and thoughts for treating primary insomnia, the online questionnaire included 20 open-ended questions (see Appendix 10). The survey was piloted using five people, including three pharmacists (PhD students), and two physicians who did not participate in the main Delphi study. This ensured the feasibility of the procedure, question clarity, and estimated the completion time of the questionnaire. After determining that no amendments were needed, potential participants were sent the questionnaire by email and the survey was accessible online for one month. Answers were aggregated, and frequencies and percentages calculated for the answers before the data was tabulated with qualitative responses as feedback for Round 2.

Round 2

After refining the responses from Round 1 and ranking the answers, the researcher determined that there were 21 statements that required further exploration/refinement. These were prepared for Round 2 (see Appendix 11). The questionnaire was piloted with three physicians to ensure the feasibility of the procedure and the clarity of the statements. Of the 21 Round 2 statements piloted, three needed clarifying because of participants' comments. All three pilot physicians participated in Round 2. The second questionnaire was sent to the participants and was open to anyone regardless of participation in Round 1. The participants were asked to rank each item on a 1-5 Likert scale (1-strongly disagree; 5-strongly agree), which best represented their opinions about criteria they would like to see included in future guidelines. A consensus was

defined as 70% or higher agreement. This survey was accessible online for three weeks.

Round 3

Responses from Round 2 were collated and refined, and feedback was sent to the participants for review. They could modify their answers to Round 2 in Round 3 should they wish to do so. The Round 3 questionnaire included 16 statements and was again sent by email. Participants were asked to specify which of these statements should be included or excluded in future guidelines. Statements that were excluded because they did not achieve 70% agreement in Round 2 were provided to participants in a separate question, and they were asked if any statement should be reinstated and included in the guidelines. A consensus was defined as 80% or higher agreement (see Appendix 12). This survey was accessible online for one month. Figure 1 in Chapter 6 shows the e-Delphi process used to achieve consensus on statements to be included in future guidelines. More details about the study are also available in Chapter 6.

3.8.4 Phase Four: A quantitative cross-sectional survey study

A quantitative study aims to generate reproducible findings that can be generalized to a larger population. There are two major types of research in such a study: the survey and experimental approach. By studying a statistically significant sample, the survey approach entails the provision of a numeric description of trends, attitudes, or views of a population living in a particular area. Experimental research, on the other hand, is predominantly used for completing laboratory projects (Smith, 1999; Smith, 2010; Creswell, 2009).

A quantitative approach has several advantages for studies that aim to find particular data and identify factors that contribute to an outcome. This approach is associated with

identifying interventions and understanding the best predictors for the final result. It does, however, have several disadvantages, among which is that it lacks flexibility for reflecting reality from different perspectives. Additionally, the quantitative approach describes a certain event; it does not explain how the event occurs. Therefore, such studies are limited to research that requires prior knowledge about the phenomenon under study (Smith, 1999; Smith, 2010; Creswell, 2009).

To investigate the relationship between a disease or other health-related condition, and any variables within a population, either at a single moment or over a short period, researchers generally use a quantitative cross-sectional study (Hennekens CH and Buring JE, 1987). Cross-sectional studies provide a snapshot of the disease frequency or other health-related conditions (e.g., exposure variables) in a population at that moment. Such studies assess the burden of disease on a population or its health needs and are useful for planning and allocating health resources (Hennekens CH and Buring JE, 1987).

Generally, cross-sectional studies can be conducted relatively quickly and at minimal cost. Their design may also help in the planning, monitoring, and assessing the output for public health interventions (Mann, 2003). In cross-sectional studies, data is collected once, and the study takes into consider the prevalence of every factor under investigation (Hennekens CH and Buring JE, 1987).

Cross-sectional studies are not, however, without their disadvantages. For example, deriving causal relationships from a cross-sectional analysis can be difficult because the study entails measurements at the time of exposure (Mann, 2003). In addition, the cross-sectional study is not suitable for studying rare or short-duration diseases. Such studies may also be subject to bias because of low response numbers and/or

misclassification due to recall bias (Hennekens CH and Buring JE, 1987).

This study collected data from people living with primary insomnia in Saudi Arabia, employing a cross-sectional design. The process was not time-consuming and was an appropriate way to reach members of the public.

3.8.4.1 Aim

To explore patients' knowledge, experiences and perceptions of the management of primary insomnia in Saudi Arabia.

3.8.4.2 Objectives

- To identify experiences of clinical practice for managing primary insomnia in Saudi Arabia from the patients' perspective.
- To find out what knowledge patients have about insomnia and its treatment.
- To understand patients' perceptions about using hypnotics and non-pharmacological treatment.

3.8.4.3 Inclusion and exclusion criteria

All adults (18 and over) experiencing insomnia with unidentified causes. Patients who have insomnia due to known physical, psychological or environmental causes or because of the use of stimulant substances or drugs.

3.8.4.4 Online questionnaire design

The questionnaire design was drawn upon the scientific literature and findings from our previous studies, an audit and an interview study with prescribing physicians. The survey questions were prepared in English on a Microsoft Word document, then

translated into the Arabic language. The Survey Monkey Software was used because it is easy to use, has a high level of data protection (SurveyMonkey Inc., 2019) and can be used with different web browsers through a mobile phone or desktop personal computer. In addition, it supports the Arabic language which is right justified. Using this platform allows the survey to effectively reach more respondents than using a Paper-Based Survey.

The questionnaire started with a welcome page that explains the purpose of the survey and offers some guidance on how to complete the survey. It is structured in five sections: 1- Screening questions that allow people with primary insomnia to complete the questionnaire and people without insomnia or other forms of insomnia to exit early. 2- Patient characteristics (such as gender, age and educational level). 3- Patient's knowledge about insomnia and its treatments. 4- Patient's experiences of using prescribed hypnotics. 5- Patient's perceptions about hypnotic medications. 6- Patient's perceptions about non-pharmacological therapy, please see appendix 13.

3.8.4.5 Piloting

To ensure the feasibility of the procedure, clarity of the questions, and to estimate the completion time of the questionnaire, a pilot study was conducted with a sample of 10 individuals before beginning the study. Hill (1998) suggested 10 to 30 participants for pilots in survey research (Hill, 1998)

3.8.4.6 Sample size

The prevalence of insomnia in Saudi Arabia is 33-78% (Ahmed, Al-Jahdali, AlALwan, et al., 2017; Ahmed, Al-Jahdali, Fatani, et al., 2017), but there is no current figure for primary insomnia. The estimated prevalence of chronic insomnia in the United States

and Western Europe is 33% of which 6% have primary insomnia (Ohayon, 2002; Ohayon, 1997; M. Ohayon, Caulet, and Guilleminault, 1997; Roth, 2007). Therefore, it was assumed for the current study that 6% of people living with chronic insomnia in Saudi Arabia have primary insomnia.

There is no single formula that can be used to calculate sample size for all study designs. For cross-sectional studies the following formula is used (Charan and Biswas, 2013):

Sample size = $\frac{(Z1-\alpha/z)2\ P(1-P)}{(d)2}$, where *"$(Z_{1-\alpha/z})^2$ is a standard normal variate (at 5% type 1 error (P<0.05) it is 1.96 and at 1% type 1 error P<0.01 it is 2.58)".* In most of studies P<0.05 is considered as significant, so 1.96 will be used in this study *(Charan and Biswas, 2013).* P is the estimated proportion and d is precision.

Based on 33% prevalence $\frac{(1.96)2\ \ 0.06x0.33(1-0.06x0.33)}{(0.05)2} = \frac{3.8416x0.0198x0.98}{0.0025} = 30$

Based on 78% prevalence $\frac{(1.96)2\ \ 0.06x0.78(1-0.06x0.78)}{(0.05)2} = \frac{3.8416x0.0468x0.95}{0.0025} = 68$

A respondent group ranging from 30 to 68 was required to provide a true representation of the population of people living with primary insomnia in Saudi Arabia.

The sample size calculation was done with advice from the Mathematics Service Centre Advisory Team, University of Reading.

3.8.4.7 Sampling method

An unrestricted self-selected online survey, which is a form of convenience sampling, was used because it can facilitate access to patients with primary insomnia who can be difficult to reach or locate through other methods and it is open to anyone from the

public to participate in and is easy to be posted on a website or Twitter. Using probability sampling methods would be inapplicable or unlikely to reach participants in sufficient numbers (Ronald D. Fricker, 2008).

3.8.4.8 Recruitment

Consultations and collaboration were sought from Professor BaHammam, the Director of Sleep Medicine Centre in Saudi Arabia, who has a Twitter account dedicated to sleep medicine and has more than 25,000 followers. This connection allowed researchers to reach potential participants. BaHammam's account on Twitter was used to recruit participants, as it is a useful medium to employ when it is difficult to make personal contact with targeted participants, and it allows researchers to reach more people than using email addresses (Saines, 2017). To improve the response rate, the link of the survey was a pinned post on Professor BaHammam's account on Twitter (Gee, 2013), This encouraged his followers with insomnia to participate, since most of his followers interact with what he writes about sleep disorders. Participants were asked to forward the survey to others who they know have insomnia. The survey was set to be opened for two weeks, however the maximum required number was obtained within three days.

3.8.4.9 Data collection

Participation in the study was entirely voluntary; participants made their own independent decision about whether to engage or not. The Arabic version of the survey was posted and pinned on BaHammam's account. Instructions about how to complete the questionnaire were included on the first page of the survey. The survey was set to allow people to participate and complete the questionnaire only once. Returning the

questionnaire was considered as giving consent to participate. No personal information such as names or addresses were collected.

3.8.4.10 Data analysis

The data was downloaded from the Survey Monkey server in Excel format and transferred into Stata statistical package before starting the analysis. At first the variables were labelled, and data coding was done. After that, data cleaning was performed to identify any inconsistencies in the data. Observations with inconsistent data were omitted from the survey. The clean data was used for analysis. Descriptive statistics were provided for information on responses, respondent characteristics, and patients' experiences and perceptions. T-test was performed for questions analysed using respondent's gender to see whether there was significant difference between male and female respondents. For questions with Likert-type scales, the responses were grouped with 'strongly agreeing' and 'agreeing' being one group, and 'strongly disagreeing' and 'disagreeing' being the other, and reported as percentage responses. To examine the statistical significance of observed dependence between certain variables, Chi squared tests were performed in contingency tables

3.8.5 Conclusion

This chapter provided explanations about the context and methodology of the thesis. It also discussed the theoretical framework underpinning with its justification. In addition, it described the research design and methods that were used to answer the research questions and achieve the research aims and objectives. Analysis of both quantitative and qualitative data, ethical considerations, and techniques to increase the reliability, validity and rigour/trustworthiness of this research were also presented.

The following chapter presents the first publication related to this research titled: *Current clinical practice for the use of hypnotics to manage primary insomnia in adults in a tertiary hospital in Saudi Arabia: An audit study.*

CHAPTER FOUR

4 Current clinical practice for the use of hypnotics to manage primary insomnia in adults in a tertiary hospital in Saudi Arabia: An audit study

4.1 Publication relevance to thesis

Chapter Four presents the publication**:**

Dobia, A., Ryan, K., Grant, D., & BaHammam, A. (2019). Current Clinical Practice for the Use of Hypnotics to Manage Primary Insomnia in Adults in a Tertiary Hospital in Saudi Arabia: An Audit Study. *Pharmacy, 7*(1). https://doi/10.3390/pharmacy7010015.

I certify that I have participated sufficiently in the intellectual content, conception and design of this study. I also collected and analysed the data and wrote the paper. Co-authors supported me with the study design, analysis checking and feedback on early drafts.

This paper presents the findings of the audit study that was conducted to gather data on current practice in treating insomnia with hypnotics in Saudi Arabia, and to assess whether it conforms to US guidelines.

pharmacy

MDPI

Article

Current Clinical Practice for the Use of Hypnotics to Manage Primary Insomnia in Adults in a Tertiary Hospital in Saudi Arabia: An Audit Study

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Abstract: Despite the risks associated with hypnotics and their recent increased use in Saudi Arabia, there are no specific national guidelines for using these medicines to treat insomnia nor are there any data on how these medicines are currently prescribed. There is the potential, however, that some physicians might be adhering to the United States guidelines. The current audit study was aimed to assess the current practice in treating insomnia with hypnotics in Saudi Arabia, and to evaluate its agreement with the US guidelines. The audit was conducted using data collected between April 2012 and March 2017 at King Fahad Central Hospital (KFCH; Jazan), of patients who were either prescribed benzodiazepines (BZDs) or Z-drugs or diagnosed with insomnia. The audit criteria followed two US guidelines for the management of insomnia in adults. Data included documented diagnosis, use of CBT-I (Cognitive Behavioral Therapy for Insomnia), use of BZDs and Z-drugs including treatment regimen, and whether physicians prescribed anti-histamines for insomnia. The data were analyzed using STATA 14 after transcription to a MS XL file. Of the 504 records reviewed, 379 patients (75%) were prescribed BZDs or Z-drugs; only 182 (48%) of them had clearly documented indications for their use. Three hundred and seven patients (60%) were diagnosed with insomnia; none of them received CBT-I as initial treatment. No patients on long-term use of hypnotics were reviewed by their physicians after they began using the medication. More than 43% of patients were prescribed anti-histamines for insomnia. No records met all (or even six) of the seven criteria. KFCH physicians do not follow US guidelines. Therefore, the Ministry of Health (MOH) should improve its administrative systems including documentation, and instead of using international guidelines that are seldom followed, physicians should be trained in prescribing hypnotics and national guidelines need to be developed.

Keywords: clinical practice; hypnotics; benzodiazepines; z-drugs; audit; primary insomnia; tertiary hospital; Saudi Arabia

1. Introduction

Studies show that while benzodiazepines (BZDs) and Z-drugs (eszopiclone, zolpidem and zaleplon) are associated with a high risk of patient misuse, and cause addiction, dependence, falls, accidents, cognitive impairment and withdrawal symptoms, the therapeutic benefits outweigh the disadvantages if the drugs are prescribed appropriately [1,2]. In the United States, the United Kingdom,

and other countries, the known risks have led to clinical guidelines to help physicians prescribe the medicines safely, and to minimize the risk of addiction [3–7].

While these guidelines contain attributes specific to the countries where they are applied, there are recommendations common to all, among which is the importance of using the smallest dosage possible to induce a therapeutic effect. Other shared recommendations include the preferred length of the prescription (2–4 weeks), the consideration of non-pharmacological treatments prior to hypnotic prescription, using drugs with the lowest cost, the recommendation that new medicines be withheld if the prescribed hypnotics are unsuccessful (except when the patient experiences adverse effects), and that prescriptions must include a withdrawal plan [3,6–8].

BZDs and Z-drugs have severe adverse effects if taken for longer than the recommended treatment period (more than 4 weeks) [3]. Despite this, the effectiveness of these medicines to treat insomnia justifies their administration if they are used appropriately and for short durations. The national guidelines for insomnia management in the US and UK begin with sleep hygiene, non-pharmacological remedies such as cognitive behavioural therapy for insomnia (CBT-I), and only after these treatments have been attempted, is the short-term use of hypnotic medicines considered for patients with severe insomnia [3,6,7]. Even when the guidelines are followed, the literature shows that patient misuse of BZDs and Z-drugs still occurs [9–12]. In addition, prescribing hypnotics for long-term use might indicate that physicians do not adhere to the guidelines.

Some audit studies have been conducted on the use of hypnotics in different regions across the world. One such study used 308 medical records to assess the use of hypnotics to manage insomnia, and compared the results to the National Institute of Clinical Excellence (NICE) guidelines. The study found that a non-pharmacological treatment was provided to only 25% of patients, whereas 33% were prescribed hypnotics for less than one year and 10% were prescribed these medicines for more than 10 years [11]. Another prospective audit study was conducted in Ireland to assess the level of prescription compliance using the main components for Z-drugs and BZD prescribing guidelines. The study over four weeks involved 81 community pharmacies and reported that less than one-fifth of the prescriptions were fully compliant with the assessment criteria; many of the prescriptions also had discrepancies [12].

Although pulmonologists in Saudi Arabia began sleep studies in the early 1990s [13], the Saudi Commission for Health Specialties (SCHS), which authorizes all health specialty professionals in Saudi Arabia, did not recognize sleep medicine as an independent specialty until 2012 [14]. For this reason, there is insufficient data concerning insomnia treatments in the Kingdom of Saudi Arabia (KSA), including how BZDs and Z-drugs are used in the Kingdom. Even though these types of medicines are restricted in Saudi Arabia and only specialists and consultants are authorized to prescribe them, most of the literature considers BZD usage for psychiatric disorders only [15–17]. Thus, further studies are necessary to investigate the use of these medicines for insomnia in the KSA. The motivation to conduct this audit study, in addition to the aforementioned problems, included the absence of well-developed clinical guidelines for the use of BZDs and Z-drugs to manage primary insomnia in the KSA. Thus, this audit study reports data gathered on the current clinical practice in a major regional Ministry of Health (MOH) referral hospital (King Fahad Central Hospital (KFCH) in Jazan) where hypnotics are used to treat insomnia.

This audit aims were to assess the current practice to treat insomnia with hypnotics in Saudi Arabia, and to evaluate its agreement with the US guidelines. There are two such guidelines, one from the American Academy of Sleep Medicine (AASM) and the other from the American College of Physicians (ACP) [3,7]. In this audit study, we attempt to answer the following questions in the absence of national clinical guidelines: what is the current clinical practice when prescribing hypnotics for patients with insomnia in Saudi Arabia, and how different is the current practice from the American guidelines? The US guidelines were used because there are no country-specific guidelines for the treatment of insomnia in Saudi Arabia, and most Saudi physicians were taught using the American system at medical schools. In addition, the Saudi MOH and other departments that provide most

medical services in Saudi Arabia often adopt US guidelines [18] because they are believed to be the best medical practice [19].

After the research criteria were developed, a systematic review of randomized controlled trials (RCT) to elucidate the usefulness of pharmacological agents to treat chronic sleep disorders from the AASM was published [4]. The review focused only on treatment rather than other management criteria, and it was recommended that treatments should follow the 2008 guidelines of the AASM [4]. This did not affect the previously developed criteria. The present paper reports on the first four steps of the traditional audit: it identifies the problem, develops the tool to measure the outcome, collects data and compares the findings with established standards, and suggests changes [20].

2. Materials and Methods

The study was conducted at KFCH, a 500-bed tertiary hospital in Jazan that serves 20 other hospitals in the region with approximately 1.5 million inhabitants. A tertiary hospital is defined as a facility that provides specialized care using highly advanced and complex procedures performed by medical specialists [21]. These facilities usually deal with referrals from primary and secondary care facilities. Thus, the audit was conducted in this facility because in Saudi Arabia these types of medication cannot be prescribed in primary care since prescription of controlled drugs is limited to secondary and tertiary care centers.

Since 2009, KFCH has used MedicaPlus, an electronic information system which also permits electronic prescriptions. MedicaPlus connects the hospital's various departments. Information can be retrieved using patient name, ID numbers, diagnosis, and prescribed medicines. Audit criteria were developed from the AASM and ACP clinical guidelines [3,7] as they are the two published guidelines most often followed; this means the criteria have already been validated. The data collection tool was also verified by an expert in clinical audits (D.G.), as well as the researcher's supervisor, prior to the performance of the study. All standards and consensus recommendations related to the use of BZDs or Z-drugs and/or the management of primary insomnia from the guidelines were incorporated into the criteria to develop a data collection tool (Table 1) to be applied in the KSA. The criteria were devised by the authors to indicate the best practice for insomnia treatment. Standards and consensus recommendations that were not related to the management of primary insomnia, for example diagnosing insomnia, were excluded. Thus, the data collection audit tool was designed to retrieve patients who had been:

- not only prescribed BZDs or Z-drugs but also had clear documentation of their use;
- given CBT-I as the initial treatment (documented);
- prescribed these drugs when physicians decided to use pharmacological treatment;
- initially prescribed the lowest licensed dosage of BZDs or Z-drugs;
- prescribed the drugs specifically for the maximum recommended duration (4–5 weeks);
- on long-term use of the medicines and were reviewed by their doctors every few weeks or on a monthly basis, and then every 6 months (documented).

During the study period of March–May 2017 at KFCH, the first author (A.D.) performed an electronic search of the medical records using the terms insomnia and/or the generic and trade names of BZDs and Z-drugs, with the advice of the hospital pharmacy and quality management departments, to identify patients. After eliminating duplicates, 771 records met the inclusion criteria of adult patients (aged 18 years and over) with insomnia who were prescribed drugs as a treatment, or their diagnosis was documented, during the period from April 2012 to March 2017. Data were collected from medical records of patients admitted to different wards, as well as for outpatients. Patients were excluded if they were prescribed any of these medicines for other indications such as an add-on therapy for epilepsy, dementia, psychosis or other psychiatric disorders; as part of substance withdrawal treatment (e.g., methadone or alcohol); for terminal illness; or if patients were admitted to the intensive care

unit (ICU). After applying the exclusion criteria, 504 patients were deemed appropriate for the data collection process.

Table 1. Data collection tool.

Patient Number
Prescribing physicians' numbers
Patients who were prescribed these medications had clearly documented indications for use (YES/NO)
Patients received CBT-I as the initial treatment (documented) (YES/NO)
Patients were prescribed BZDs or Z-drugs if pharmacological treatments were considered (YES/NO)
Patients were initially prescribed the lowest licensed dosage (for adults or elderly) of BZDs or Z-drugs (YES/NO)
Patients were prescribed BZDs or Z-drugs for 4–5 weeks (YES/NO)
Patients on long-term use of medicines were reviewed by their doctors every few weeks or monthly and then every 6 months (Documented) (YES/NO)
To treat chronic insomnia, anti-histamine or anti-histamine/ analgesic medicines were used (YES/NO)

As this study is one of three studies of a PhD research project at the University of Reading in the UK, the University of Reading Ethics Committee (UREC) provided guidance and approved the study number (17/15), on 8 March 2017. On 19 March 2017, similar guidance and approval were given by the Research Ethics Committee of the General Directorate of Health Affairs (Jazan), Ministry of Health, Saudi Arabia. Permission to access the data was obtained from the Hospital Director and coordinated with the medical records department.

Before data collection began, the researcher received suitable training from the medical records technicians on how to use medical records and collect the required data at the hospital. The data collection tool was piloted using 10 medical records to ensure that all relevant information could be gathered. Obtained data were anonymized, and the last four digits of each patient's hospital ID substituted with identification letters. Names, addresses or other personal information were not collected. In addition, the prescribers' identities were anonymized using a unique identifier number. Information on KFCH physicians' current practices was gathered from the medical records and entered into the data collection tool for comparison with the audit criteria. No names, addresses and other personal information were collected.

Data extracted from the medical records were coded by one of the authors (A.D.) as "YES or NO" options to indicate whether or not the criterion had been met. Data were transferred from the data collection sheet (MS Word) into an MS XL file and then entered into STATA 14 for analysis [22]. All variables (i.e., criteria) had a "YES/NO" response. These responses were recoded for convenience as follows: all "YES" responses were recoded as 1, and all "NO" responses were recoded as null. Tabulate (tab) and summarize (sum) commands provided the descriptive statistics in STATA and showed the number (and percentage) of records that met each criterion. The reliability of the findings was addressed by using a structured and documented process for data collection and analysis. The validity was addressed by the process of inspecting the data collected at the different stages. Figure 1 presents a summary of the study process.

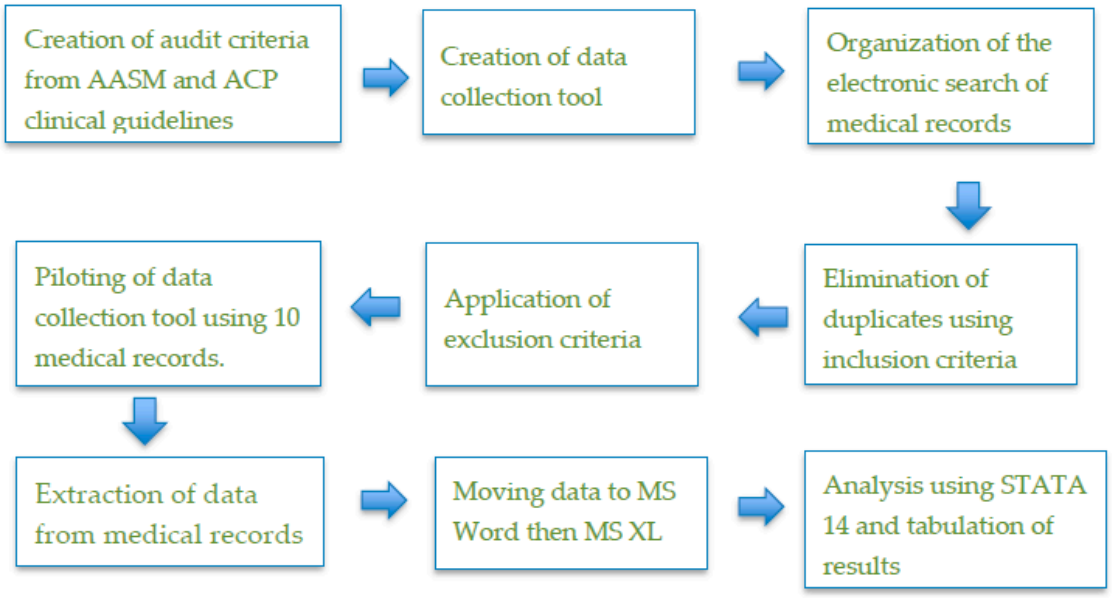

Figure 1. Summary of the study process.

3. Results

The results were computed based on 504 medical records of patients treated for insomnia using BZDs or Z-drugs or any other medication. Of the 504 records which met the inclusion criteria:

- 75% (379) of patients were prescribed BZDs or Z-drugs, and of these, 48% (182) had clearly documented indications for their use.
- 61% (307) of patients received some form of medication for insomnia; none were offered or received CBT-I as a first-line treatment; 59% (182) used BZDs or Z-drugs as first treatment, of which 65% (118) began with the lowest recommended dose; 51% (93) of all prescriptions complied with the recommended duration.
- After being prescribed BZDs or Z-drugs and beginning medication use, no patient was reviewed by the physician for the effects of long-term use.
- 44 % (134) of patients were given anti-histamines or anti-histamine analgesics (combination of paracetamol and diphenhydramine) for insomnia.

In addition, antipsychotic medicines such as quetiapine and olanzapine or antidepressants such as mirtazapine and doxepin were prescribed for some patients as first line pharmacological treatment. Table 2 shows that physicians in KFCH do not follow the current US guidelines for insomnia treatment.

Table 2. Number and percentage of the responses to the audit criteria.

Indicators	Records	Count Yes	Percentage %
Patients who received BZDs or Z-drugs had clearly documented indications for use	379	182	48
Patients received CBT-I as the initial treatment (documented)	307	0	0
Patients were prescribed BZDs or Z-drugs if pharmacological treatments were considered	307	182	59
Patients were initially prescribed the lowest licensed dosage of prescribed BZDs or Z-drugs	182	118	65
Patients were prescribed BZDs or Z-drugs for 4-5 weeks	182	93	51
Patients on long-term use of medicines were reviewed by their doctors every few weeks or monthly, and then every 6 months	89	0	0
To treat chronic insomnia, anti-histamine or anti-histamine analgesic medicines were used	307	134	44

The most important points are that CBT-I was not used as an initial treatment, BZDs and Z-drugs were prescribed without documented indications for use, patients were not reviewed by their doctors once they started using the medicines, and physicians used non-recommended medicines such as anti-histamines to treat insomnia. Table 3 shows how many criteria were followed based on each individual record.

Table 3. Criteria followed by individual records.

Number of Criteria Met	Count	Percentage (%)
Met 0 criteria	13	4.2
Met 1 criterion	105	34.2
Met any 2 criteria	47	15.3
Met any 3 criteria	69	22.5
Met any 4 criteria	62	20.2
Met any 5 criteria	11	3.6
Total	**307**	**100**

It should be noted that none of the records met all the criteria or even six of them, and only 11 (3.6%) met five criteria. Approximately one-third of the records of patients diagnosed with insomnia met only one criterion. This means that physicians at KFCH are either unaware of current guidelines or are unwilling to comply with them when treating patients with insomnia.

4. Discussion

To the best of our knowledge, this audit study is the first to assess the practice of prescribing BZD and Z-drugs in the KSA. The current results indicate that physicians at KFCH do not follow the US guidelines for prescribing BZD or Z-drugs for insomnia, nor do they comply with all audit criteria developed from these guidelines. After excluding the first and sixth criteria (using CBT-I as initial therapy and reviewing patients taking the drugs for long periods), only 60 medical records met the remaining five audit criteria (less than one-fifth of cases). Additionally, 109 medical records of the 307 patients who were diagnosed with insomnia failed to meet even one of the six criteria. Therefore, physicians treated one-third of patients with primary insomnia without reference to the guidelines. This suggests that many KFCH physicians are either unaware, unwilling or unable to comply with international guidelines.

Furthermore, documented indications of use were found in less than half of patients prescribed the drugs under investigation. This might be due to an inadequate prescribing system, physicians' busy schedules, or because they are not aware of the guidelines or the value of recording indications for drug use. Alternatively, physicians might not believe that the symptoms/indications warrant documentation. However, it is important for other physicians to have a complete patient history of drug-use to ensure that they can undertake a thorough diagnosis of the patient before initiating or continuing treatment [23].

The Clinical Guidelines for the Evaluation and Management of Chronic Insomnia in Adults [3] recommend that BZDs and Z-drugs should be prescribed only after accurate diagnosis and when symptoms are associated with daily dysfunction [3]. Telephone interviews in the UK, Germany, Italy, and Portugal have found that chronic insomnia is related to anxiety and depression [24]. For this reason, a clear indication should be documented to improve physician-to-physician communication and help physicians to consider the underlying issues associated with chronic insomnia. To avoid prescription duplication, physicians need to document indications for the use of BZDs and Z-drugs, which would assist other professionals with patient treatments. Furthermore, poor documentation can lead to severe consequences such as misdiagnosis, lack of communication between physicians, and/or inappropriate prescribing of medications [25].

Our study findings show that compared to US guidelines, BZDs and Z-drugs were prescribed inappropriately for the majority of patients at KFCH. The audit also revealed that no patient received

CBT-I as a preliminary treatment step, as recommended by the US guidelines [3,7]. Although the evidence shows that CBT-I has the same effect in the management of insomnia as pharmacological treatments for short periods, is superior for long periods, and is preferred by patients [26], this was clearly not the case at KFCH where patients did not receive CBT-I.

The guidelines from the AASM state that combined treatments (CBT-I and pharmacological) are required and even preferred when the availability of other treatments, the occurrence of side effects, dependence on past treatment, and patient preference are considered [3]. This audit found that pharmacological treatment was the only documented method of treatment administered to patients with insomnia at KFCH. This discrepancy might be due to a belief that CBT-I is not effective or worth documenting, or due to the physicians' busy schedule and the short consultation time. The lack of a referral process or shortage of psychologists with expertise in CBT-I might also explain its non-use. According to Saudi Arabia–World Health Organization (2014), in the Kingdom (population: 32 million) only 1.38 psychologists exists per 100,000 of the population [27].

The results also indicated that physicians at KFCH did not prescribe BZDs or Z-drugs for two-fifths of patients diagnosed with insomnia. The audit showed that physicians prescribed antipsychotic medicines such as quetiapine and olanzapine or antidepressants such as mirtazapine and doxepin. In addition, many prescribed anti-histamines or anti-histamine analgesics, either alone or with other medicines, were given to more than 43% of patients, even though the AASM recommends neither for chronic insomnia [3]. Although the KSA's Ministry of Health Drug List recommends the use of temazepam and nitrazepam [28], physicians at KFCH do not prescribe these medications. These findings confirm that many physicians at KFCH do not comply with the US guidelines concerning the use of BZDs or Z-drugs as an initial treatment for insomnia. This might be due to unawareness or a lack of concern regarding side effects.

More worryingly, over one-third of patients were not prescribed the lowest effective dose of BZDs or Z-drugs, and most elderly patients were prescribed the same dose as younger adults. This ignores the US guidelines that state that older patients should receive half the standard adult dose and that doses should be limited to prevent addiction issues and severe side-effects [3]. Older adults are more susceptible to BZD or Z-drug toxicity, which might result in permanent sedation, falls, coma and/or death due to overdose [29]. High dosage prescriptions of BZDs or Z-drugs in KFCH suggest that elderly patients are vulnerable to poisoning by these medicines and that physicians are aiding their misuse. This agrees with a study in the UK [9], which reported that healthcare professionals are the most common cause of the misuse of BZDs and Z-drugs due to their inappropriate prescribing practice.

Another significant problem is that approximately half of the prescriptions were not compliant with the recommended maximum duration of treatment (4–5 weeks). This finding closely mirrors previous research projects conducted by other researchers in the UK and Ireland, which report that BZDs and Z-drugs are often prescribed for extended periods [9–12], which increases the risk of dementia, especially with long-term use (more than three months) in elderly patients [30]. There is no knowledge about outcomes in patients who receive BZDs or zolpidem at KFCH long-term, especially regarding risks and side-effects.

The results of the present study showed that doctors did not review patients on long-term use of BZDs or zolpidem, the only Z-drug available in the KSA, once they began using the medication; this clarifies the continued prescription of these medicines for years by these physicians. This also clarifies the likelihood of misuse of BZDs or Z-drugs by patients, or the development of dependency or addiction to these drugs. It is possible, even probable, that most patients in the KSA are unaware of the risks or side effects of such medicines. In fact, during data collection, we noticed that patients often visited different clinics for the same medicine; these patients whose doctors fail to conduct a follow-up are at high risk of dependence and drug–drug interactions [29]. For example, evidence suggests that BZD use by patients with pulmonary disease might lead to respiratory depression [31]. Moreover, drugs lose their sleep-inducing efficiency with prolonged use [31].

This study had several strengths. To the best of our knowledge, this study is the first to explore the treatment of insomnia in the KSA. More importantly, it provides researchers with baseline information for further research. The study was also conducted in a major regional hospital (KFCH) in Jazan, one of the many hospitals run by the MOH. We feel that KFCH in Jazan is representative of other major hospitals of the MOH in the Kingdom. In other words, the practice identified here could be consistent with other major hospitals of the MOH and, thus, the findings might be extrapolated to them.

One of the study's limitations is its retrospective nature; older records were still being copied by the Department of Medical Records from patients' paper records at the time of the study, raising the possibility that the study's information might be incomplete. Despite this, the study may present a reasonably accurate overview of current practice at KFCH. Another limitation is that it was conducted in a single hospital in the KSA. Further work is therefore needed to determine practices nationwide.

5. Conclusions

The present study shows that physicians at KFCH do not comply with the guidelines developed by the US [3,7] regarding the use of BZDs and Z-drugs to treat chronic, primary insomnia, and do not document indications for their use; the latter requires clarification. A second issue is that the non-pharmacological treatment form of insomnia (CBT-I) is not used in this major hospital. Therefore, this study's essential recommendations are that initial treatments for patients with primary insomnia should be CBT-I and all physicians should be aware of its importance. Using non-pharmacological treatment methods might ameliorate and/or prevent drug misuse. In any case, prescribing practices related to the duration of treatment in the KSA do not conform to the US guidelines. To understand the basis for this occurrence, further research on the factors that guide diagnostic and treatment practices for insomnia in the Kingdom is required. Finally, the results show that patients using hypnotics for the long-term were not reviewed by their doctors. It is important for patients to attend weekly and monthly check-ups to ensure treatment process and the effects of medicines are determined in a timely manner.

To overcome issues regarding the use of hypnotics in the KSA, the Saudi Ministry of Health should review physicians' practices and the availability of medicines on the Drug List; offer training to prescribing physicians regarding best practice guidelines for managing insomnia; and introduce an electronic care plan that prompts prescribers to consider CBT-I, choose the correct drug, dose, duration, and review the patient's medical history. The hospital's computerized system should be improved and physicians should be trained to use it. Saudi standards and guidelines for insomnia treatment are required to govern the use and prescription of sleep medications. This will also help to provide long-term optimal patient care.

Author Contributions: I/we certify that I/we have participated sufficiently in the intellectual content, conception and design of this work or the analysis and interpretation of the data (when applicable), as well as the writing of the manuscript. I/we take public responsibility for the work and have agreed to have my/our name listed as a contributor to the work. Intellectual content, A.D. and K.R.; conceptualization, A.D., K.R., D.G. and A.S.B.; methodology, A.D., K.R., D.G. and A.S.B.; investigation, A.D.; formal analysis, A.D., K.R., D.G. and A.S.B.; writing—original draft preparation, A.D. and K.R.; writing—review and editing, D.G. and A.S.B.; supervision, K.R.

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References

1. Olfson, M.; King, M.; Schoenbaum, M. Benzodiazepine use in the United States. *JAMA Psychiatry* **2015**, *72*, 136–142. [CrossRef] [PubMed]
2. NICE. Hypnotics. 2015. Available online: https://www.nice.org.uk/advice/ktt6 (accessed on 20 June 2016).

3. Schutte-Rodin, S.; Broch, L.; Buysse, D.; Dorsey, C.; Sateia, M. Clinical guideline for the evaluation and management of chronic insomnia in adults. *J. Clin. Sleep Med.* **2008**, *4*, 487–504. [PubMed]
4. Sateia, M.J.; Buysse, D.J.; Krystal, A.D.; Neubauer, D.N.; Heald, J.L. Clinical practice guideline for the pharmacologic treatment of chronic insomnia in adults: An American Academy of Sleep Medicine Clinical Practice Guideline. *J. Clin. Sleep Med.* **2017**, *13*, 307–349. [CrossRef] [PubMed]
5. Riemann, D.; Baglioni, C.; Bassetti, C.; Bjorvatn, B.; Dolenc Groselj, L.; Ellis, J.G.; Espie, C.A.; Garcia-Borreguero, D.; Gjerstad, M.; Gonçalves, M.; et al. European guideline for the diagnosis and treatment of insomnia. *J. Sleep Res.* **2017**, *26*, 675–700. [CrossRef] [PubMed]
6. NINC. Guidance on the Use of Zaleplon, Zolpidem and Zopiclone for the Short Term Management of Insomnia: Technology Appraisal Guidance. 2004. Available online: https://www.nice.org.uk/guidance/ta77/chapter/1-Guidance (accessed on 15 June 2016).
7. Qaseem, A.; Kansagara, D.; Forciea, M.A.; Cooke, M.; Denberg, T.D. Management of Chronic Insomnia Disorder in Adults: A Clinical Practice Guideline from the American College of Physicians. *Ann. Intern. Med.* **2016**, *165*, 125–133. [CrossRef] [PubMed]
8. ISS. The first Guidelines for the Assessment and Management of Patients with Sleep Disorders. Available online: http://www.irishsleepsociety.org/guidelines.htm (accessed on 12 July 2016).
9. Kapil, V.; Green, J.L.; Le Lait, C.; Wood, D.M.; Dargan, P.I. Misuse of benzodiazepines and Z-drugs in the UK. *Br. J. Psychiatry* **2014**, *205*, 407–408. [CrossRef] [PubMed]
10. Siriwardena, A.N.; Qureshi, M.Z.; Dyas, J.V.; Middleton, H.; Orner, R. Magic bullets for insomnia? Patients' use and experiences of newer (Z drugs) versus older (benzodiazepine) hypnotics for sleep problems in primary care. *Br. J. Gen. Pract.* **2008**, *58*, 417–422. [CrossRef] [PubMed]
11. Singh, G.; Bhardwaj, R. Audit on use of hypnotics for insomnia in comparison with national institute of clincal excellence guidelines. *Eur. Psychiatry* **2010**, *25*, 991. [CrossRef]
12. Cadogan, C.; Ryder, S. An audit of prescribing practices for benzodiazepines and Z-drugs. *Ir. Med. J.* **2015**, *108*, 84–86.
13. Bahammam, A.S. Sleep medicine in Saudi Arabia: Current problems and future challenges. *Ann. Thorac. Med.* **2011**, *6*, 3–10. [CrossRef]
14. BaHammam, A.S.; Al-Jahdali, H.; AlHarbi, A.S.; AlOtaibi, G.; Asiri, S.M.; AlSayegh, A. Saudi regulations for the accreditation of sleep medicine physicians and technologists. *Ann. Thorac. Med.* **2013**, *8*, 3–7. [CrossRef] [PubMed]
15. Qureshi, N.A.; Al-Ghamdy, Y.S.; Al-Haddad, N.S.; Abdelgadir, M.H.; Tawfik, M.H. Integration of mental health care into primary care. Preliminary observations of continuing implementation phase. *Saudi Med. J.* **2001**, *22*, 899–906. [PubMed]
16. Koenig, H.G.; Al Zaben, F.; Sehlo, M.G.; Khalifa, D.A.; Al Ahwal, M.S.; Qureshi, N.A.; Al-Habeeb, A.A. Mental health care in Saudi Arabia: Past, present and future. *OJPSYCH* **2014**, *4*, 113. [CrossRef]
17. Al Ghamdy, Y.S.; Qureshi, N.A.; Abdel Ghadir, M.H.; Al Habeeb, T.A.; Ahmad, S.A. Psychotropic Drugs Prescriptions in Al-Qassim Region, Saudi Arabia. *East. Mediterr. Health J.* **1999**, *5*, 27–34.
18. Altokhais, T.I.; Al-Obaid, O.A.; Kattan, A.E.; Amer, Y.S.; CPG Collaborative Groups. Assessment of implementability of an adapted clinical practice guideline for surgical antimicrobial prophylaxis at a tertiary care university hospital. *J. Eval. Clin. Pract.* **2017**, *23*, 156–164. [CrossRef] [PubMed]
19. Albejaidi, F.M. Healthcare system in Saudi Arabia: An analysis of structure, total quality management and future challenges. *JAPSS* **2010**, *2*, 794–818.
20. Benjamin, A. Audit: How to do it in practice. *BMJ* **2008**, *336*, 1241–1245. [CrossRef]
21. Flegel, K. Tertiary hospitals must provide general care. *Can. Med. Assoc.* **2015**, *187*, 235. [CrossRef]
22. StataCorp. *Stata Statistical Software: Release 14*; StataCorp LP: College Station, TX, USA, 2015.
23. Center for Substance Abuse Treatment. *Clinical Guidelines for the Use of Buprenorphine in the Treatment of Opioid Addiction*; Substance Abuse and Mental Health Services Administration (US): Rockville, MD, USA, 2004.
24. Ohayon, M.M.; Roth, T. Place of chronic insomnia in the course of depressive and anxiety disorders. *J. Psychiatr. Res.* **2003**, *37*, 9–15. [CrossRef]
25. Schaeffer, J. Poor Documentation: Why It Happens and How to Fix It. *For The Record*. 2016. Available online: https://www.fortherecordmag.com/archives/0516p12.shtml (accessed on 22 May 2017).
26. Stepanski, E.J. Hypnotics should not be considered for the initial treatment of chronic insomnia. *Con. JCSM* **2005**, *1*, 125–128. [PubMed]

27. Organization, W.H. Mental Health Atlas Country Profile. 2014. Available online: http://www.who.int/mental_health/evidence/atlas/profiles-2014/sau.pdf (accessed on 28 October 2018).
28. Essential Medicines and Health Products Information Portal. Ministry of Health Formulary (MOHF) Drug List, 2nd Revised ed. 2014. Available online: http://apps.who.int/medicinedocs/en/d/Js23157en/ (accessed on 20 June 2016).
29. Gunja, N. The clinical and forensic toxicology of Z-drugs. *J. Med. Toxicol.* **2013**, *9*, 155–162. [CrossRef]
30. James, W. Hypnotics and the risks of dementia. *JCSM* **2017**, *13*, 837. [CrossRef] [PubMed]
31. George, C. Perspectives on the management of insomnia in patients with chronic respiratory disorders. *Sleep* **2000**, *23*, S31–S35. [PubMed]

4.2 Conclusion

This chapter presented current clinical practice for using hypnotics to treat insomnia in adults by auditing 504 medical records. In general, the study showed that physicians working at KFCH in Jazan did not comply with US guidelines. It is important to understand the reasons for this occurrence and factors that impact physicians' behaviour when using international guidelines to treat insomnia, so an interview study was conducted with some of these physicians (see Chapter 5).

CHAPTER FIVE

5 Perceptions of physicians in Saudi Arabia on the use of international clinical guidelines for managing primary insomnia

5.1 Publication relevance to thesis

Chapter Five presents the publication**:**

Dobia A, Ryan K, Abutaleb M, Edwards A (2019) Perceptions of physicians in Saudi Arabia on the use of international clinical guidelines for managing primary insomnia. PLoS ONE 14(8): e0220960. https://doi.org/10.1371/journal.pone.0220960

I certify that I have participated sufficiently in the intellectual content, conception and design of this study. I also collected and analysed the data and wrote the paper. Co-authors supported me with the study design, analysis checking and feedback on early drafts.

This paper presents the findings of the interview study that was conducted to explore the knowledge, perceptions, and attitudes of physicians practising in Saudi Arabia about using international guidelines for managing insomnia.

PLOS ONE

RESEARCH ARTICLE

Perceptions of physicians in Saudi Arabia on the use of international clinical guidelines for managing primary insomnia

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Abstract

Introduction

While there are no national clinical guidelines for managing primary insomnia in Saudi Arabia, there are also no published studies of physicians' perceptions of and attitudes towards using international guidelines. The objective of this study was to explore the knowledge, perceptions, and attitudes of physicians practising in Saudi Arabia about using international guidelines for managing insomnia.

Methods

A qualitative study using in-depth, face-to-face, and semi-structured interviews with 15 physicians held in July 2017 at a tertiary care hospital in Jazan, the distal south-western province in Saudi Arabia. Interviews were audio-recorded, transcribed verbatim, coded using the qualitative software NVivo11 and analysed thematically. Data saturation was assumed as no new understandings of the broad thematic issues were produced by the last three interviews.

Results

Themes identified were: Knowledge, Resistance, Barriers and Facilitators. Participants acknowledged their lack of awareness of available guidelines and their lack of training and education about Cognitive Behavioural Therapy for Insomnia (CBT-I). They highlighted a lack of education for patients about insomnia and its treatment. Beliefs about dependence on hypnotics and the inappropriateness of international guidelines for Saudi Arabia inclined many to resist using them. Inability to document diagnosis and consultations due to limited time and lack of suitable electronic systems, lack of suitably trained practitioners for referral for CBT-I, and lack of accountability for practice were identified as key barriers to following international guidelines. Development of national guidelines was the most important facilitator suggested by participants.

Competing interests: The authors have declared that no competing interests exist.

Conclusions

The health authorities in the government of the Kingdom of Saudi Arabia (KSA) should improve general public awareness about sleep disorders and provide focused training for specialists and technologists. Above all, KSA needs its own nationwide guidelines for treating sleep-disorders based on evidence-based clinical trials, consistent with its history, culture, socioeconomic conditions and traditions.

Introduction

Clinical guidelines are known to reduce inconsistent prescribing practices [1]. Their purpose is to organize and provide the best available evidence to support clinical decision-making about the quality of care, patient outcomes and cost-effectiveness [2, 3]. While the number of guidelines for healthcare-use continues to grow, their practical implementation is often slow, complex, and unpredictable [4–6].

Although general practitioners have a largely favourable attitude to clinical guidelines, many do not follow them [7, 8]. The reasons for this are many and varied but a lack of applicability to patient needs is high among them. It appears not to matter whether the guidelines are prescriptive or proscriptive, whether they encourage or discourage certain types of behaviour or treatment; physicians are reluctant to follow them [9]. Nevertheless, non-adherence can lead to suboptimal or even inadequate treatments, and to unnecessary diagnostics [10].

Most methods used to change clinical practice have been based on beliefs rather than on scientific evidence [11]. To improve physician's adherence to clinical guidelines, therefore, investigating knowledge, beliefs, and the presence of barriers and facilitators to following them is crucial [11, 12]. Many functional barriers to guideline-use have been identified, such as the practitioner's limited expertise, the patient's awareness of the drugs, and the social, cultural and organizational context in which the treatment occurs [11–15]. These barriers can be classified into personal, guideline-related, and external factors. A systematic review by Cabana and colleagues (1999) of barriers to physician adherence included 76 studies. The authors developed a framework in which barriers were classified into three categories: those related to the physician's knowledge, (e.g., lack of awareness and lack of familiarity), those that influenced the physician's attitude (e.g., lack of agreement and lack of motivation) and those related to behaviour (e.g., patient preferences, guideline characteristics and physician's lack of time) [13]. In a more recent study (2009) that focused on guideline recommendations, the barriers most often identified were: the physician's lack of agreement with the recommendations due to limited applicability or lack of evidence (68% of key recommendations), environmental factors such as organisational constraints (52%), lack of knowledge regarding guideline recommendations (46%), and factors such as unclear or ambiguous recommendations (43%) [16].

Healthcare authorities would benefit from understanding the perceptions of and attitudes towards the use or non-use of clinical guidelines by physicians. A recent qualitative study of 46 Spanish physicians, coordinated in six discussion groups, revealed two principal factors that influenced their perceptions of clinical guidelines: "knowledge" and a sense of "usefulness". These were related to other factors, including confidence in guidelines, usability, accessibility, ease of dissemination, and guideline formats [17].

There is little qualitative research in the Middle East about the knowledge, perceptions and attitudes of general practitioners towards clinical practice guidelines (CPGs) that can help to facilitate implementation of good practice. A recent study in the United Arab Emirates, found

that practitioners had a positive attitude towards CPGs and welcomed the use of evidence-based practice that is supported by electronic medical records, persistent quality monitoring and structured care programmes [18]. Participants, however, also expressed negative attitudes towards impractical guidelines, inconsistent recommendations among guidelines and the possibility of 'changing evidence' [18].

In Saudi Arabia, the few quantitative studies [19, 20] that have been conducted, found that practitioners had positive attitudes towards and were satisfied with CPGs. This was because of the potential of CPGs to reduce risk and variation in healthcare practice, improve safety, and be useful sources of advice for patients. A cross sectional survey conducted at the King Khalid University Hospital revealed that 99% of practitioners thought that CPGs were good tools for clinical practice in that they increased safety and uniformity of practice, thereby decreasing risk. In addition, 98% had confidence in well-developed guidelines especially for the management of diabetic keto-acidosis [19]. Almazrou and Alnaim (2018), in Riyadh, Saudi Arabia, found that 89% of physicians used clinical guidelines in the management of their patients either because they were based on evidence (84%) or because it was a requirement by the institutions where they work (40%) [21]. The main barriers against the implementation of clinical guidelines in the region were the lack of awareness of the guideline and knowledge of its use and application [21]. Also, a self-administered questionnaire conducted in Riyadh found that 40% of physicians did not consider sleep disorders a distinct specialty [22]. The researcher reported poor recognition of some serious consequences of sleep disorder and a lack in education and training among these physicians. Only 15% of them had attended lectures about sleep disorders during their postgraduate training or practice [22].

Insomnia is one of the most prevalent diseases in Saudi Arabia. It has been found to affect up to 78% of the population and the level of services provided in the country are below the level of services provided in other developed countries even though there have been improvements in these services since 2005 [23,24]. Benzodiazepines are also reported to be some of the most abused drugs among the youth in Saudi Arabia [25]. Accordingly, sleep medicine is considered to be a modern specialty in Saudi Arabia and it is being expanded due to the increasing demand for specialized practitioners to provide accurate diagnosis and appropriate management for sleep disorders including insomnia [24].

In the absence of national Saudi guidelines for treating primary insomnia, previous work has shown that many physicians follow (or at least consult) United States (US) guidelines, which the Saudi Ministry of Health (MOH) considers to be best practice [26, 27]. An audit, however, of medical records of patients who were prescribed benzodiazepines (BZDs) or Z-drugs (from April 2012 to March 2017 in the same institution as the interview study reported here) compared practice with US guidelines and found that physicians did not actually follow US or international guidelines [28]. Imperatively, further research is needed into the factors that guide diagnostic and treatment practices in Saudi Arabia. Therefore, in this paper, drawing on what participants had to say about their current knowledge and practices, we address the question: What are the perceptions, attitudes and knowledge of physicians in KSA towards international guidelines for managing primary insomnia?

Methods

The study was conducted in a public tertiary care hospital located in Jazan Province, the distal southwestern region in Saudi Arabia. A purposive sample of physicians who were prescribers of BZDs or Z-drugs for insomnia between 2012 and 2017 was recruited. Potential participants were identified by the lead pharmacist, and provided with an invitation pack, containing an Invitation Letter and Information Sheet. Two potential participants chose not to proceed

because they lacked adequate knowledge about the study subject. The researcher (AD) continued inviting physicians until the required number of 15 was reached. An interview guide, designed to encourage participants to talk in a conversational manner about their experiences, was developed based on the literature and findings from a previous audit study conducted in the same hospital [28]. The interview questions were piloted with one physician prior to conducting the study.

Face-to-face, in-depth, semi-structured interviews with AD were digitally audio-recorded with the physicians' permission. Participants were interviewed in English using open questions open-ended such as "How do you manage patients with insomnia?", "Which guidelines do you follow when prescribing for patients with insomnia?" and "Where did you learn about the guidelines?" Follow-up questions arose from the participant's answers. Probing questions elicited further information if and when required. Participants were asked to reflect upon some of the findings from the previous audit [28].

Interviews were transcribed verbatim, anonymized, and entered into the qualitative software NVivo 11 (QSR International) for initial coding. The researchers met regularly to discuss the developing coding schema and resolve discrepancies to reduce the possibility of researcher bias. Data were then coded by AD using an inductive approach and analysed using thematic analysis [29]. The interviews were read and re-read and material relevant to each code was collated and relevant codes combined into potential themes and sub-themes [29]. The codes were read against each theme to ensure a coherent pattern and the same process was followed for the whole data set [29]. Verbatim extracts illustrating the themes were selected for reporting in this paper. Ethical guidance (approval number 17/15) was obtained from the University of Reading Ethics Committee (UREC) and from the Research Ethics Committee (REC) at the General Directorate of Jazan Health Affairs, MOH, KSA.

Results

Fifteen physicians, who were prescribing BZDs and Z-drugs between April 2012 and March 2017, took part in interviews lasting 18–50 minutes. Table 1 shows selected demographic details of the participants.

Three principal themes (illustrated in Fig 1) were found from the interview data: knowledge, resistance, and barriers and facilitators. Sub-themes of knowledge encompassed lack of physician awareness of insomnia guidelines, lack of physician education and training of CBT-I and lack of patients' understanding of insomnia and associated treatments. Sub-themes of resistance comprised beliefs of physicians about dependence and the inappropriateness of international guidelines to be implemented in their current care provision. Barrier sub-themes included inability to accurately document diagnosis and consultations, lack of CBT practitioners or lack of suitable referral for CBT-I, and lack of accountability for practice. Development of local guidelines for management of insomnia was the only facilitator. Themes and subthemes with illustrative quotations from participants (in italics) are presented below.

Knowledge

Issues related to both physicians' and patients' knowledge of primary insomnia and appropriate treatments were identified through three subthemes.

Lack of physicians' awareness of insomnia guidelines. When participants were asked about international guidelines for treating insomnia, some acknowledged that they knew little or nothing about them. They usually focus, they said, on their specialty, managing patients with insomnia according to what they know or had learned from colleagues.

Table 1. Demographic details of participants.

Variables–Number
Gender
• Male: 14
• Female: 1
Specialties
• Psychiatry with training in the field of sleep medicine (SM): 3
• Psychiatry: 5
• Neurology: 2
• Family medicine: 4
• Internal medicine: 1
Professional status
• Consultant: 7
• Specialist: 6
• Resident: 2
Years of experience
• <2 years: 2
• 3–5 years: 2
• 6–10 years: 4
• >10 years: 7
Nationality
• Saudi Arabian: 7
• Egyptian: 5
• Sudanese: 2
• Syrian: 1
Place of education and training
• Inside Saudi Arabia: 6
• Canada: 1
• Egypt: 5
• Sudan: 2
• Syria: 1

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No fixed international or national guidelines applied, at least for me. I have never seen the guidelines. (Psychiatrist >10 years' experience)

I don't know if there is a specific guideline for insomnia . . . we depend on general advice about drugs that cause sleepiness, either as a side effect or as a target to treat sleep disorders or insomnia per se. (Neurologist>10 years' experience)

Some participants believed that such practices are common and that, while they might be unaware of specific guidelines for treating insomnia, they follow them nonetheless.

Maybe I am applying (the guidelines) without knowing. (Psychiatrist 6–10 years' experience)

If you are dealing with psychiatrists maybe they have specific guidelines to follow, but for non-psychiatrists I think we follow the general rules, you know, which usually come from the guidelines. They are not memorized, though; they make it as a subconscious practice but not according to the specific guidelines. (Neurologist>10 years' experience)

Lack of physicians' education and training about CBT-I and guidelines. When asked why they did not follow US guidelines for using CBT-I as a first-line treatment, most participants said that they lacked appropriate education and training.

We don't have trained persons who can give Cognitive Behavioural Therapy to the patients. I think only a psychiatric hospital has that. (Family medicine <2 years' experience)

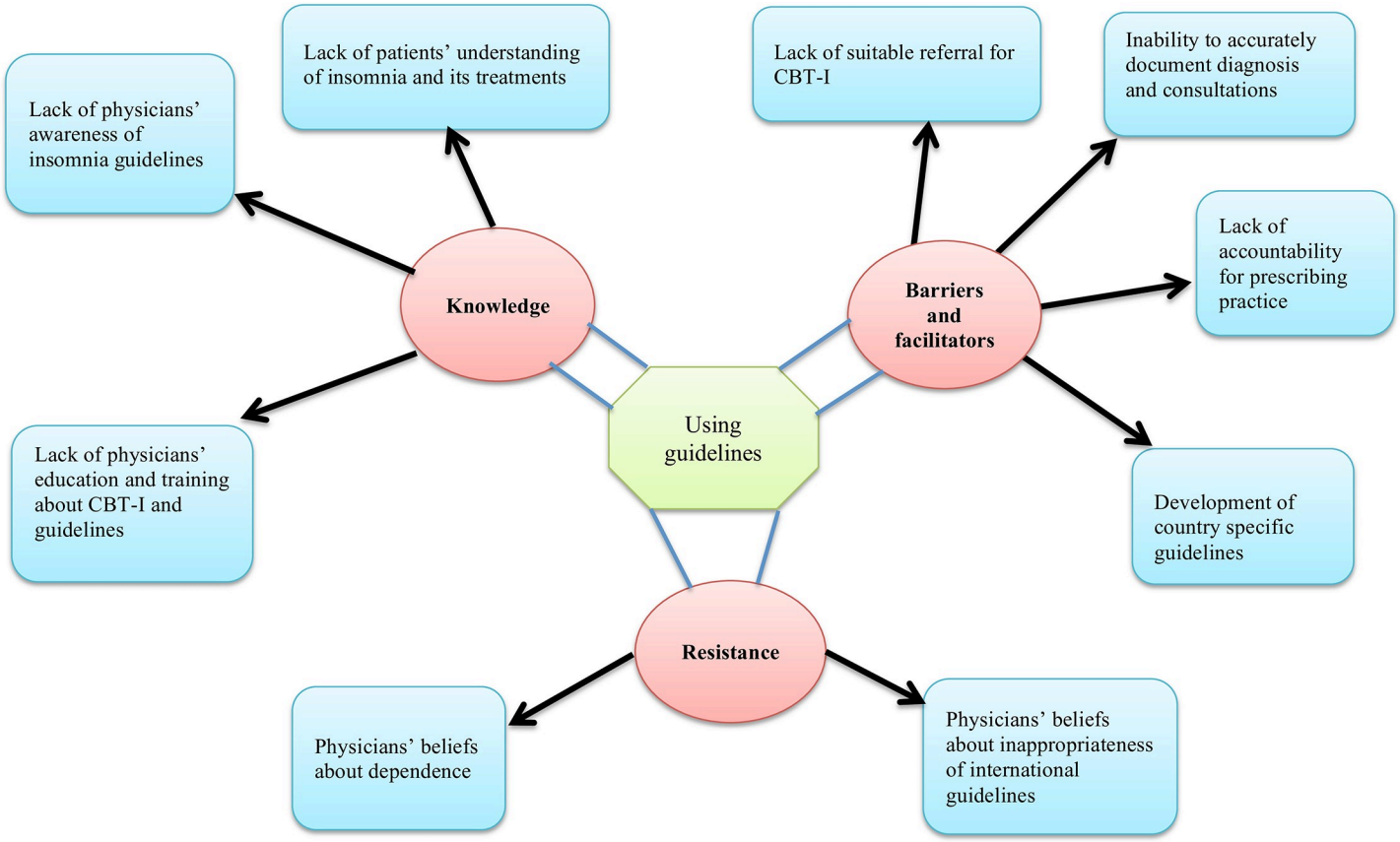

Fig 1. Analytical themes and subthemes.

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I don't know what you mean by this CBT or Cognitive Behavioural Therapy. (Neurologist>10 years' experience)

Asked whether they had a good knowledge about the guidelines and followed them for treating insomnia, some participants said that the health ministry should provide obligatory courses for training and encourage doctors to attend.

I think "No" and the solution to this problem is to make courses and training for doctors. The training can be in psychiatric hospitals and to be announced for doctors in every hospital that you must attend or it would be better for you to attend this course for two or three days and to reinforce those doctors if they attend by certificates or continuing medical education hours (Psychiatrist 6–10 years' experience).

Lack of patients' understanding of insomnia and its treatment. Participants discussed their expectations about patients in KSA in terms of their understanding of insomnia, the side effects of medications, and the patient's willingness to be referred to psychiatric hospitals for appropriate treatment. Physicians said that KSA patients are insufficiently informed to accept, for example, CBT-I treatments and/or they are unwilling to visit doctors without receiving prescription medicines.

Some people, especially in our area, are not educated, so because you are a doctor, you should treat with pharmacological treatments. (Psychiatrist trained in SM 3–5 years' experience)

Stigma related to visiting a psychiatric hospital, even for insomnia, is well known in KSA. For this reason, many participants said that they cannot be sure that patients will attend follow-up appointments or agree to CBT-I treatment in a psychiatric hospital.

Many patients who come to the clinic are still having the stigma. Even if he has insomnia and someone advises him to go to a psychiatric clinic, he is very reluctant to come to the clinic because, once he goes to the psychiatric clinic that means he is insane. So, the stigma of a psychiatric disorder including sleep disorders is still there, and even the doctor suffers a lot to explain psych-education. (Psychiatrist 6–10 years' experience)

Many participants were reluctant to prescribe BZDs or Z-drugs as a first-line pharmacological treatment for KSA patients, believing that many patients are insufficiently educated to stop taking the medication once they start. They thought that risks and side effects should be weighed against benefits, and BZDs or Z-drugs given only to well-informed patients.

Yes, in many cases I write benzodiazepines for short periods of time, but the patients must be highly educated. I must be sure that he is not (inclined to) substance abuse, so I write. I don't hesitate to write benzodiazepines for this patient. (Psychiatrist <2 years' experience)

Our patients don't read about the problem, about the medication itself, they don't know about side effects. This is one of the major dilemmas in our practice. (Family medicine 6–10 years' experience)

Resistance

Because of specific local challenges, such as culture and uneducated patients, some physicians resisted applying international guidelines. Reasons for resistance were identified through two subthemes.

Physicians' beliefs about dependence. One criterion most physicians disagreed with was prescribing BZDs or Z-drugs as a first-line pharmacological treatment for patients with insomnia. Most said that they prefer not to prescribe them to avoid their risk and side effects. For example:

I prefer the other medications [meaning anti-histamine with sedative effect, antidepressants or antipsychotics] because of fear of dependence. (Psychiatrist 6–10 years' experience)

Last choice is BZDs and non-BZDs group because I am fearful of the dependence of these medications, especially here in our region. (Psychiatrist 6–10 years' experience)

A few participants, fearing patients' dependence, believed that BZDs and Z-drugs should not be prescribed at all, even in the short term.

I start believing do not give it at all. Within one or two days, okay, people will get used to that even if they are not truly addicted but it is a very cheap and fast and perfect solution for the insomnia, that's what I believe. (Psychiatrist >10 years' experience)

Some participants held other views, believing that the drugs can be prescribed safely for short periods, but as mentioned above, only to well informed or highly educated patients who are unlikely to become dependent on them.

We are afraid of tolerance and dependence. . . our patients are not educated well to avoid this. . . poor education is a problem in communicating with patients. (Psychiatrist <2 years' experience)

Physicians' beliefs about the inappropriateness of international guidelines. Almost all participants had concerns about the suitability and applicability of international guidelines to their practice. The physicians spoke often of the difficulty in applying the guidelines to specific patients because of differences in culture, religion, and social norms.

I think the guidelines are like, how can I say it, not applicable in our countries. (Psychiatrist <2 years' experience)

In modifying, as I told you, I think there is some cultural, some genetics, some differences between our regions and western. So, their guidelines are slightly different and do not give such results which we are reading about. (Psychiatrist 6–10 years' experience)

Barriers and facilitators

Participants discussed barriers that hinder them from following international guidelines for treating insomnia. Analysis identified three principal barriers.

Inability to accurately document diagnosis and consultations. Many participants raised the issue of poor hospital documentation. They believed that guideline recommendations cannot be followed because the recording system is flawed. They would not prescribe a recommended medication with known risks and side effects without a robust documenting system to monitor patients and to prevent them from duplicating their medication. It is still too easy, in the absence of adequate documentation, for patients to visit different clinics, even at the same hospital, to get the same medications.

Maybe the problem is with the *hospital system because it is dangerous to start medications without documenting the cause because maybe the next time you are not the one who will treat the patient. We have problems with documentation. If we start a patient with benzo he will continue forever on benzo because changing doctors and no documentation for how long he was using this medication and what was the cause. (Psychiatrist trained in SM 3–5 years' experience)*

Even though the physicians acknowledged the importance of documentation, and agreed that it is a pressing issue, most were reluctant to complete the necessary documentation themselves. Workload, time-limits and difficulties of using the computer/record system were the principal barriers. They suggested that documentation should be carried out by others, possibly by trained clerical staff.

Only few words (are) sometimes not efficient in the documentation. So, I think if there is a secretary or another person who can do this work, [it] will be helpful for the documentation and feedback. (Psychiatrist 6–10 years' experience)

We're supposed to do that. Frankly speaking not everyone is doing documentation including myself, of course, because of the tightness during the clinic especially, you know, if you have 25 patients within three hours and in the last one year we are dependent on the computer, so no more hand written so, again, there are some difficulties to type in the computer and sometimes the network is slow. (Neurologist>10 years' experience)

Lack of suitable referral for CBT-I. Participants raised the issue of the lack of appropriately trained health professionals, to whom to refer patients, which forces physicians to start the second line treatment immediately.

For CBT, we don't have expert professionals in CBT so usually they will skip to the next step in the guidelines, which is the medication (Psychiatrist trained in SM 3–5 years' experience)

We don't have one good place for psychotherapy (Psychiatrist >10 years' experience)

Lack of accountability for prescribing practice. It is also clear from the analysis that many instances of physician malpractice occur in prescribing and treating patients with insomnia. Such treatments endanger not only patients' health but also their lives. Some participants believed that physicians and other professionals should be held accountable for the consequences of their treatments, particularly when they do not conform to standard practice.

Some hospitals have no strict system for prescribing medications. (Psychiatrist trained in SM >10 years' experience)

Hospital issues, maybe there is no good system [for] the doctors [to follow]. I think these are the most things I can explain. No clear rules in the hospital that require the doctors to see [follow-up] their patients. (Family medicine>10 years' experience)

I think more and more malpractice and abuse for these medications especially in private hospitals. Some patients come to my clinic making quarrels with me because I am giving him only 10 tabs of Alprazolam and arguing with me and say I am going to that private hospital in Jeddah and I am receiving three boxes of Xanax. He is receiving about 300 tablets from private hospitals so he is shouting with me in the clinic to [prescribe] like the private hospitals. (Psychiatrist 6–10 years' experience)

Development of country specific guidelines. All participants expressed the need for guidelines to be developed and followed by all physicians in KSA hospitals. Such guidelines must align not only with the patients' needs but also with the history, culture, social practices and socioeconomic conditions of KSA.

I think the guideline is important. Patients are different from country to country, according to culture, according to education. Many factors are affecting patients and affecting our selection of drugs to our patients. (Psychiatrist <2 years' experience)

Country specific guidelines would help physicians diagnose and treat insomnia patients, many of whom present with symptoms related to cultural behaviours (for example the common use of Khat, a stimulant or amphetamine-like plant from Jazan Province), and have different treatment expectations from patients in other countries. Social barriers and other factors specific to KSA might affect the treatment of insomnia and need to be incorporated into country specific guidelines.

Those who are using drugs like (Khat) or (Amphetamine) are definitely have insomnia and will seek help. They will [shop around] and try to get benzodiazepines. If they could not get it they will try to get another medication, which can induce sleep. [Our] culture is different [from other countries]. (Psychiatrist >10 years' experience)

Local guidelines would, to some extent, protect physicians if their practices were assessed, for example:

Following our guidelines, it is not necessarily just aiming to give proper treatment but also to protect you and also the patient can go back to those guidelines and get convinced that the doctor is following the right guidelines. (Psychiatrist trained in SM >10 years' experience)

Discussion

Physicians revealed that their current practices and choices on whether or not to use available international clinical guidelines when treating primary insomnia depended on knowledge of and resistance to guidelines, the presence of barriers limiting their use, and the lack of facilitators to encourage adherence to the stipulated guidelines. Although some of the themes identified in this study are similar to those discussed in previous studies [16–18], no research, to the best of the authors' knowledge, has identified physicians' resistance to implementing international guidelines as a principal theme.

Some of the physicians recruited for this study, especially those who had more than 10 years of experience, admitted that they were unaware of international guidelines for insomnia treatment and that they normally focused on their specialty, treating patients based on the clinical knowledge and skills they acquired at college or from their colleagues. This finding agrees with research conducted in Estonia by Pille Taba (2012), which found that physicians practicing for over 25 years or those who treat patients in an outpatient setting find it difficult to use guidelines. This is because their prescribing practices are based on personal experience and how patients react towards certain prescribed drugs [30].

Several physicians acknowledged that they lacked training in and education about sleep disorders and associated treatment, which affected their practices. They said that they cannot provide CBT-I for their patients because they lack knowledge of and training in such treatments and do not have trained colleagues (eg. psychologists) to whom to refer patients. This finding supports studies conducted by Almeneessier & BaHammam (2017) who found that KSA lacks the education and training to help insomnia specialists to practice in the field [31], and a World Health Organisation mental health atlas KSA country profile (2014) that reported 1.38 psychologists per 100,000 population in KSA (population: 32 million) [32].

One factor that many physicians underscored was the patient's education about insomnia and its treatments and how it influenced, either positively or negatively, their (the participant's) clinical decision about following guidelines. Some participants stated that patients have been known to harass specialists for the medications they want, disregarding professional clinical advice, in contrast to what is happening in Europe, where many patients specifically choose psychological help [33]. Participants said that poor education of their patients resulted in feelings of being stigmatized if they were referred to a psychiatric hospital for non-pharmacological treatment or counselling. There is, additionally, the problem of the patient's health literacy, since many patients have little or no idea about the effectiveness and level of risk of dependence of some pharmacological treatments. In any case, patients can always seek a more compliant doctor, who will prescribe the drugs they want but which might not be in their best healthcare interests [34].

It is also clear that many physicians are reluctant to prescribe BZDs for their patients, even though these drugs are recommended in many international guidelines. This dated attitude towards using such medications affects best clinical practice and explains why physicians often use other medications such as zolpidem, antidepressants or antipsychotics. This finding agrees with a study conducted in Britain by Siriwardena et al., (2006), which indicated that general practitioners often prefer prescribing Z-drugs over BZDs, believing them to be more effective and safer, which is unsupported by the evidence [35]. In fact, this belief might be a cause for

resistance to international guidelines about hypnotics. According to Siriwardena et al., (2006), the problem has persisted for several years with most studies finding that physicians decide which medications to use according to their understanding of the medication's risk and side effects [35].

Generally, participants in the current study recognized the value of guidelines but they also believed that adherence must be flexible and adjusted according to the patient's educational status and to national contexts. The physicians maintained that international guidelines were valuable only if adapted for regional use. Inevitably, this leads to considerable resistance and non-adherence because cultures, religions and social values often diverge. We need to understand that countries are as different from one another as patients are from each other, and that those differences need to be considered. A study by Lugtenburg (2016) with Dutch general practitioners indicated that the lack of applicability to local conditions is the principal barrier to international guidelines being followed [16].

The need for a robust records system is also required to provide comprehensive documentation of patient care. Physicians indicated that their documentation system has several loopholes and that they tend to forego documentation of administrative issues, which contributes to poor records yet, paradoxically, they said that documentation is crucial for drug prescription purposes. This argument correlates with systematic review findings of Hasanain et al., (2014), that although the KSA government introduced the Electronic Medical Record [19] in 1988, the documentation system faced the challenges of software complexity, cost overruns, privacy concerns, inadequate uniform standards, and inadequate vendor maintenance and support [36]. Insomnia medications such as BZDs or Z-drugs are two prescriptive classes of drugs that require adequate documentation to ensure that patients are well monitored. The current study identified the lack of a user-friendly, reliable record system as a barrier to optimal patient care since many physicians were reluctant to prescribe medications such as BZDs or Z-drugs without adequate patient records.

Lack of accountability is still another challenge to consider with regard to the use of clinical guidelines [37]. Most KSA hospitals, especially private hospitals, do not have a reliable or clear system to track physician behaviour, which would encourage best practice and decrease instances of malpractice. The lack of accountability might lead to negligence and weak performance of practitioners and imperil patients' health and even their lives. Birrenbach et al. (2016) assessed the attitudes of physicians in Switzerland towards clinical guidelines and revealed that they believed that clinical guidelines were likely to improve quality of care and decrease malpractice [38]. Therefore, the MOH and other health sectors in Saudi Arabia should consider mandatory implementation of clinical guidelines in their hospitals to make healthcare professionals accountable for their practices. Moreover, implementation should be followed up with evaluation and monitoring of physicians' behaviours to ensure best practice.

Farquhar et al., (2002) in their systematic review revealed that most clinicians in Western countries viewed clinical practice guidelines as useful, cost-saving, educational and likely to improve quality of care. Some clinicians also perceived clinical guidelines as impractical for individualised care, potentially increasing litigation or disciplinary action and restricting clinician's autonomy [7].

Physicians in our study in Saudi Arabia paralleled the positive perceptions about guidelines of their Western counterparts but many claimed that international guidelines are inapplicable in KSA because of the different cultural, religious and social norms. They believed that physicians and other professionals should be held accountable for the consequences of their practices, however, there was no mention of litigation, limited clinician autonomy or costs of health care.

This study is the first of its kind to explore physicians' perceptions about treating insomnia in the KSA. The semi-structured interview enabled participants to take the lead and to discuss

issues of importance to them. Data was analysed thematically which enabled the identification of key themes documenting the views of KSA physicians about their prescribing practices and attitudes towards international guidelines, giving them voice for the first time.

Hennick et al., (2016) stated that code saturation is usually reached after nine interviews, sufficient for the identification of broad thematic issues or the development of a survey instrument, but 16–24 interviews are needed to reach meaning saturation [39]. This study has produced a rich description of a purposive sample of Saudi physicians' attitudes towards the use of guidelines, with several examples of variation in each code and theme, which assisted the presentation of data that was appropriate and adequate. Since no new understandings were discerned from the last three interviews, data saturation was assumed to have occurred.

Although the study was conducted in a single site and interviewed only 15 physicians, which can be considered as limitations, it reflects the common structure of the health system in the KSA. Most provinces have one central tertiary care hospital that receives referrals from general hospitals and their nearby primary care centres. The study was conducted in a tertiary hospital in KSA belonging to the government sector, and reflects practices for more than 60% of the population countrywide. We, therefore, expect that findings are transferable and can be extrapolated to similar contexts.

Conclusion

Practice in this hospital and probably across the KSA is below internationally accepted standards and urgent action is required. The current situation does not encourage physicians to follow international guidelines, and therefore many ignore them. There are also cultural influences, chiefly in the form of beliefs and attitudes that affect both patients and physicians.

The KSA medical community should be familiarised with sleep disorders and their treatments and be held accountable for their prescribing practices. Medical practitioners should be able to avail themselves of all possible treatment regimens for their patients, including CBT-I, which should be provided by psychologists in non-psychiatric hospital settings. The government of KSA should enhance awareness in the general public about sleep hygiene and disorders. The MOH should establish a robust electronic system linking all hospitals and primary health care centres, and encourage documentation. They should also regulate prescribing behaviour and hold professionals to account for their practices. Above all, KSA needs its own evidence-based nationwide guidelines for treating sleep disorders according to its culture and socioeconomic conditions and traditions.

Author Contributions

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References

1. Gundersen L. The effect of clinical practice guidelines on variations in care. *Annals of Internal Medicine*. 2000; 133(4):317–317. https://doi.org/10.7326/0003-4819-133-4-200008150-00102 PMID: 10929192
2. Van Dulmen SA, Maas M, Staal JB, Rutten G, Kiers H, Nijhuis-van der Sanden M, et al. Effectiveness of peer assessment for implementing a dutch physical therapy low back pain guideline: Cluster randomized controlled trial. *Physical Therapy*. 2014; 94(10):1396–1409. https://doi.org/10.2522/ptj.20130286 PMID: 24830716
3. Campbell N, Feldman R, Drouin D. Hypertension guidelines: Criteria that might make them more clinically useful. *Americal Journal of Hypertension*. 2003; 16(8):698–699.
4. Sheldon TA, Cullum N, Dawson D, Lankshear A, Lowson K, Watt I, et al. What's the evidence that NICE guidance has been implemented? Results from a national evaluation using time series analysis, audit of patients' notes, and interviews. *British Medical Journal*. 2004; 329(7473):999. https://doi.org/10.1136/bmj.329.7473.999 PMID: 15514342
5. Grol R. Successes and failures in the implementation of evidence-based guidelines for clinical practice. *Medical Care*. 2001; 39(8 Suppl 2):li46–54.
6. Rycroft-Malone J, Seers K, Crichton N, Chandler J, Hawkes CA, Allen C, et al. A pragmatic cluster randomised trial evaluating three implementation interventions. *Implementation Science*. 2012; 7:80. https://doi.org/10.1186/1748-5908-7-80 PMID: 22935241
7. Farquhar CM, Kofa EW, Slutsky JR. Clinicians' attitudes to clinical practice guidelines: A systematic review. *Medical Journal of Australia*. 2002; 177(9):502–506. PMID: 12405894
8. Heselmans A, Donceel P, Aertgeerts B, Van de Velde S, Ramaekers D. The attitude of belgian social insurance physicians towards evidence-based practice and clinical practice guidelines. *BMC Family Practice*. 2009; 10:64. https://doi.org/10.1186/1471-2296-10-64 PMID: 19740436
9. Carlsen B, Glenton C, Pope C. Thou shalt versus thou shalt not: A meta-synthesis of GPs' attitudes to clinical practice guidelines. *British Journal of General Practice*. 2007; 57(545):971–978. https://doi.org/10.3399/096016407782604820 PMID: 18252073
10. Storm-Versloot MN, Knops AM, Ubbink DT, Goossens A, Legemate DA, Vermeulen H. Long-term adherence to a local guideline on postoperative body temperature measurement: Mixed methods analysis. *Journal of Evaluation in Clinical Practice*. 2012; 18(4):841–847. https://doi.org/10.1111/j.1365-2753.2011.01687.x PMID: 21518400
11. Grol R. Beliefs and evidence in changing clinical practice.[personal paper.]. *British Medical Journal*. 1997; 315(7105):418–421. https://doi.org/10.1136/bmj.315.7105.418 PMID: 9277610
12. Grol R, Grimshaw J. From best evidence to best practice: Effective implementation of change in patients' care. *The Lancet*. 2003; 362(9391):1225–1230. https://doi.org/10.1016/S0140-6736(03)14546-1
13. Cabana MD, Rand CS, Powe NR, Wu AW, Wilson MH, Abboud PA, et al. Why don't physicians follow clinical practice guidelines? A framework for improvement. Jama. 1999; 282(15):1458–1465. https://doi.org/10.1001/jama.282.15.1458 PMID: 10535437
14. Pagliari H, Kahan JP. Researching perceived barriers and facilitators to implementation. *Journal of Clinical Nurses*. 1999; 13(6):731–740. https://doi.org/10.1111/j.1365-2702.2004.00941.x
15. Robbie F, Anne W, Gillian P. Barriers to clinical guidelines: The need for concerted action. *British Journal of Clinical Governance*. 2001; 6(3):166–174. https://doi.org/10.1108/EUM0000000005680
16. Lugtenberg M, Zegers-van Schaick JM, Westert GP, Burgers JS. Why don't physicians adhere to guideline recommendations in practice? An analysis of barriers among dutch general practitioners. *Implementation Science*. 2009; 4:54. https://doi.org/10.1186/1748-5908-4-54 PMID: 19674440
17. Sola I, Carrasco JM, Diaz Del Campo P, Gracia J, Orrego C, Martinez F, et al. Attitudes and perceptions about clinical guidelines: A qualitative study with spanish physicians. *PLoS One*. 2014; 9(2):e86065. https://doi.org/10.1371/journal.pone.0086065 PMID: 24505253
18. Baynouna Al Ketbi LM, Zein Al Deen S. The attitudes and beliefs of general practitioners towards clinical practice guidelines: A qualitative study in al Ain, United Arab Emirates. *Asia Pacific Family Medicie*. 2018; 17:5. https://doi.org/10.1186/s12930-018-0041-2 PMID: 29853782

19. Amer YS, Al Nemri A, Osman ME, Saeed E, Assiri AM, Mohamed S. Perception, attitude, and satisfaction of paediatric physicians and nurses towards clinical practice guidelines at a University teaching hospital. *Journal of Evaluation in Clinical Practice*. 2018. https://doi.org/10.1111/jep.12923 PMID: 29611621

20. Wahabi HA, Alzeidan RA, Fayed AA, Esmaeil SA, Al Aseri ZA. Attitude and practice of the health care professionals towards the clinical practice guidelines in King Khalid University Hospital in Saudi Arabia. *Journal of Evaluation in Clinical Practice*. 2011; 17(4):763–767. https://doi.org/10.1111/j.1365-2753.2011.01694.x PMID: 21627737

21. Alnaim L, Almazrou S. A study of barriers and facilitators of clinical practice guidelines implementation among physicians. *Indian Journal of Pharmaceutical Sciences*. 2018; 79(6):923–929.

22. BaHammam AS. Knowledge and attitude of primary health care physicians towards sleep disorders. *Saudi Medical Journal*. 2000; 21(12):1164–1167. PMID: 11360092

23. Ahmed AE, Al-Jahdali H, Fatani A, Al-Rouqi K, Al-Jahdali F, Al-Harbi A, et al. The effects of age and gender on the prevalence of insomnia in a sample of the Saudi population. *Ethnicity & Health*. 2017; 22(3):285–294. https://doi.org/10.1080/13557858.2016.1244624 PMID: 27846729

24. Bahammam AS, Alsaeed M, Alahmari M, Albalawi I, Sharif MM. Sleep medicine services in Saudi Arabia: The 2013 national survey. *Annals of Thoracic Medicine*. 2014; 9(1):45–47. https://doi.org/10.4103/1817-1737.124444 PMID: 24551019

25. Alahmari T, Ashworth F, Alkhalaf, A. Changing trends of substance addiction in Saudi Arabia between 1993 and 2013. *MOJ Addiction Medicine & Therapy*. 2019; 6(1).

26. Albejaidi FM. Healthcare system in saudi arabia: An analysis of structure, total quality management and future challenges. *Journal of Alternative Perspectives in the Social Sciences*. 2010; 2(2):794–818.

27. Altokhais TI, Al-Obaid OA, Kattan AE, Amer YS. Assessment of implementability of an adapted clinical practice guideline for surgical antimicrobial prophylaxis at a tertiary care University hospital. *Journal of evaluation in clinical practice*. 2017; 23(1):156–164. https://doi.org/10.1111/jep.12658 PMID: 27807920

28. Dobia A, Ryan K, Grant D, BaHammam A. Current Clinical Practice for the Use of Hypnotics to Manage Primary Insomnia in Adults in a Tertiary Hospital in Saudi Arabia: An Audit Study. *Pharmacy*. 2019; 7(1). https://doi.org/10.3390/pharmacy7010015 PMID: 30691097

29. Braun V, Clarke V. Using thematic analysis in psychology. *Qualitative Research in Psychology*. 2006; 3(2):77–101.

30. Taba P, Rosenthal M, Habicht J, Tarien H, Mathiesen M, Hill S, et al. Barriers and facilitators to the implementation of clinical practice guidelines: A cross-sectional survey among physicians in estonia. *BMC Health Service Research*. 2012; 12(1):455. https://doi.org/10.1186/1472-6963-12-455 PMID: 23234504

31. Almeneessier AS, BaHammam AS. Sleep medicine in saudi arabia. *Journal of Clinical Sleep Medicine*. 2017; 13(4):641–645. https://doi.org/10.5664/jcsm.6566 PMID: 28212693

32. World Health Organization. Mental health atlas country profile Saudi Arabia: WHO; 2014 [cited 2018 28 October]. Available from: http://www.who.int/mental_health/evidence/atlas/profiles-2014/sau.pdf.

33. Layard R. The case for psychological treatment centres. *British Medical Journal*. 2006; 332(7548):1030–1032. https://doi.org/10.1136/bmj.332.7548.1030 PMID: 16644834

34. Cook JM, Marshall R, Masci C, Coyne JC. Physicians' perspectives on prescribing benzodiazepines for older adults: A qualitative study. *Journal of General Internal Medicine*. 2007; 22(3):303–307. https://doi.org/10.1007/s11606-006-0021-3 PMID: 17356959

35. Siriwardena AN, Qureshi Z, Gibson S, Collier S, Latham M. Gps' attitudes to benzodiazepine and 'z-drug' prescribing: A barrier to implementation of evidence and guidance on hypnotics. *The British Journal of General Practice*. 2006; 56(533):964–967. PMID: 17132386

36. Hasanain R, Vallmuur K, Clark M. Progress and challenges in the implementation of electronic medical records in Saudi Arabia: A systematic review. *Health Informatics- An International Journal*. 2014; 3(2). https://doi.org/10.5121/hiij.2014.3201

37. Morriss R. Mandatory implementation of nice guidelines for the care of bipolar disorder and other conditions in england and wales. *BMC Medicine*. 2015; 13:246. https://doi.org/10.1186/s12916-015-0464-7 PMID: 26420497

38. Birrenbach T, Kraehenmann S, Perrig M, Berendonk C, Huwendiek S. Physicians' attitudes toward, use of, and perceived barriers to clinical guidelines: A survey among swiss physicians. *Advances in Medical Education and Practice*. 2016; 7:673–680. https://doi.org/10.2147/AMEP.S115149 PMID: 28008300

39. Hennink MM, Kaiser BN, Marconi VC. Code saturation versus meaning saturation: How many interviews are enough? *Qualitative Health Research*. 2017; 27(4):591–608. https://doi.org/10.1177/1049732316665344 PMID: 27670770

5.2 Conclusion

This chapter presented the qualitative findings about knowledge, perceptions and attitudes of physicians working in Saudi Arabia toward using international guidelines to manage insomnia. The study illustrated that the practice at KFCH in Jazan, which might reflect the practice across the whole country, is below international standards. There are some cultural factors that discourage physicians from following international guidelines. Importantly, the study revealed that there is a need to develop specific guidelines which are concordant with the traditions and culture of the country. See chapter 6.

CHAPTER SIX

6 Using benzodiazepines and Z-Drugs for managing primary insomnia in adults in Saudi Arabia: An e-Delphi study to aid the development of clinical guidelines

6.1 Publication relevance to thesis

Chapter Six presents the publication:

Dobia, A., Ryan, K., BaHammam, A. S., & Edwards, A. (2019). Using benzodiazepines and Z-drugs for managing primary insomnia in adults in Saudi Arabia: An e-Delphi study to aid the development of clinical guidelines. *Sleep and Breathing*. https://doi.org/10.1007/s11325-019-01794-7.

I certify that I have participated sufficiently in the intellectual content, conception and design of this study. I also collected and analysed the data and wrote the paper. Co-authors supported me with the study design, analysis checking and feedback on early drafts.

This paper presents the findings of the e-Delphi study that was conducted with sleep experts to obtain consensus statements that might be used to aid the development of clinical guidelines for the use of benzodiazepines (BZDs) and Z-drugs for the management of primary insomnia in adults in Saudi Arabia.

Sleep and Breathing
https://doi.org/10.1007/s11325-019-01794-7

SLEEP BREATHING PHYSIOLOGY AND DISORDERS • ORIGINAL ARTICLE

Using benzodiazepines and Z-drugs for managing primary insomnia in adults in Saudi Arabia: an e-Delphi study to aid the development of clinical guidelines

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Abstract

Purpose This study aims to obtain consensus statements required for the development of clinical guidelines for the use of benzodiazepines (BZDs) and Z-drugs for the management of primary insomnia in adults in Saudi Arabia.

Methods Three rounds of the e-Delphi technique using a Bristol Online Survey (BOS) were conducted between May and August 2018. The Director of the Saudi Sleep Medicine Group helped recruit the country's sleep medicine experts. Snowballing was used to forward invitation emails, information sheets, and the survey to known sleep medicine experts and physicians deemed to be interested in the field. All participants' details were anonymised except to the researcher.

Results Fifteen experts from four different regions and specialities in Saudi Arabia participated in Round 1. Twenty-one statements originated from participants' responses. In Round 2, there were 17 respondents and 16 of the statements obtained the required consensus of 70% or higher. Eleven experts participated in Round 3 and eight statements received 100% agreement, two received 91%, and six received 82%. Having obtained the required consensus of 80% or higher in Round 3, these 16 statements fulfilled the criteria to be included in future guidelines. The five statements that failed to attain the required consensus were rejected as inappropriate for inclusion in Saudi Arabian clinical guidelines.

Conclusions The items that achieved the required consensus can be included in future guidelines for the use of BZDs and Z-drugs in the treatment of primary insomnia in adults to standardize best practices in sleep medicine in Saudi Arabia.

Keywords Benzodiazepines · Z-drugs · Saudi Arabia · Clinical guidelines · Primary insomnia · e-Delphi technique

Note: This manuscript or essence of its contents is not previously published in partial or full in the website or printed journal.

Key Messages
Findings from this study will help to develop guidelines for the prescription of BDZs and Z-drugs for the treatment of primary insomnia in Saudi Arabia. Additionally, with guidelines in place, patient outcomes following the judicious use of hypnotic drugs will improve.

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Introduction

Insomnia and other sleep disorders are amongst the most neglected illnesses by medical practitioners [1]. The various studies that have attempted to address the prevalence of sleep disorders in the Kingdom of Saudi Arabia are limited [2]. Nevertheless, according to the available data, it is evident that sleep disorders are increasingly becoming prevalent amongst Saudis, yet sleep medicine services in Saudi Arabia remain below the level of services offered in developed countries [3]. A recent study reported the prevalence of insomnia with the presence of daytime dysfunction in 57% of Saudi adults attending primary care services [1]. Various obstacles have been cited as the factors that hinder the progress of speciality in sleep medicine in Saudi Arabia. They include a lack of specialists, few trained technicians, and insufficient funding [2]. Furthermore, awareness about insomnia and other sleep disorders as well as their consequences is low amongst healthcare authorities and practitioners [1]. This lack of knowledge is attributed to the poor education received by medical students who transition into practice [4]. The low awareness is also widespread amongst the general public, health care workers and authorities, and the insurance companies in Saudi Arabia [2]. With such low awareness and knowledge about insomnia, there are no evidence-based clinical guidelines regarding the management of the illness amongst Saudis.

Overall, two treatment options have been accepted widely for the management of insomnia. These methods include cognitive behavioural therapy for insomnia (CBT-I) and hypnotic medications [5, 6]. Comparatively, hypnotic drugs act faster than CBT-I and are thus preferred by patients [6]. Some of the drugs used in the treatment of insomnia are benzodiazepines and Z-drugs. Despite being indicated for this disorder, benzodiazepines have the potential to trigger dependence with consequent rebound and withdrawal symptoms upon sudden discontinuation [6]. In contrast to benzodiazepines, Z-drugs are more selective in their action and have a lower tendency to develop dependence and withdrawal symptoms [6]. They still, however, have similar adverse effects associated with benzodiazepines as they can cause anterograde amnesia, sedation, impaired balance, and complex sleep-related behaviour [6, 7].

Hypnotic risks and side effects have led to the development of many guidelines for diagnosing and managing chronic insomnia in different countries [8–12]. Whilst benzodiazepines and Z-drugs have proven benefits in the management of primary insomnia, contradiction and differing opinions surround their use [13]. This is because there is no clear evidence guiding the judicious use of these drug classes for the treatment of insomnia, especially in countries like Saudi Arabia where there is an overall low awareness of sleep medicine [2]. In addition, many physicians in Saudi Arabia do not follow international guidelines because they lack awareness of them or think they are culturally inappropriate for use in Saudi Arabia [14]. It is, therefore, imperative that Saudi Arabia has its own guidelines for treating and managing insomnia and other sleep disorders, which are consistent with its own history and culture.

Consensus methods can be used to come up with guiding principles to eliminate the barriers associated with contradictory opinions [15]. One such approach is the Delphi technique, a structured process designed to arrive at a consensus of choice or judgement following responses by a panel of experts to rounds of questionnaires on a topic for which there is little evidence [16, 17]. This method is particularly useful in situations where several dissenting opinions and contradictions surround a subject [15, 16], as in the use of Z-drugs and benzodiazepines in the management of primary insomnia in Saudi Arabia. Guidelines developed by this means are likely to be accepted widely by medical practitioners in the country involved [15].

Methods

The purpose of this study was to use the e-Delphi method to create a set of statements that could be used to develop a clinical guideline for the use of Z-drugs and benzodiazepines for managing primary insomnia (difficulty to sleep without a known cause) [11] amongst adults in Saudi Arabia.

Delphi technique

The consensus process incorporated three rounds e-Delphi technique [16], using Bristol online survey, which took place between May and August 2018. Ethical approval (number 17/15) was obtained from University of Reading Ethics Committee (UREC), United Kingdom. Experts in sleep medicine in Saudi Arabia, defined as those who are specialists in sleep medicine (accredited by the Saudi Commission for Health Specialties) or work in sleep clinics or have experience of treating patients with insomnia, were recruited with the help of the Saudi Sleep Medicine Group. Snowballing was also used as participants were asked to forward an invitation email including an information sheet and a link to the survey to other physicians and/or experts in sleep disorders when they thought might be interested in participating. Participation in the first-round questionnaire was considered as consent to participate in the study. All participants' details were anonymised, except to the first author.

Round 1

The first round online questionnaire included open-ended questions to solicit some information from participants [18] about their current practices and thoughts for managing primary insomnia, which might be appropriate for

inclusion in consensus statements. The objective of the study and some specific instructions were provided for participants. Some demographic details were asked as well. The survey was piloted with five people (three pharmacists and two physicians) not participating in the work or in the main e-Delphi study. The purpose of the pilot was to ensure feasibility of the procedure, clarity of the questions, and to estimate the time for completing the questionnaire. No amendments were requested in Round 1. Potential participants were sent the questionnaire by email and the survey was accessible for 1 month. Responses from each question of the first round were aggregated, and then frequencies and percentages were calculated when appropriate to identify the most frequent answers. All data were tabulated together with qualitative responses as feedback for participants in the next round.

Round 2

Before completing the second questionnaire, each participant reflected on his/her answers compared to those of other participants. The researcher refined all responses from Round 1 and created items for ranking based on the participants' answers and best-practice guidelines for managing primary insomnia in adult patients. Twenty-one statements were prepared for circulation in Round 2. A second online questionnaire was sent to participants, who were asked to forward it to other experts regardless of whether they had participated in Round 1. Participants were asked to rank each item on a 1 to 5 Likert scale (definitely disagree to definitely agree) that best represented their opinions about the criteria that they wanted to be included in future Saudi Arabia guidelines. They were also asked to briefly comment on their reasons for choosing a specific grade (1–5). The consensus was defined as 70% or higher agreement. The questionnaire was piloted with three physicians to ensure the procedure's feasibility and the clarity of the statements. Of the 21 statements sent in the e-Delphi pilot, three were clarified according to the participants' comments. All of those three physicians participated in Round 2, and the survey was accessible for 3 weeks.

Round 3

Responses from Round 2 were collated and refined. Participants received feedback with ratings summarised by the researcher so that they could revise their judgements. A third questionnaire was then sent, which included 16 statements. Participants were asked to specify which of these should be included or excluded in future guidelines. Statements that were excluded because they did not achieve 70% agreement in the second round were provided for participants in a separate question, and they were asked if any statement should be reinstated and included in the guidelines. Consensus was defined as 80% or higher agreement (Fig. 1 shows e-Delphi process to achieve consensus on statements to be included in future guidelines). The survey was accessible for a month.

Results

Round 1

Fifteen participants from the four largest regions in Saudi Arabia (East, West, South, and Central) participated in Round 1. Eight of the participants stated that they were qualified from outside Saudi Arabia and the rest were from inside. Details of demographic data are provided in Table 1. Responses from this round lead to forming 21 statements to be ranked.

Round 2

Twenty-one statements were sent for ranking in Round 2. Seventeen responses were received and all who participated in this round were specialised or trained in sleep medicine. The data were analysed using in the BOS that showed the percentage that each statement achieved. Each statement that achieved 70% or higher from summation of score 4 and 5 on the Likert scale was considered as agreement. Sixteen statements made the cutoff for consensus agreement and five statements failed to achieve the 70% agreement in this round. Feedback from this round about the statements, each item's rankings, and the participants' choices were prepared and circulated to the expert panel, allowing each participant to reflect on his/her answers in relation to those of other participants before completing the third questionnaire.

Round 3

In Round 3, 11 responses were received and all participants were experts in sleep medicine (specialised, trained in sleep medicine, or working in sleep clinics). Table 1 shows the demographic details and characteristics of the participants in each round.

All statements (16) that were returned to the expert panel in this round made the cutoff of 80% or higher consensus agreement. Table 2 shows the statements sent in Round 3 and the percentage agreements achieved. None of the excluded statements achieved the percentage agreement to be reinstated. Table 3 shows the statements that did not achieve consensus in Rounds 2 and 3. Anonymity was retained during the study.

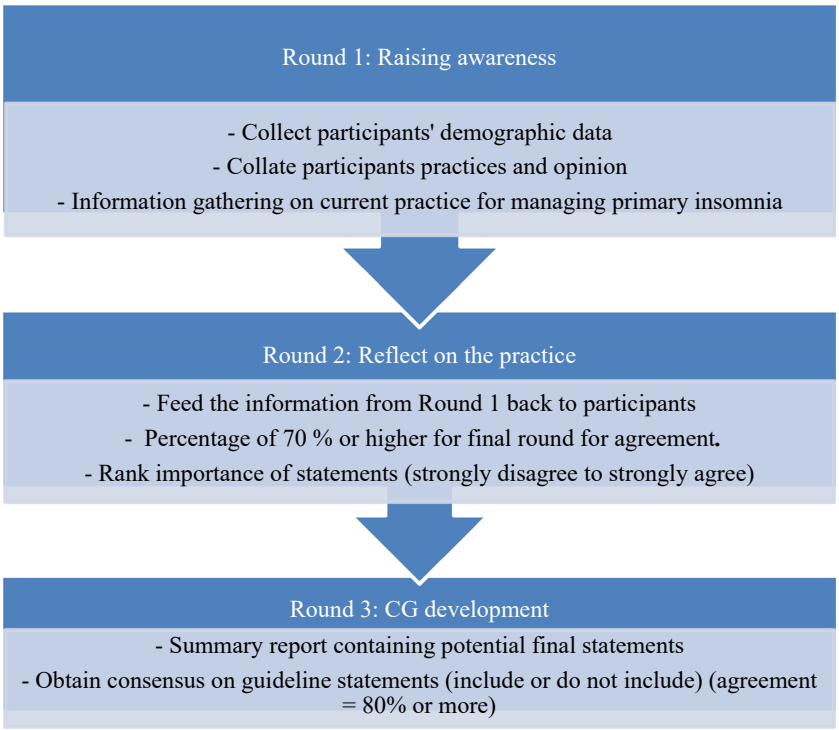

Fig. 1 e-Delphi process to achieve consensus on statements to be included in future guidelines

Discussion

Clinical practice guidelines form critical frameworks for the summary and translation of continually changing evidence from research into actual practice [19]. They assist practitioners in making reasonable clinical decisions about appropriate healthcare for specific clinical circumstances [20, 21]. This study aimed to obtain consensus on items required for developing clinical guidelines for using benzodiazepines and Z-drugs for managing insomnia amongst adults in Saudi Arabia. After three rounds of review, the e-Delphi technique generated 16 statements to be included in future guidelines. Five statements failed to reach the 80% level of consensus needed and were, therefore, excluded from the guidelines. The e-Delphi technique was considered the most appropriate method considering the lack of national clinical guidelines currently in the Saudi healthcare literature. This method facilitated the consolidation of information from experts in several

Table 1 Demographic data and characteristics of participants (Rounds 1, 2, and 3)

	Round 1	Round 2	Round 3
Gender	Male: 14 Female: 1	Male: 16 Female: 1	Male: 9 Female: 2
Expert in sleep medicine	Yes: 8 No: 7	Yes: 17 No: 0	Yes: 11 No: 0
Years of practice as a sleep medicine specialist or in a sleep clinic	< 5 years: 5 5–10 years: 4 > 10 years: 6	< 5 years: 8 5–10 years: 3 > 10 years: 6	< 5 years: 4 5–10 years: 3 > 10 years: 4
Region	South: 6 East: 1 West: 2 Central: 6	South: 4 East: 1 West: 1 Central: 11	South: 4 East: 1 West: 1 Central: 5
Place of practice	University hospital/sleep centre: 4 Ministry of health: 7 Private: 2 Military hospital: 2	University hospital/sleep centre: 7 Ministry of health: 6 Private: 2 King Faisal specialist hospital and research centre: 2	University hospital/sleep centre: 5 Ministry of health: 4 Private: 1 King Faisal specialist hospital and research centre: 1

Table 2 Statements achieving 80% agreement or higher, to be included in future guidelines

Statements
100% agreement
1. When using benzodiazepines or Z-drugs to treat primary insomnia, the diagnosis should be recorded
2. Cognitive Behavioural Therapy for Insomnia (CBT-I) is effective and recommended for primary insomnia as first-line treatment
3. Benzodiazepines or Z-drugs are recommended for primary insomnia for short-term use only
4. When prescribing benzodiazepines or Z-drugs beyond the maximum treatment period, reasons for continuing should be documented
5. When prescribed benzodiazepines or Z-drugs are ineffective, alternative medicines should be used
6. When initiating benzodiazepines or Z-drugs for a patient, inform the patient that it will be for a limited duration
7. When prescribing benzodiazepines or Z-drugs for long term, patients should be reviewed regularly, at least every 4–6 weeks
8. When withdrawing patients on long-term use of benzodiazepines or Z-drugs, tapering should be considered
91% agreement
1. Extension beyond the maximum treatment period of benzodiazepines or Z-drugs should not take place without re-evaluating the patient
2. Short-term hypnotic treatment should be supplemented with CBT-I when possible
82% agreement
1. Sleep hygiene is effective and recommended in the treatment of primary insomnia as first-line treatment
2. Benzodiazepines and Z-drugs should be used to treat primary insomnia only when it is severe, disabling, or causing extreme distress
3. Benzodiazepines or Z-drugs should be prescribed in the first instance with the lowest effective dosage used
4. Benzodiazepines or Z-drugs should not be prescribed for more than 4 weeks
5. Benzodiazepines or Z-drugs should not be prescribed for patients with a history of addiction or substance abuse
6. Switching from one hypnotic to another should occur only if a patient experiences adverse effects directly related to a specific agent

locations and omitted the burden of travelling around the country [15, 16]. Because the researcher could provide feedback after each round, encourage participants to reflect on their answers, and assess them compared to other answers, the e-Delphi technique enhanced an interactive exchange of information between participants [16]. The expert panel agreed that the use of benzodiazepines and/or Z-drugs for primary insomnia should be accompanied by a documented diagnosis. The panel also agreed that before initiating any intervention, it is imperative to conduct a thorough assessment of the patient to identify all the possible causes of disturbed sleep and to identify all the salient exacerbating factors so that appropriate treatment is indicated as necessary [22]. The panel also came to the consensus that CBT-I is useful and recommended as a first-line treatment for primary insomnia. The management of primary insomnia amongst the adult population in Saudi Arabia should centre, at least initially, on cognitive and behavioural non-pharmacological approaches. These strategies include sleep hygiene, straightforward advice, relaxation techniques, counselling, and behavioural therapy [8]. Behavioural and psychological interventions have been proven to be useful for all adults as well as for chronic users of hypnotic drugs [8]. When the initial behavioural or psychological treatment proves ineffective, other approaches should be considered and the patient evaluated for potential occult comorbidities [11].

Thus, the expert consensus is that pharmacological interventions should be considered when non-pharmacological treatments were unsuccessful and alternated from one class to the other only if they prove unsuccessful. Importantly, the choice of benzodiazepines or Z-drugs should be guided by the treatment goal, symptomatology, patient preference, past response patterns, cost, comorbidities, interactions with concomitantly administered medications, side effects, contraindications, and the availability of other treatment options [11]. Although short- to intermediate-acting benzodiazepines or Z-drugs are recommended for adults with primary insomnia [6, 11], all of the expert opinions reviewed by the study emphasised that these drugs should be used for short-term use only.

Due to dependency and tolerance associated with most hypnotic medications, the panel recommended a maximum treatment duration of 2 weeks. Repeat or additional prescriptions for benzodiazepines or Z-drugs should be avoided because their long-term use can complicate prognoses [22]. Furthermore, it was agreed that dosage tapering should be considered for patients withdrawing from these drugs and that CBT-I is known to be effective in helping medication tapering and discontinuation [11].

Table 3 Statements eliminated from inclusion in future guidelines

Statements	Percentage achieved
Short-acting benzodiazepines or Z-drugs are recommended as the first-line pharmacological treatment for primary insomnia	25
Only Z-drugs (e.g. zolpidem) are recommended as the first-line pharmacological treatment for primary insomnia	0
When prescribed benzodiazepines or Z-drugs are ineffective, the dose should not be increased	12.5
When prescribed benzodiazepines or Z-drugs are ineffective, the dose should be increased	25
When prescribed benzodiazepines or Z-drugs are ineffective, a combination with other sedative agents can be used	37

The e-Delphi technique further revealed that all the experts involved were of the opinion that when prescribing benzodiazepines and Z-drugs beyond the maximum treatment period, reasons for continuing should be documented. Long-term hypnotic therapy may be indicated for individuals with refractory or severe insomnia or persons with chronic comorbidities [11]. Consistent follow-up, however, is imperative, preferably every 4–6 weeks in the initial phase of treatment, to assess potential side effects, treatment efficacy, and the reason for continuing the medication [11]. The prescriber should always ensure that hypnotic medications are reviewed regularly and all review dates and relevant advice are clearly documented in the patient's records [22].

The panel was unanimous that alternative medicines should be used if the prescribed benzodiazepines or Z-drugs are deemed to be ineffective. Drugs from other classes are available to treat primary insomnia, but unlike benzodiazepines and Z-drugs, they work through receptors other than the benzodiazepine section of the gamma-aminobutyric acid (GABA-A) receptor [6]. Additionally, the experts agreed that patients should be informed that using benzodiazepines or Z-drugs is for a limited duration only. Patient education should always accompany treatment, particularly if benzodiazepines and Z-drugs are prescribed. Amongst the many factors that patients should be informed about are safety concerns, treatment expectations and goals, potential drug interactions and side effects, alternative treatment modalities including behavioural and cognitive therapy, rebound insomnia, and the possibility for dosage increments [11].

Over 90% of the responses given recommended that extension beyond the maximum treatment period for benzodiazepines or Z-drugs should not take place without re-evaluation of the patient and that short-term hypnotic treatment should be supplemented with CBT-I when possible. Furthermore, patients should be advised to keep sleep diaries and that, should a relapse occur, the data be used for long-term re-evaluation [11]. In addition to clinical reassessment of patients, regular administration of survey tools, such as questionnaires, might be useful in outcome assessment. Findings from such tools would help in informing subsequent treatment efforts [11].

Most experts consider sleep hygiene a useful treatment modality and recommend it as a first-line treatment for insomnia. Even though insomnia patients should follow sleep hygiene recommendations, there is insufficient evidence to support the effectiveness of sleep hygiene alone for managing chronic primary insomnia [11]. For this reason, sleep hygiene should be combined with other interventions, such as biofeedback therapy (educating patients to control involuntary processes in their body such as muscle tension and blood pressure) [11].

Even though short-acting benzodiazepines or Z-drugs are recommended as the first-line pharmacological treatment for primary insomnia [11], the majority of participants rejected this recommendation to be included in the guidelines. A significant number of experts believed that benzodiazepines and Z-drugs should be used to treat primary insomnia only when it is severe, disabling, or causing extreme distress. A majority of the panellists also recommended prescribing these drugs in the first instance at the lowest effective dose. This dose should be used for maintenance and tapered off as determined by the prognosis [11]. Further, the specialists said that benzodiazepines or Z-drugs should not be prescribed for more than 4 weeks as recommended in the literature [23], and that switching from one hypnotic to another should be considered only if the patient experiences adverse effects from the drug they are using [22]. Importantly, most of the responders agreed that benzodiazepines should not be prescribed to known or suspected users of illicit drugs. According to the literature, exceptions may be made if the drugs are indicated as part of an opiate detoxification programme or prescribed under close monitoring and supervision by psychiatrists on an acute basis [22].

Overall, a consensus was reached for most of the recommendations with significant agreements between rounds. The e-Delphi technique was well received and external reviewers contributed extensive comments to support the development of guidelines. Although the authors believe that the contributions from the medical experts to the consensus statements are thoughtful and valuable, this study has some limitations. The absence of a face-to-face meeting might have deprived experts from exchanging important information, such as clarification of reasons for disagreements [24, 25].

Conclusion

With little awareness about sleep disorders and the absence of evidence-based clinical guidelines on the management of insomnia, adults in the Saudi Arabia are at a higher risk of suffering serious consequences from the condition. It is imperative, therefore, that effective guidelines for treating insomnia and sleep disorders are developed in Saudi Arabia, particularly guidelines concerning the pharmacological management of primary insomnia with benzodiazepines and Z-drugs. Using the e-Delphi technique, this study developed evidence-based expert clinical opinions for using benzodiazepines and Z-drugs in managing insomnia, and such findings based on consensus statements, together with insomnia advocacy, reviewing service delivery across Saudi Arabia, and best-practice management of primary insomnia, can lead to optimal sleep disorder healthcare in Saudi Arabia.

Authors' contributions Ali Dobia: substantial contribution to conception, design, acquisition of data, data analysis and interpretation, and writing the manuscript.

Professor Kath Ryan: conception, design, data analysis, writing of paper, and final approval of the version to be published.

Ahmed S. BaHammam: conception, design, data acquisition, revising of paper and final approval of the version to be published.

Dr. Alexander Edwards: conception, design, data analysis, revising of paper and final approval of the version to be published.

This manuscript has been read and approved by all the authors, the requirements for authorship as stated earlier in this document have been met, and each author believes that the manuscript represents honest work.

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Compliance with ethical standards

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Ethics approval and consent to participate Ethical approval (number 17/15) was obtained from University of Reading Ethics Committee (UREC), United Kingdom.

Participation in the first-round questionnaire was considered as consent to participate in the study.

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References

1. Almeneessier AS, Alamri BN, Alzahrani FR, Sharif MM, Pandi-Perumal SR, BaHammam AS (2018) Insomnia in primary care settings: still overlooked and undertreated? J Nat Sci Med 1:64–68
2. Almeneessier AS, BaHammam AS (2017) Sleep medicine in Saudi Arabia. J Clin Sleep Med 13(4):641
3. Bahammam AS, Alsaeed M, Alahmari M, Albalawi I, Sharif MM (2014) Sleep medicine services in Saudi Arabia: the 2013 national survey. Ann Thorac Med 9(1):45–47. https://doi.org/10.4103/1817-1737.124444
4. Almohaya A, Qrmli A, Almagal N, Alamri K, Bahammam S, Al-Enizi M, Alanazi A, Almeneessier AS, Sharif MM, Bahammam AS (2013) Sleep medicine education and knowledge among medical students in selected Saudi medical schools. BMC Med Educ 13:133. https://doi.org/10.1186/1472-6920-13-133
5. (2005) National Institutes of Health State of the Science Conference statement on Manifestations and Management of Chronic Insomnia in Adults, June 13–15, 2005. Sleep 28(9):1049–1057
6. Asnis GM, Thomas M, Henderson MA (2015) Pharmacotherapy treatment options for insomnia: a primer for clinicians. Int J Mol Sci 17(1). https://doi.org/10.3390/ijms17010050
7. Brandt J, Leong C (2017) Benzodiazepines and Z-drugs: an updated review of major adverse outcomes reported on in epidemiologic research. Drugs R&D 17(4):493–507. https://doi.org/10.1007/s40268-017-0207-7
8. Qaseem A, Kansagara D, Forciea MA, Cooke M, Denberg TD (2016) Management of Chronic Insomnia Disorder in adults: a clinical practice guideline from the American College of Physicians. Ann Intern Med 165(2):125–133. https://doi.org/10.7326/m15-2175
9. Riemann D, Baglioni C, Bassetti C, Bjorvatn B, Dolenc Groselj L, Ellis JG, Espie CA, Garcia-Borreguero D, Gjerstad M, Goncalves M, Hertenstein E, Jansson-Frojmark M, Jennum PJ, Leger D, Nissen C, Parrino L, Paunio T, Pevernagie D, Verbraecken J, Weess HG, Wichniak A, Zavalko I, Arnardottir ES, Deleanu OC, Strazisar B, Zoetmulder M, Spiegelhalder K (2017) European guideline for the diagnosis and treatment of insomnia. J Sleep Res 26(6):675–700. https://doi.org/10.1111/jsr.12594
10. Sateia MJ, Buysse DJ, Krystal AD, Neubauer DN, Heald JL (2017) Clinical practice guideline for the pharmacologic treatment of chronic insomnia in adults: an American Academy of sleep medicine clinical practice guideline. J Clin Sleep Med 13(2):307–349
11. Schutte-Rodin S, Broch L, Buysse D, Dorsey C, Sateia M (2008) Clinical guideline for the evaluation and management of chronic insomnia in adults. J Clin Sleep Med 4(5):487–504
12. Schmitz MF (2016) The ACP guidelines for treatment of chronic insomnia: the challenge of implementation. Behav Sleep Med 14(6):699–700. https://doi.org/10.1080/15402002.2016.1220131
13. McMillan JM, Aitken E, Holroyd-Leduc JM (2013) Management of insomnia and long-term use of sedative-hypnotic drugs in older patients. CMAJ 185(17):1499–1505. https://doi.org/10.1503/cmaj.130025
14. Dobia A, Ryan K, BaHammam A, Edwards A (2018) Perceptions of physicians in Saudi Arabia on the use of international clinical guidelines for managing primary insomnia. PLOS One (Under Review)
15. Falzarano M, Pinto Zipp G (2013) Seeking consensus through the use of the Delphi technique in health sciences research. J Allied Health 42(2):99–105
16. R Avella J (2016) Delphi panels: research design, procedures, advantages, and challenges, vol 11. https://doi.org/10.28945/3561
17. Marriott J, Stehlik P (2012) A critical analysis of the methods used to develop explicit clinical criteria for use in older people. Age Ageing 41(4):441–450. https://doi.org/10.1093/ageing/afs064
18. Hsu C-C, Sandford BA (2007) The Delphi technique: making sense of consensus. Pract Assess Res Eval 12(10):1–8
19. Curtis K, Fry M, Shaban RZ, Considine J (2017) Translating research findings to clinical nursing practice. J Clin Nurs 26(5–6):862–872. https://doi.org/10.1111/jocn.13586
20. Almazrou Mazrou S (2013) Expected benefits of clinical practice guidelines: factors affecting their adherence and methods of implementation and dissemination. J Health Specialties 1(3):141–147
21. (1992) Guidelines for clinical practice: from development to use. National Academies Press (US), Washington DC
22. Barnsley Clinical Commissioning Group: Insomnia Management Guideline (February 2016)
23. Janhsen K, Roser P, Hoffmann K (2015) The problems of long-term treatment with benzodiazepines and related substances. Dtsch Arztebl Int 112(1–2):1–7. https://doi.org/10.3238/arztebl.2015.0001
24. Eubank BH, Mohtadi NG, Lafave MR, Wiley JP, Bois AJ, Boorman RS, Sheps DM (2016) Using the modified Delphi method to establish clinical consensus for the diagnosis and treatment of patients with rotator cuff pathology. BMC Med Res Methodol 16:56. https://doi.org/10.1186/s12874-016-0165-8
25. Walker A, Selfe J (1996) The Delphi method: a useful tool for the allied health researcher. Int J Ther Rehabil 3:677–681

6.2 Conclusion

This chapter presented findings of the e-Delphi study that was conducted to achieve evidence-based expert clinical opinions on the use of benzodiazepines and Z-drugs to manage primary insomnia in the KSA. Sixteen statements made the cut-off for consensus agreement (80% agreement) and five statements failed to achieve even 70% agreement in the study. The agreed statements might be used in the development of official clinical guidelines for the country and lead to improve sleep disorders services in the country. It is important to understand patients knowledge, experience and perceptions of using hypnotics for primary insomnia, so an online survey study was conducted with patients (see Chapter 7).

CHAPTER SEVEN

7 The use of hypnotics for primary insomnia in Saudi Arabia: a survey of patients' experiences and perceptions

7.1 Publication relevance to thesis

Chapter Seven presents the publication**:**

Dobia, A., Ryan, K., Edwards, A., Abutaleb, M. & BaHammam, A. S. (2019). The use of hypnotics for primary insomnia in Saudi Arabia: a survey of patients' experiences and perceptions. *Sleep and Breathing*. *(Submitted, August 2019)*

I certify that I have participated sufficiently in the intellectual content, conception and design of this study. I also collected and analysed the data and wrote the paper. Co-authors supported me with the study design, analysis checking and feedback on early drafts.

This paper presents the findings of the survey study that was conducted to explore patients' knowledge, experiences and perceptions of the management of primary insomnia in Saudi Arabia.

The use of hypnotics for primary insomnia in Saudi Arabia: a survey of patients' experiences and perceptions

Abstract

Purpose: This study was conducted to evaluate the knowledge, experience and perception of patients with primary insomnia in Saudi Arabia concerning its management, including the use of hypnotics and non-pharmacological therapies.

Methods: A cross-sectional design study was conducted in July 2019 using a self-administered questionnaire survey.

Results: 68 patients with primary insomnia participated in the study (53% male and 47% female; 60% younger than 45 years and a majority had a university-degree education level). 64.7% of respondents were dissatisfied with their knowledge of insomnia and related problems and 97% of respondents reported that they would like more information about insomnia and its treatment. Approximately 59% of respondents reported using prescribed sleep medicines from the first instance, and only 6% were referred to a psychologist for counselling. Benzodiazepines and Z-drugs were prescribed for 16% and 19% of respondents respectively, while a majority were given antihistamines or over-the-counter herbs. Sixty percent of patients used their medications for long periods, 87% were not involved in the treatment decision; 80% of patients on long-term use were not seen by doctors regularly, and 93% were not provided with a plan for medicine discontinuations; More than 60% of respondents agreed that sleeping pills are the best solution for treating insomnia and 31% reported that sleeping pills are safe and they prefer to continue them. On the other hand, more than 45% would not prefer non-pharmacological treatments (e.g., counselling).

Conclusions:

The responses to this survey indicated a lack of knowledge about insomnia and its treatments amongst Saudis with primary insomnia. Prescribing hypnotic medicines is commonly used to treat primary insomnia and non-pharmacological treatments seldom used; these responses suggest inappropriate and long-term use of hypnotics. Patients should be better educated about insomnia and its treatments, physicians should be encouraged to use non-pharmacological treatment, and country specific guideline should be developed to help physicians to achieve these improvements.

Key messages

The findings that many patients report using hypnotics for long periods, were not provided with CBT-I, were not involved in their treatment decisions nor provided with a plan for medicine discontinuations, suggests that many patients are not being treated following the best practices suggested by international guidelines. This would suggest that physicians should be trained about insomnia guidelines and patients should be educated about insomnia and its treatments.

Introduction

The prevalence of insomnia is rising, and so is the use of hypnotic drugs [1]. Benzodiazepines and Z-drugs are the most commonly prescribed medications for the management of insomnia in primary care settings [2]. There is a global lack of knowledge about the availability of Cognitive Behavioural Therapy for insomnia (CBT-I) which means that the use of hypnotic medicines is still prevalent [3]. Several studies have been conducted to determine the attitudes, perceptions, and practices of physicians with regard to the prescription of hypnotic medicines [4]. Since patients are the recipients of treatment,

however, conducting regular studies with them to understand their knowledge, experiences and attitudes about insomnia and its treatments will lead to improved support and appropriate treatment [4]. A systematic review of studies conducted in Europe, the United States, Australia and New Zealand has concluded that there is a lack of knowledge and concern among patients about the long-term use and side effects of hypnotics [5].

Despite the fact that benzodiazepines and Z-drugs are associated with adverse psychomotor and cognitive effects, as well as daytime somnolence [6], many patients perceive them as safe and effective because they are prescribed by their doctors within a trusted medical system [5]. Even when a prescription for hypnotic medication was necessary, researchers found that physicians often prescribed them without a full discussion with the patient and without giving proper advice on the treatment [4,7]. There is also evidence of a lack of knowledge and awareness among patients about what to do or who to consult if experiencing side effects or what to do if drug use extends past the recommended period [5]. This situation points to the possibility that patients are not extensively involved in the treatment and decision-making process, resulting in suboptimal treatment outcomes and adverse drug events [8].

In Saudi Arabia, estimates of the frequency of insomnia range from 33-78% [9,10]. There are no figures for the prevalence of primary insomnia, which is not related to environmental, psychiatric or medical causes [11], but it is reported to be account for 6% of all insomnia in other countries [12,13]. Findings from previous research showed that, in a tertiary hospital in Saudi Arabia, prescribing physicians did not follow international guidelines for the management of primary insomnia [14]. Some physicians suggested that Saudi patients lacked knowledge of insomnia and its treatments. One barrier to following guidelines for the treatment of primary insomnia included the fear of patients becoming dependent on

hypnotics. [15]. To optimise treatment in the management of primary insomnia involving the use of hypnotics, it is necessary to develop an understanding of the knowledge, experiences, and attitudes of patients toward them. This study, therefore, aimed to explore the knowledge, experience and perception of patients about using benzodiazepines and Z-drugs to manage primary insomnia in Saudi Arabia.

Methods

Online questionnaire design

This study used a cross-sectional survey on the Survey Monkey Software platform. The questionnaire was designed based upon the scientific literature and on findings from previous studies conducted by our research group [14,15]. Survey questions were structured in the following six sections:

- Screening questions that allowed people with primary insomnia to complete the questionnaire and people without insomnia or other forms of insomnia to exit early.
- Patient demographics such as gender, age and educational level.
- Patients' knowledge about insomnia and its treatments.
- Patients' experiences of using prescribed hypnotics.
- Patients' perceptions about hypnotic medications.
- Patients' perceptions about non-pharmacological therapy.

Validation, translation and reliability of the questionnaire

The survey questions were prepared in English on a Microsoft Word document and then translated into the Arabic language. Three people, who were expert in the field of either sleep medicine or questionnaire methodology, validated the questionnaire. They were provided with the aim and objectives of the study and asked a) if the questionnaire would address the

objectives; and b) if the responses to the questions were likely to provide the required information [16,17]. In addition, they were asked to review all of the questionnaire items for readability, clarity, and comprehensiveness [16].

Two senior bilingual speakers independently translated the questionnaire from the English version into Arabic and then met to discuss differences before agreeing the Arabic translation. The Arabic draft was then translated back into English by two other bilingual speakers, who had no knowledge of the English version of the questionnaire [17]. In collaboration with the translators, the translations were reviewed by the research team to assess the back-translations for equivalence to the original English version. Discrepancies between the two versions of translation were discussed by the research team and resolved to produce the final Arabic version [17].

The reliability of the questionnaire was checked using the test-retest method. The questionnaire was presented to 10 people, in Saudi Arabia, who were using sleep medicines. They were asked to complete the questionnaire and then one week later they were asked to complete it again. The responses were checked item-by-item to see if they were the same. All 10 people were consistent in their answers apart from one person who changed one answer from (definitely agree) to (agree) and another who added three choices instead of two to a question. These differences were not considered to make a difference to the analysis by the research team, so the questionnaire was deemed reliable.

Sampling and sample size

An appropriate number of adult patients (18 and over) in Saudi Arabia experiencing primary insomnia with unidentified causes were included in the study. Patients who have insomnia

due to known physical, psychological, or environmental causes or because of the use of stimulant substances or drugs were excluded automatically by the survey.

The sample size was calculated based on the following formula [18]:

Sample size = $\frac{(Z1-\alpha/z)2\ P(1-P)}{(d)2}$ where *"$(Z_{1-\alpha/z})^2$ is a standard normal variable (at 5% type 1 error (P<0.05) it is 1.96 and at 1% type 1 error P<0.01 it is 2.58)".* In most studies, P<0.05 is considered significant, so 1.96 will be used in this study. P is the estimated proportion and d is the precision. As there is no current figure for primary insomnia in Saudi Arabia, the estimated prevalence of primary insomnia in the United States and Western Europe, which is 6% of individuals with chronic insomnia, was used [12,13]. Therefore, it was assumed for the current study that 6% of people living with chronic insomnia in Saudi Arabia have primary insomnia. Based on the prevalence documented, a respondent group ranging from 30 to 68 was required to provide a true representation of the population of people living with primary insomnia in Saudi Arabia. A self-selecting online survey, a form of snowball sampling, was used for the study, using the Survey Monkey platform that allows Arabic text.

Recruitment and data collection

The Twitter account of one of the authors (AB, the Director of the Sleep Disorders Centre in King Saud University, Saudi Arabia), which is dedicated to sleep medicine and has more than 25,000 followers, was used to recruit participants. To improve the response rate, the link to the Arabic version of the survey was pinned to his account on Twitter for a week. Participants were asked to forward the survey to others who they know have insomnia. Participation in the study was entirely voluntary. Instructions about how to complete the questionnaire were included on the first page of the survey. The survey was set to allow people to participate and complete the questionnaire only once. Returning the questionnaire was considered giving consent to participate. No personal information, such as names or addresses, were collected.

The survey was set to be open for two weeks, however the maximum required number of participants was obtained within 5 days and the survey was then closed.

Data analysis

The data set was downloaded from the Survey Monkey server in Excel format and transferred into STATA statistical package. At first the variables were labelled and data coding was completed. Subsequently, data cleaning was performed to identify any inconsistencies in the data set. Descriptive statistics are provided for information on responses, respondent characteristics, and patients' experiences and perceptions. All relevant variables were analysed with respect to the age and sex of the respondent. A t-test was used to examine the statistical significance of apparent differences in responses to some questions by respondent gender. With a null hypothesis that there is no difference in knowledge about insomnia and its treatment between male and female genders, using unpaired t-test with a confidence limit 5% was performed; responses with statistically significant differences at this 5% level are indicated by *. For questions with Likert scales, the responses were reported as percentages. Correlations between variables were determined when applicable. To examine the statistical significance of observed dependence between certain variables, Chi squared tests were performed in contingency tables, with a null hypothesis that the responses compared were independent. Links with significance at a confidence limit of 5% are indicated by * and a confidence limit of 1% are indicated by **.

Ethical considerations

Ethical approval number (17/15) was obtained from the University of Reading Research Ethics Committee and the Jazan Health Affairs, Ministry of Health in Saudi Arabia on 21 May 2019.

Results

Over five days, 217 respondents completed the online survey, which indicates considerable interest in the study. Of that total, 149 responses were excluded because the respondents had secondary insomnia. Thus, this study used a sample of 68 respondents, of whom 54 (79.4%) reported having insomnia; the other 14 did not know or were unsure if they had primary insomnia but were all identified as people living with primary insomnia based on their responses to subsequent screening questions.

1.1 Demographic data

Table 1 shows the demographic characteristics of the respondents.

Table1: **Demographics characteristics**

Variable	**N**	**%**
Gender of the respondent		
Female	36	52.9
Male	32	47.1
Age of the respondent		
Between 18 and 44 years old	41	60.3
Between 45 and 64 years old	26	38.2
65 years old and over	1	1.5
Education Level of the respondents		
Secondary school or below	14	20.6
University degree	47	69.1
Masters	4	5.9
PhD	3	4.4

1.2 Knowledge about insomnia and its treatment

When asked about their knowledge of insomnia and related problems, there were some contradictions between participants, as 82% thought that sleeping tablets are safe for short periods but 59% thought that they can be used long-term; 35% were satisfied with their knowledge but 97% wanted more information. There were also significant differences in knowledge between male and female respondents, (see Table 2).

Table 2: Knowledge about insomnia and its treatment (TRUE values)

No.	Variable	Total (N=68)	Male (N=32)	Female (N=36)	
		TRUE%	TRUE%	TRUE%	
1.	I am satisfied with my knowledge about insomnia and related problems	35.3	47.2	21.9	*
2.	I know that there are different ways to treat insomnia other than using sleeping pills	64.7	77.8	50.0	*
3.	I would like more information about insomnia and its treatment	97.1	97.2	96.9	
4.	Sleeping pills should be used when other treatments (such as counselling) are unsuccessful	51.5	61.1	40.6	
5.	Sleeping pills are safe but only for short periods	82.4	86.1	78.1	
6.	There are different types of sleeping pills	95.6	97.2	93.8	
7.	Sleeping pills might cause dependence and other side effects	86.8	94.4	78.1	*
8.	Sleeping pills can be used for long periods	58.8	52.8	65.6	
9.	Sleeping pills can be shared with anyone (family or friends)	19.1	13.9	25.0	

* indicates a statistically significant difference in responses between males and females with $p < 0.05$.

1.3 Experiences of using sleep medicines

When patients were asked about their experiences using sleep medicine, around 59% reported that they had used prescribed sleep medicines and only 6% had received CBT-I. The majority of patients (60%) had used their medications for long periods. One-quarter to one-third of the participants had tried a variety of ways to obtain sleep medicine (see Table 3).

Although a third of the respondents said that there was not enough time to discuss their problems with their doctor, and the vast majority (87%) were not involved in decision-making about their treatment, most people (85%) were told how to use their sleep medicine and were mostly compliant (70%) with the dosage. Very few patients (6%) were provided with a discontinuation plan and only one-fifth of long-term users were seen regularly by their doctor (see Table 3).

Table 3: Experience of sleep therapeutics

Variable/ statement	Frequency	Percentage
What was the first treatment provided		
I was given advice for improving my sleep	24	35.3
I was prescribed sleep medicines	40	58.8
I was sent for a psychologist or sleep specialist for 6-8 counselling sessions	4	5.9
Sleeping pills currently used by the respondents		
Z-Drugs	12	19.0
Benzodiazepines	10	15.8
Antihistamines	32	50.8
Over-the-counter herbs	12	19.0
Others	6	9.5
Duration of taking sleeping pills		
Less than 6 weeks	16	23.5
More than 6 weeks	6	8.8
More than 6 months but less than a year	20	29.4
More than a year	21	30.8
I have never taken sleeping pills	5	7.3
When medicines are finished, where do you get them from next time?		
Go to the doctor to get another prescription	43	63.2
Borrow the medicines from friends or family members	3	4.4
Buy them from a private pharmacy without prescription	22	32.4
If your doctor refuses to give you another prescription for your medicines, what do you do? (multiple response question)		
I argue with the doctor to get the prescription	15	22.1
I go to another doctor in the same hospital	16	23.5
I ask someone he knows to make (Wasta)[1]	17	25.0
I go to a private hospital	22	32.4
I borrow them from family or friends	5	7.4
I buy them from a private pharmacy without prescription	25	36.8
I buy them from outside Saudi Arabia, for example, from Egypt	9	13.2
What information did you receive when you first started using sleeping pills (multiple response)		
Information about insomnia	16	23.5
Information about types of treatment	10	14.7
The names of different sleeping pills or classes	6	8.8
Explanation about the reasons for prescribed sleeping pills	14	20.6
Side effects of sleeping pills	16	23.5

Risks of sleeping pills	6	8.8
How to use sleeping pills	58	85.3
That sleeping pills should be used for short term only	14	20.6
There was not enough time to discuss these issues with the doctor	20	29.4
When you were prescribed sleeping pills, were you involved in your treatment decision?		
No	59	86.8
Yes	9	13.2
If your sleeping pills were ineffective, did you increase the dose on your own without consulting your doctor?		
No	48	70.6
Yes	20	29.4
If you were prescribed sleeping pills for a long time, did you see your doctor regularly?		
No	39	79.6
Yes	10	20.4
If you were prescribed sleeping pills for a long time, did your doctor prepare a plan for discontinuation?		
No	45	93.8
Yes	3	6.3

Where the respondent got their sleeping pills in the first instance	**Percentage**		
	Male (N=32)	**Female (N=36)**	
Governmental hospitals	39	25	
Private hospitals	18	41	*
Community pharmacy without prescription	31	36	
Family or friends	6	6	

* indicates a statistically significant difference in responses between males and females with $P<0.05$.

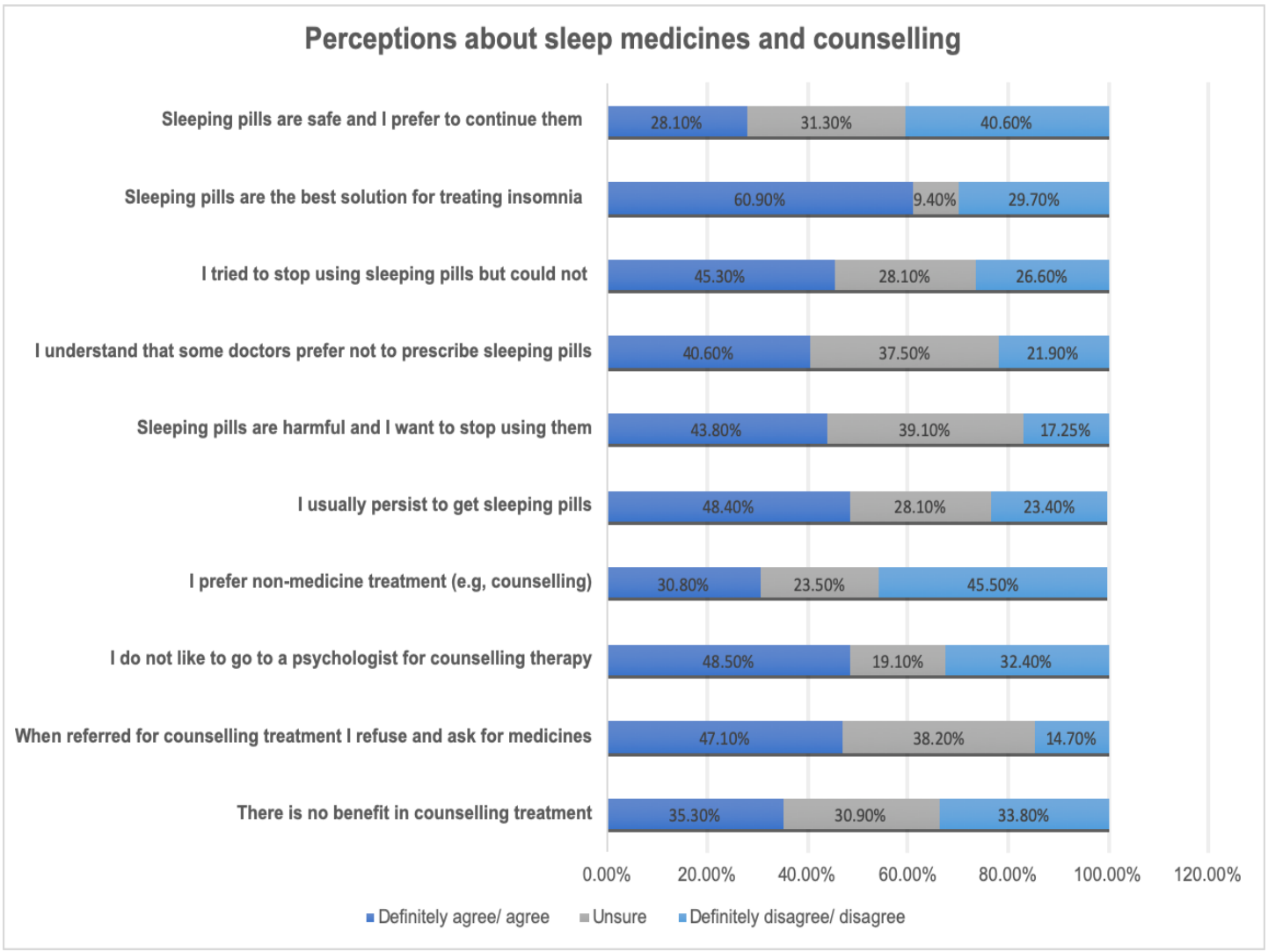
[1] *wasta* is a term that suggests *using connections or influence*

1.4 Perceptions about pharmacological and non-pharmacological treatments

When asked for their opinions about treatments, the majority of respondents did not think that long-term sleep medications are safe or did not know if they are. While

44% believed that sleeping pills are harmful and that they wanted to stop using them, 61% believed that they are the best solution for treating insomnia, and 48% often insisted on getting them. On the other hand, more than one-third of patients believed that counselling treatment offers no benefits (see Figure 1).

Figure 1: Perceptions about pharmacological and non-pharmacological treatments



To check if the patients were behaving in the way that their responses suggested, their responses were compared using cross tabulation, and Chi squared tests in contingency tables were used to assess the significance of apparent links that were identified between the variables. Our null hypothesis was that each of the two variables were completely independent. This analysis identified a number of important links with statistically significant response distribution (see Table 4). Notably, there was an increase in the number of respondents who usually persisted in getting sleeping pills,

among those who tried to stop sleeping pills but could not. Likewise, patients who reported using sleeping pills for more than six months were also more likely to report that they had tried to stop sleeping pills but could not. Although there may also be a link between respondents who reported that they usually persisted in get sleeping pills and those who reported that sleeping pills can be safely used for a long time, this correlation was weaker than the other linked variables identified. There was, however, a link between respondents who were given advice or referred for counselling sessions and those who reported preferring non-medicine treatments. Finally, there was some indication that government hospitals were more likely to provide advice before initiating medication, while private hospitals and pharmacies were less likely do so, but this observation was not statistically significant.

Table 4: Cross tabulation between different variables

	Tried to stop sleeping pills but could not			
Usually persist to get sleeping pills	**Disagree**	**Neither agree or disagree**	**Agree**	**Total**
Disagree	**8**	**4**	**3**	**15**
Neither agree or disagree	**6**	**11**	**1**	**18**
Agree	**3**	**3**	**25**	**31**
Total	**17**	**18**	**29**	**64**
Chi square = 31.30473 **Degree of freedom = 4** **P value = 0.00001****				
	Patients tried to stop using sleeping pills but couldn't			
Duration	**Disagree**	**Neither agree or disagree**	**Agree**	**Total**
Less than 6 months	**8**	**10**	**1**	**19**
More than 6 months	**9**	**7**	**28**	**44**
Never use sleeping pills long time	**0**	**1**	**0**	**1**
Total	**17**	**29**	**18**	**64**

Chi square = 21.2792341 **Degree of freedom = 4** **P value = 0.000279****				
	Sleeping pills can be used for long time			
Usually persist to get sleeping pills	**False**	**True**	**Total**	
Disagree	**9**	**6**	**15**	
Neither agree or disagree	**9**	**9**	**18**	
Agree	**7**	**24**	**31**	
Total	**25**	**39**	**64**	
Chi square = 7.204844 **Degree of freedom = 2** **P value = 0.027258***				
	Patients prefer non-medicine treatments			
Type of treatment provided	**Disagree**	**Neither agree or disagree**	**Agree**	**Total**
Advice	**4**	**3**	**17**	**24**
Medicines	**19**	**13**	**8**	**40**
Referred for counselling sessions	**2**	**0**	**2**	**4**
Total	**25**	**16**	**27**	**68**
Chi square = 17.506642 **Degree of freedom = 4** **P value = 0.001541****				

Note: *P < 0.05 mean significant at 5%

**P<0.01 means significant at 1%

Discussion

This study revealed that patients in Saudi Arabia are often prescribed hypnotics for insomnia, do not receive CBT-I as a first-line treatment and are rarely involved in the treatment decision. A majority of patients reported that they were on long-term

hypnotics and were not reviewed regularly by their doctors or provided with a plan for discontinuation (Table 3). Among the patients, there was limited knowledge about insomnia and its treatments, and many were only given information about how to use hypnotic medicines when they were prescribed. Even though 44% of patients believed that hypnotics are harmful and would have liked to stop using them, they still believed that hypnotic medicines are the best solution for treating insomnia. While many patients are dependent on their medication and use different methods to get prescriptions, there is considerable resistance among them to using non-pharmacological treatments for insomnia.

One limitation of this study is the mode of sampling, which was a self-completed questionnaire that was administered via the Twitter account of a sleep medicine specialist. The bias of Twitter users who are following a sleep medicine account means that we seem to have captured a highly educated sample and missed others who either have no access to or are not interested in Twitter. The rapid response rate and high number of respondents, however, confirm that this research methodology is a powerful tool and, in spite of the limitations, represents an effective way to gain an initial understanding of patient perspectives that can subsequently be validated over a broader patient population.

The findings of this study indicate that patients usually receive sleep medication as a first-line treatment rather than non-pharmacological treatment. This finding is consistent with a previous study by our group indicating that patients in Saudi Arabia are not receiving CBT-I [14], even though it is recommended as initial therapy by many clinical guidelines [19-21] and by many experts in Saudi Arabia [22]. This might be due to Saudi physicians' lack of knowledge about non-pharmacological

treatment modalities for primary insomnia or their not having the time or expertise to deliver non-pharmacological treatment to patients [15]. The current study shows that patients who had not received CBT-I reported that they believed that non-pharmacological treatment is not beneficial. This belief may have contributed to the demand for medical treatment but could conversely reflect a limitation of patient information provided at initial presentation with primary insomnia. It is possible that when patients are offered non-pharmacological intervention, they become more positive about it.

The study revealed that the majority of the participants reported limited knowledge about insomnia and its treatment, and most expressed a desire for more information about both. The study also revealed that most respondents believed that sleep medicines can cause dependence but can be used for long periods. This finding, though apparently contradictory, is not uncommon. As noted by Sirdifield et al. (2013), the belief that sleep medicines are not harmful may be because doctors prescribe the drugs and patients trust their doctor's professional opinion even if they prescribe them multiple times [4].

Using antihistamines and over-the-counter herbs for managing primary insomnia, long-term use of hypnotics and lack of regular reviews for patients on long-term prescriptions contradicts most of the available clinical guidelines [19-21]. These practices mirror the previous findings of a study conducted in a tertiary hospital in Saudi Arabia showing that around 44% of patients were prescribed antihistamines for primary insomnia. For long-term use, most patients had been prescribed hypnotics, but physicians did not review their patients after initiating this medication [14].

The study also revealed ineffective doctor-patient interaction among sleeping-pill users before and after being prescribed. It was noted that a majority of respondents were given sleep medicine because of the doctor's 'executive' decision and that they had been excluded from discussing their problems with the doctor. It was also noted that most long-term sleep-medicine users were not seeing their doctor regularly nor had they been provided with a plan for medicine discontinuation. These findings are consistent with a previous study showing that patients are not involved in treatment decisions [8]. This might be due to the belief of many Saudi physicians that patients lack knowledge about insomnia and its treatment [15]. What is more, physicians often find it challenging to discuss the risks or side effects of medicines with their patients [2]. This can be a source of dependence on sleep medicines. Indeed, there is a high association between long-term sleeping pill use and addiction [23,24].

The study shows a high dependence on sleep medicines among respondents. This was evidenced by the various efforts that they had taken to access sleep medicines if the doctor had refused additional prescriptions. The study shows that respondents went to private hospitals, bought medicines from private pharmacies without prescription, went to another doctor at the same hospital, 'asked someone they know to make (wasta)' and argued with the doctor to get a prescription—all clear indications of sleeping-pill dependence and misuse [24,25].

This study also found that a majority of respondents believed that sleep medicines are unsafe and preferred not to continue using them. Most, however, also agreed that sleep medicines are the best solution for treating insomnia. This shows that while the respondents were aware of the medicine's harmful nature, they believed that sedatives are the only option for them. The study revealed that respondents were not involved in

the treatment decision or had discussed the availability of other treatments and that sleep medicines were often the first treatment given for insomnia. This could explain why the majority of respondents would like to stop their medicines. These findings are congruent with other studies that generally show that most sleep medicine users express the desire to stop using them [26]. Forty-one percent of the respondents also understood that some doctors preferred not to prescribe hypnotics, signifying an understanding of their doctor's awareness of the medicine's side effects [4].

The majority of respondents did not prefer non-pharmacological treatments, believing that they confer no benefits. When asked the question in different ways, the majority emphasised that they would not like to go to psychiatric hospitals for counselling therapy and most acknowledged that, if referred for counselling treatment, they would refuse. These findings support the view of many physicians that being referred to psychiatric hospitals for CBT-I carries stigma for Saudi patients and that there is a need for trained psychologists in general hospitals or specialist sleep clinics to provide the service for patients [15]. The only study conducted in Saudi Arabia to investigate stigma among patients with anxiety and depression found that the majority of patients either refused to complete the study or declined to continue when they realised that they would be asked about their mental illness [27]. This explains the extent to which Saudi patients feel stigmatised about their conditions when they are referred to psychiatric hospitals for non-pharmacological treatment.

It was noted that men were more satisfied with their knowledge of insomnia compared to women. Because the study was conducted in a country in which there has been a disparity between men and women in both access to education and the distribution of educational funds [28], this finding is plausible. A similar finding was

also seen with more men than women knowing about other ways to treat insomnia. A recent study by Al-Ahmadi (2011) shows that, in general, access to information is a major challenge women in Saudi Arabia face, even including those in leadership positions [29]. Given that the sample was taken from an educated population with a majority of respondents having a university degree, possibly a result of the sampling method that relied on access to Twitter, this shows that despite the high level of education in respondents, men have better access to information than women.

This study found that women have a higher tendency than men to obtain sleep medicine from private hospitals in the first instance. We propose two reasons for this, based on the fact that 44% of those with a university degree were female. A high level of education has been correlated with high incomes [30,31] and private hospitals are normally more expensive to access than public hospitals. Additionally, it might be easier for women to access sleep medicine in private hospitals because public hospitals are usually more accountable [32]. For this reason, public hospitals would be more reluctant to issue hypnotics in the first instance compared to private hospitals.

Global issues regarding the use of hypnotics, such as long-term use, misuse, patients not being involved in treatment decisions and patients on long-term use not being reviewed regularly by their doctors or provided with a plan for discontinuation are also common in Saudi Arabia. This study is the first of its kind to explore the knowledge, experiences and perceptions of patients concerning the use of hypnotics for treating insomnia in KSA and provides insight for future work.

Conclusion

Due to lack of information about insomnia and the different ways of treating it, Saudi patients are at higher risk of experiencing side effects with, misusing and becoming

dependent on hypnotics than informed patients elsewhere. Saudi physicians could be encouraged to use non-pharmacological treatments as first-line therapies and educate patients about insomnia and its treatments. The Ministry of Health should develop country-specific guidelines that take account of the perspectives of prescribers and patients to optimise sleep disorder healthcare in Saudi Arabia.

References

1. Weiß V, Heinemann S, Himmel W, Nau R, Hummers-Pradier E (2016) The use of benzodiazepines and Z-drugs for patients with sleeping problems-A survey among hospital doctors and nurses. Deutsche medizinische Wochenschrift (1946) 141 (13):e121-126

2. Heinemann S, Weiß V, Straube K, Nau R, Grimmsmann T, Himmel W, Hummers-Pradier E (2016) Understanding and reducing the prescription of hypnotics and sedatives at the interface of hospital care and general practice: a protocol for a mixed-methods study. BMJ open 6 (8):e011908

3. Anderson KN (2018) Insomnia and cognitive behavioural therapy—how to assess your patient and why it should be a standard part of care. Journal of thoracic disease 10 (Suppl 1):S94

4. Sirdifield C, Anthierens S, Creupelandt H, Chipchase SY, Christiaens T, Siriwardena AN (2013) General practitioners' experiences and perceptions of benzodiazepine prescribing: systematic review and meta-synthesis. BMC family practice 14 (1):191

5. Sirdifield C, Chipchase SY, Owen S, Siriwardena AN (2017) A systematic review and meta-synthesis of patients' experiences and perceptions of seeking and using benzodiazepines and Z-drugs: towards safer prescribing. The Patient-Patient-Centered Outcomes Research 10 (1):1-15

6. Pollmann AS, Murphy AL, Bergman JC, Gardner DM (2015) Deprescribing benzodiazepines and Z-drugs in community-dwelling adults: a scoping review. BMC pharmacology and toxicology 16 (1):19

7. Makoul G, Arntson P, Schofield T (1995) Health promotion in primary care: physician-patient communication and decision making about prescription medications. Social science & medicine 41 (9):1241-1254

8. Mokhar A, Kuhn S, Topp J, Dirmaier J, Härter M, Verthein U (2019) Long-term use of benzodiazepines and Z drugs: a qualitative study of patients' and healthcare professionals' perceptions and possible levers for change. BJGP Open:bjgpopen18X101626

9. Ahmed AE, Al-Jahdali F, AlALwan A, Abuabat F, Salih SB, Al-Harbi A, Baharoon S, Khan M, Ali YZ, Al-Jahdali H (2017) Prevalence of sleep duration among Saudi adults. Saudi Medical Journal 38 (3):276-283. doi:10.15537/smj.2017.3.17101

10. Ahmed AE, Al-Jahdali H, Fatani A, Al-Rouqi K, Al-Jahdali F, Al-Harbi A, Baharoon S, Ali YZ, Khan M, Rumayyan A (2017) The effects of age and gender on the prevalence of insomnia in a sample of the Saudi population. Ethnicity & health 22 (3):285-294. doi:10.1080/13557858.2016.1244624

11. J.Thorpy M (2011) Classification of Sleep Disorders. Principles and Practice of Sleep Medicine, Fifth edn. Elsevier,

12. Roth T (2007) Insomnia: definition, prevalence, etiology, and consequences. Journal of clinical sleep medicine: JCSM: official publication of the American Academy of Sleep Medicine 3 (5 Suppl):S7

13. Ohayon MM (1997) Prevalence of DSM-IV diagnostic criteria of insomnia: distinguishing insomnia related to mental disorders from sleep disorders. Journal of psychiatric research 31 (3):333-346

14. Dobia A, Ryan K, Grant D, BaHammam A (2019) Current clinical practice for the use of hypnotics to manage primary insomnia in adults in a tertiary hospital in Saudi Arabia: An audit study. Pharmacy 7 (1). doi:10.3390/pharmacy7010015

15. Dobia A, Ryan K, Abutaleb M, Edwards A (2019) Perceptions of physicians in Saudi Arabia on the use of international clinical guidelines for managing primary insomnia. PLoS ONE 14(8): e0220960. https://doi.org/10.1371/journal.pone.0220960

16. Taherdoost H (2016) Validity and reliability of the research instrument; how to test the validation of a questionnaire/survey in a research.

17. Tsang S, Royse CF, Terkawi AS (2017) Guidelines for developing, translating, and validating a questionnaire in perioperative and pain medicine. Saudi journal of anaesthesia 11 (Suppl 1):S80

18. Charan J, Biswas T (2013) How to calculate sample size for different study designs in medical research? Indian journal of psychological medicine 35 (2):121

19. Schutte-Rodin S, Broch L, Buysse D, Dorsey C & Sateia M (2008) Clinical guideline for the evaluation and management of chronic insomnia in adults *Journal of Clinical Sleep Medicine* 4 (5):487-504

20. Morgan K, Kucharczyk E, & Gregory P (2011) Insomnia: Evidence-based approaches to assessment and management *Clinical Medicine* 11 (3):278-281. https://doi.org/10.7861/clinmedicine.11-3-278.

21. Qaseem A, Kansagara D, Forciea M A, Cooke M & Denberg T D (2016) Management of Chronic Insomnia Disorder in Adults: A Clinical Practice Guideline from the American College of Physicians *Annals of Internal Medicine* 165 (2):125–133

22. Dobia A, Ryan K, BaHammam A S & Edwards A (2019) Using benzodiazepines and Z-drugs for managing primary insomnia in adults in Saudi Arabia: An e-Delphi study to aid the development of clinical guidelines *Sleep and Breathing*. https://doi.org/10.1007/s11325-019-01794-7.

23. Dimsdale J E, Norman D, DeJardin D & Wallace M S (2007) The effect of opioids on sleep architecture *Journal of clinical sleep medicine* 3 (01):33-36

24. Longo L P, & Johnson B (2000) Addiction: Part I. Benzodiazepines-side effects, abuse risk and alternatives *American family physician* 61 (7): 2121-2128

25. Roussin A, Bouyssi A, Pouché L, Pourcel L, & Lapeyre-Mestre M (2013) Misuse and dependence on non-prescription codeine analgesics or sedative H1 antihistamines by adults: a cross-sectional investigation in France *PLOS One* 8 (10): e76499

26. King M B, Gabe J, Williams P, & Rodrigo E K (1990) Long term use of benzodiazepines: the views of patients *The British Journal of General Practice* 40 (334):194

27. Alamri, Y. (2016). Mental illness in Saudi Arabia: Stigma and acceptability. *International Journal of Social Psychiatry*, 62 (3):306–307. https://doi.org/10.1177/0020764016628896

28. Hamdan A (2005) Women and education in Saudi Arabia: Challenges and achievements. *International Education Journal* 6 (1):42-64.

29. Al-Ahmadi H (2011) Challenges facing women leaders in Saudi Arabia. *Human Resource Development International* 14 (2): 149-166.

30. Bloom D E, Hartley M, & Rosovsky H (2007) Beyond private gain: The public benefits of higher education *International handbook of higher education* (pp. 293-308). Springer, Dordrecht.

31. Holmes C (2013) Has the expansion of higher education led to greater economic growth? N*ational Institute Economic Review* 224 (1):R29-R47.

32. Perlstadt, H. (2019). Health Care Under the Knife: Moving Beyond Capitalism for Our Health *Social Forces* soz099. https://doi.org/10.1093/sf/soz099

7.2 Conclusion

This chapter presented the findings of the survey study that was conducted to understand patients' knowledge, experiences and perceptions of using hypnotics for primary insomnia. The study illustrated that issues regarding the use of hypnotics – such as long-term use, misuse, patients not being involved in treatment decisions and patients on long-term use not being reviewed regularly by their doctors or provided with a plan for discontinuation – also exist in Saudi Arabia. The following chapter (Chapter 8) will discuss general findings of the research, cultural aspects in Saudi Arabia, strength and limitations, recommendations and conclusion.

CHAPTER EIGHT

8 Discussion

8.1 Introduction

This thesis includes four primary studies conducted in Saudi Arabia to investigate current practice of prescribing hypnotics and help policymakers in the KSA to develop national clinical practice guidelines for managing primary insomnia. The first study, which explored prescribing practices of insomnia treatment in KSA, used an audit of medical records of patients diagnosed with primary insomnia or who were prescribed hypnotics (including Z-drugs and benzodiazepines) at a central public hospital in one of Saudi Arabia's 14 provinces. The audit gathered data on current clinical practice for managing insomnia with hypnotics and found poor compliance with U.S. guidelines (Schutte-Rodin et al., 2008). The second study explored the attitudes and perceptions of physicians about consulting international clinical guidelines. The third study involved an e-Delphi technique to develop statements for clinical guidelines should KSA develop such guidelines for managing insomnia. A fourth study used an online survey to investigate the perspectives of patients about the management of primary insomnia because it is important to incorporate their perceptions and experiences for framing the overall project.

This chapter discusses the general research findings, highlights their strengths and limitations, and concludes by offering recommendations for managing insomnia.

8.2 Research findings

The results of the audit study indicated that physicians at King Fahad Central Hospital, which is almost identical to 14 other hospitals across Saudi Arabia, neither followed U.S. guidelines for prescribing benzodiazepines or Z-drugs for insomnia nor complied with the audit criteria developed from those guidelines. After excluding two criteria that had not been met (CBT-I for primary therapy and reviewing patients on long-term use of hypnotics), less than one-fifth of the medical records met the remaining five criteria. Furthermore, one-third of patients diagnosed with primary insomnia were treated without reference to any guidelines for managing their condition. Findings from the second study (the interviews) revealed that physicians with more than 10 years' experience admitted that they were unaware of the U.S. guidelines for managing insomnia and generally treated patients according to their own clinical expertise, the knowledge they gained during medical training, or through recommendations from consultant colleagues. These findings confirm that many doctors authorised to prescribe benzodiazepines and Z-drugs are unaware of, unwilling, or unable to follow international guidelines for insomnia treatments. This raises the issue of physician resistance to international guidelines for treating insomnia in Saudi Arabia.

The findings from our studies are not unusual concerning physician resistance to guidelines, and especially to research carried out in other countries. One study conducted by Taba (2012) in Estonia found that because physicians with careers exceeding 20 years had difficulty using guidelines, they depended primarily for prescription guidance on personal experience and/or the patient's reaction to the medication (Taba, Rosenthal, Habicht et al., 2012).

U.S. guidelines for managing primary insomnia in adults recommend that Z-drugs and benzodiazepines be used only after an accurate diagnosis and a determination of symptom recurrence over several days (Schutte-Rodin et al., 2008). Findings from the audit indicated that less than half of patient records had documented indications for some of the prescribed medications. Indeed, physicians in the interview study identified work-loads, time-limits and difficulties in using the computer/record system as principal barriers to completing the documentation. Although participants recognized the importance of documentation, many suggested that such tasks should be delegated to clerical staff. An electronic medical record system was established in Saudi Arabia in 1988, but there are lingering concerns about privacy, cost, maintenance and support (Hasanain, Vallmuur and Clark, 2014). Studies in other countries have identified a link between insomnia and other psychiatric conditions for which BZDs can be prescribed, such as anxiety and depression (Staner, 2010), and therefore efficient documentation is needed for prescriptions, to help enhance communication among management teams for optimal patient outcomes. Such documentation would assist other healthcare providers to avoid duplicating prescriptions and reduce improper prescribing practices and misdiagnosis (Fox, Flynn, Fortier et al., 2011).

The audit study's findings also indicated that CBT-I was not considered as a preliminary treatment for patients with insomnia, which contravenes U.S. guidelines. When CBT-I was discussed with physicians during the interviews, it was clear that some participants lacked knowledge of or training in sleep disorders. In fact, most of the physicians we interviewed admitted to knowing little about CBT-I, in addition to the shortage or unavailability of well-trained psychologists and psychotherapists who could offer such therapeutic modalities to the patients. This corroborates the findings of other studies that physicians in Saudi Arabia lack appropriate education and training

in sleep medicine and that a shortage of qualified personnel offering CBT-I services exists (Almohaya et al., 2013; World Health Organization, 2014; Almeneessier and BaHammam, 2017). This leaves physicians with one option only—pharmacological treatments. However, evidence shows that CBT-I has a similar effect to pharmacological treatments for managing insomnia, is superior for long term treatment (Mitchell et al., 2012), and preferred by patients familiar with it (Mitchell et al., 2012). The results of both studies (the audit and the interviews) emphasise the need to focus on CBT-I for sleep disorders through continuous professional education and/or training programs for physicians and psychologists.

Despite the fact that pharmacological treatments are the only option for managing insomnia at this hospital in KSA, the audit found that benzodiazepines and Z-drugs were not the first-choice for many physicians. This contradicts the recommendation of the U.S. guidelines (Schutte-Rodin et al., 2008; Riemann et al., 2017). Only 59% of patients under study were prescribed either benzodiazepines or Z-drugs and the remaining 41% were prescribed anti-histamines, other OTC medicines, or nothing at all. Some patients were prescribed antipsychotic medications, such as quetiapine and olanzapine, as well as antidepressants, such as mirtazapine and doxepin, as a first-line pharmacotherapy with no indication that they suffered from depression or psychosis. Such practices, which contradict U.S. guidelines, were also evident in the findings of the interview study, which revealed that many physicians were reluctant to prescribe benzodiazepines for patients. This reluctance contravenes best clinical practice and explains why some physicians use other groups of medications such as antidepressants and antipsychotics instead of benzodiazepines and Z-drugs for insomnia treatments (Wiegand, 2008). In fact, reluctance to prescribe benzodiazepines is common. One study in the UK found that general practitioners prefer Z-drugs over benzodiazepines

because they believe them to be safer and more effective, a belief not supported by the literature (Siriwardena, Qureshi, Gibson et al., 2006; Siriwardena, Apekey, Tilling et al., 2010). Such mistaken beliefs about the effectiveness and safety of BZDs might be associated with physician resistance in KSA to international guidelines on hypnotics. While those physicians who participated in the interview study recognized the value of the guidelines, many believed that adherence must be flexible and adjusted to the educational status of the patient about the disorder and to the national context.

Our audit findings also revealed an interesting practice concerning drug dosage. U.S. guidelines recommend prescribing the lowest effective dose of benzodiazepines and Z-drugs, especially for elderly patients—although this was not the case for more than one-third of patients in this study. Elderly patients were sometimes prescribed a dose suitable for young adults, which contravenes U.S. recommendations that older patients should receive half the dose of young people due to the former's susceptibility to toxicity (Schutte-Rodin et al., 2008). Furthermore, more than half of the prescriptions exceeded the maximum recommended duration of treatment (4-5 weeks), with no information on the outcomes of patients who received long-term benzodiazepines or Z-drugs therapy. This study also found that physicians did not follow-up on long-term users of benzodiazepines and Zolpidem, the only Z-drug available in KSA at that time. Perhaps this accounts for some patients misusing these drugs and/or developing dependence (Hajak, Müller, Wittchen et al., 2003).

While it is imperative to understand the prescribing practices of physicians in KSA, the findings of our second study (the interviews) revealed that it is equally important to understand the perceptions and attitudes of physicians concerning international guidance for managing insomnia. In the second study, many physicians affirmed that

the guidelines are valuable only if they are adapted for national use. This has led to resistance and non-adherence because of country-specific religious, cultural, and social values. However, we need to recognise that nations are as different from each other as one patient is from the next.

Most healthcare facilities in KSA do not routinely monitor the clinical performance of physicians, including their prescribing behaviours, which reduces accountability, especially for those working in private hospitals. Lack of accountability might lead to negligence and weak performance by healthcare practitioners, resulting in poor treatment practices and even to loss of life (Morriss, 2015). However, tracking prescribing behaviours through audit projects has been associated with improving the quality of patient care and reducing instances of malpractice (Birrenbach, Kraehenmann, Perrig et al., 2016). In our interview study, almost all participants emphasized the need for developing country-specific guidelines that align with patient needs, social norms and national cultures to reduce instances of malpractice. It was important, therefore, to conduct a further study to develop consensus statements using an online method that relies on a panel of experts to aid the development of country-specific guidelines for Saudi Arabia.

The e-Delphi technique was the most suitable method for determining the best statements to be used for developing clinical guidelines in Saudi Arabia because of the method's ability to consolidate information from several experts in different locations without requiring the researcher to travel across the country (Avella, 2016). Using three rounds of questionnaires, the e-Delphi technique generated sixteen statements that might be included in future KSA guidelines.

The expert panel members were united in the opinion that diagnosis should be documented when using benzodiazepines or Z-drugs for insomnia. It was also agreed that before initiating any treatment, it is important to assess the patient and to identify possible causes of sleep disturbance. This would help physicians to begin appropriate treatment (Wong and Ng, 2015). While CBT-I is generally considered effective and recommended as a first-choice treatment for primary insomnia, other non-pharmacological approaches such as sleep hygiene, relaxation techniques, counselling, straightforward advice, and behavioural therapy are also recommended by international guidelines (Qaseem et al., 2016). Therefore, only if the initial behavioural treatments are ineffective should physicians consider other approaches and re-evaluate the patient for potentially hidden comorbidities (Schutte-Rodin et al., 2008).

The consensus from the e-Delphi technique was that pharmacological interventions should be considered after the failure of non-pharmacological options—but only for the short-term. Whether benzodiazepines or Z-drugs are used should be guided by the treatment goal, severity of symptoms, patient choice/preference, history of treatment responses, cost, comorbidities, interactions with concomitantly administered medications, side effects, contraindications between medications, and the availability of other treatment options (Schutte-Rodin et al., 2008). The expert panel recommended using medication for a maximum of four weeks because of the possibility of dependence and tolerance. This means that additional prescriptions should be avoided. If the physician believes, however, that benzodiazepines and Z-drugs should be prescribed for more than the maximum recommended period, his or her reasons for doing so should be documented. For example, hypnotics might be prescribed beyond the maximum duration for patients with refractory or severe insomnia or in cases of chronic comorbidities (Schutte-Rodin et al., 2008).

The panel also recommended that tapering (the process of weaning the patient off medication to minimize and reduce withdrawal symptoms) should be considered for those discontinuing benzodiazepines or Z-drugs. One such method is CBT-I, which has been shown to help patients discontinue some medications (Schutte-Rodin et al., 2008). To check for treatment efficacy, potential side effects, and the possibility of continuing medication (Schutte-Rodin et al., 2008), there was broad agreement on the need for consistent follow-up every 4-6 weeks. There was also unanimous agreement that alternative medications should be used in the event that Z-drugs and benzodiazepines were found to be ineffective. In addition, a provision for patient education on treatment duration was recommended and should be mandatory for every Z-drug or benzodiazepine prescription. Other points of patient education included safety, treatment expectations, potential interactions with other drugs, side effects, the possibility of insomnia recurrence, and alternative treatment modalities (Schutte-Rodin et al., 2008).

More than 90% of the respondents in the e-Delphi study recommended that extended use of benzodiazepines or Z-drugs should not take place beyond the recommended period without re-evaluating the patient. Many respondents, however, rejected the inclusion of Z-drugs and benzodiazepines as a first-choice pharmacological treatment for primary insomnia, even though it is recommended as best practice by international guidelines (Schutte-Rodin et al., 2008; Morgan, Kucharczyk, & Gregory, 2011; Qaseem et al., 2016), believing that the drugs should only be used in the management of severe primary insomnia when it is disabling or causes excessive distress. This explains our finding in the audit study that most patients were prescribed other medications in the first instance such as anti-depressants or antipsychotics. This also supports a finding from the interview study that most physicians preferred not to

prescribe benzodiazepines for patients at all. Many panelists also recommended that physicians should prescribe the lowest effective dose of benzodiazepines and Z-drugs in the first instance, and switch from one class to another only if the patient experiences adverse drug reactions from their medication.

To optimise the purpose of this thesis and include all perspectives, it was necessary to consider the patients' knowledge, experiences, and attitudes toward hypnotics as well. In fact, we found in the fourth study that patients generally had insufficient knowledge about insomnia and its treatment modalities. However, most respondents expressed a wish for more information, which was consistent with the findings from our interview study and supported by the physicians' belief that Saudi patients know little about insomnia. The fourth study also showed that most respondents are aware that sleeping pills can lead to dependency, even though many were long-term users themselves. This finding, though apparently contradictory, is not uncommon. As noted by Sirdifield et al. (2017), the notion that sleeping pills are not "hurtful" to respondents may be due to the fact that doctors prescribe them and patients see this as a well-informed, professional decision, especially when the prescription is repeated several times.

The study also showed that patients usually receive sleep medications as a first-line treatment rather than non-pharmacological treatments. This finding supports our previous study, the audit, which suggested that patients in Saudi Arabia are not receiving cognitive behavioural therapy for insomnia (CBT-I), even though CBT-I is the recommended initial therapy by many clinical guidelines (Schutte-Rodin et al., 2008; Morgan, Kucharczyk, & Gregory, 2011; Qaseem et al., 2016). This might be due to the fact that physicians in Saudi Arabia lack knowledge about non-pharmacological

treatment modalities for primary insomnia as suggested in the interview study (Dobia et al., 2019).

Using antihistamines and over-the-counter herbs to manage primary insomnia, the long-term use of hypnotics, and the lack of regular review of patients on long-term hypnotics were also common occurrences among patients, which contradicts the advice of most clinical guidelines (Schutte-Rodin et al., 2008; Morgan, Kucharczyk, & Gregory, 2011; Sateia, Buysse, Krystal, et al., 2017). This practice mirrored the previous findings of the audit study, which revealed that around 44% of patients were prescribed antihistamines for primary insomnia, that most were prescribed hypnotics for the long term, and that physicians did not review their patients after initiating hypnotics treatment. These results indicated widespread, unsafe practices in the treatment of insomnia.

The study also revealed an ineffective doctor-patient interaction among sleep-medicine users before and after prescriptions. It was noted that a majority of respondents were given the sleep medicines as a result of the doctor's professional opinion and that the patients were excluded from discussing the issue with their doctor. As a result, most patients felt that they were not involved in the treatment decision. It was also noted that most long-term sleep-medicine users were not seeing their doctors regularly and had not been provided with a plan for discontinuing their medicine. These findings are consistent with a previous study that shows that patients are not involved in treatment decisions (Mokhar, Kuhn, Topp, et al., 2019) This might be due to the belief of many Saudi physicians who we interviewed that patients lack knowledge about insomnia and its treatment. Physicians also find it challenging to discuss the risks or side effects with patients because of their respective differences in knowledge (Heinemann et al., 2016).

This tendency to prescribe and re-prescribe sleep medicine without patient input or review might be a source of sleeping-pill addiction or dependence since there is a high association between long-term sleeping-pill use and addiction (Longo & Johnson, 2000; Dimsdale et al., 2007).

This study also showed a high dependence on sleep medicines among respondents. This was evidenced by the various efforts that patients take to access their medicines if their doctor refuses to write further prescriptions. Some respondents went to private hospitals, to buy sleep medicine from a private pharmacy without a prescription or to a second doctor at the same hospital. Some asked an acquaintance for help getting the medicine (Wasta), used their connections or influence for the same purpose, or argued with their physician for prescriptions. These are clear indications of sleeping-pill dependence and misuse (Longo & Johnson, 2000; Roussin et al., 2013).

The study also found that many of respondents were of the opinion that sleeping pills were unsafe and thus would not continue using them. This is evidenced by the efforts of a majority of respondents to stop taking their medicine. This study is congruent with other studies that show that most sleep-medicine users generally expressed a desire to stop using their medication (King et al., 1990), which is supported by the majority of respondents who believe that sleeping pills are harmful. A majority of respondents also understood that some doctors preferred not to prescribe sleeping pills. This indicates patient confidence in their doctors, whose prescriptions they believe are professionally informed (Sirdifield et al., 2017). However, most of those respondents also agreed that sleeping pills are the best solution for treating insomnia. This shows that while the respondents are aware of the harmful nature of the pills, they also believe that this was the only treatment option available. This supports a widespread opinion among

physicians in Saudi Arabia that patients need to be educated about insomnia and its treatment and partly explains why respondents are not involved in decisions about their treatment or why sleep medicines are the first prescription given for insomnia.

A majority of respondents indicated that they would not consider non-medicine treatments because they confer no benefits. When the researcher rephrased the question, the respondents revealed that they would not go to a psychiatric hospital for counselling therapy and most acknowledged that, if referred for counselling treatment, they would refuse. These findings support the view of many physicians that Saudi patients fear being stigmatised if they are referred for CBT-I at a psychiatric hospital. In any case, there is a need for trained psychologists in general hospitals to provide such services for patients. Not surprisingly, other studies show a resistance to counselling among patients (Sanchez & Atkinson, 1983; Alamri Y, 2016; Blau & DiMino, 2019), which may explain why our audit study found that CBT-I was not used for patients and support physicians' views about fear of stigma among Saudi patients.

Because many Saudi physicians resist using international guidelines for managing insomnia for their patients, citing cultural differences as a key barrier, it is imperative to discuss cultural factors that may influence whether Saudi clinicians follow international guidelines for the management of primary insomnia with benzodiazepines and Z-drugs. These factors call for the development of Saudi-specific guidelines and are discussed in the following section.

8.3 Cultural aspects that necessitate the development of local guidelines

8.3.1 Adherence to Cultural Roots

Historically, Saudi Arabia is steeped in Islam, with many practices rooted in the teaching of the Quran, such as whole-day fasting and nocturnal praying during the holy month of Ramadan (Training and Doctrine Command U.S. Army, 2006; The Embassy of The Kingdom of Saudi Arabia in Washington, 2019). There are five daily prayers imposed on adult Muslims between 4 am and 9 pm, and other optional prayers observed at other times by many Saudi adults. Most Saudi physicians take these cultural and religious practices into account when managing patients with insomnia, leading to a reluctance by some to prescribe benzodiazepines or Z-drugs for its treatment. As a first-line pharmacological treatment for insomnia, these drugs can cause drowsiness or sleepiness in low to moderate doses, and for some patients, particularly the elderly who are susceptible to falls, this can affect their observance of night-time prayers. This alone might explain why Saudi physicians do not always adhere to international guidelines for prescribing these drugs (Dobia, Ryan, Grant, et al., 2019). It is not that the physicians question the drugs' efficacy but rather that the guidelines fail to consider the cultural and religious traditions of non-Western countries such as Saudi Arabia (Dobia, Ryan, Abutaleb, et al., 2019).

8.3.2 Sleep Patterns

According to Ahmed BaHammam (2011), Professor of Sleep Medicine at King Saud University, the Quran covers sleep types, their importance for general health, and healthy sleep practices. The Quran explains that sleep is vital for human health and that believers should maintain "the pattern of light and darkness," meaning

that the day is specified for work and the night for sleep. Even though most Saudis are Muslims and the Quran's recommendations about sleep broadly align with best sleep practices identified by sleep scientists (BaHammam, 2011), social and cultural norms in Saudi Arabia can affect sleep patterns. For example, social visiting, which takes place in groups, often occurs daily—or on special occasions—until late at night (Countries and their Cultures Forum, 2019), and for this reason many Saudis nap during the day. This may explain why Saudis often reverse sleep cycles during weekdays (Merdad, Merdad, Nassif, et al., 2014).

In a reversed sleep cycle, people experience a sleep-wake inversion, exchanging diurnal habits for nocturnal ones. This means that they are active during the night and sleep during the day. Such sleep habits are particularly common in Saudi adolescents, many of whom have poor sleep quality compared to adolescents in other countries (Merdad et al., 2014). This contributes to a widespread belief among Saudi physicians that international guidelines for treating insomnia are not suited to Saudi Arabia.

8.3.3 Patient Safety Culture

A mistaken belief in the ineffectiveness and poor safety of the drugs might also be associated with Saudi clinical resistance to following international guidelines concerning hypnotics. This might, in part, be due to recent attempts by healthcare organisations in Saudi Arabia to implement a culture of safety triggered by a rise in adverse drug events (Alahmadi, 2010) or to the high incidence of abuse of benzodiazepines and other medications (Elmontsri, Almashrafi, Banarsee et al., 2017). Certainly, benzodiazepines are associated with a high rate of dependence in Saudi Arabia and elsewhere, which can manifest as withdrawal symptoms, tolerance or drug-seeking behaviours (Hood, Norman, Hince et al., 2014).

In the treatment of primary insomnia, benzodiazepines and Z-drugs are given for an average period of 4 weeks (Schutte-Rodin et al., 2008). Taking them beyond this period, which some patients do with unresolved sleep problems, can lead to dependency. A cross-sectional study investigated the progression between different stages of drug involvement in Saudi Arabia and found many instances of patients abusing benzodiazepines and that the age of drug involvement onset differed from that in other cultures (Bassiony, 2008). For example, in Saudi Arabia, the age of onset of using drugs such as amphetamines, cannabis and benzodiazepines with tobacco is much earlier compared to Western countries (Bassiony, 2008), which some researchers consider to be a strong predictor of progression to misuse and dependence (Bassiony, 2008).

Due to the fear of dependence, many Saudi physicians prefer not to use benzodiazepines or Z-drugs as a first-line pharmacological agent in the management of primary insomnia for their patients (Dobia, Ryan, Grant, et al., 2019). In a country where alcohol consumption is forbidden, this might lead patients to use other stimulants such as amphetamines and khat, which, in turn, might lead to benzodiazepine dependence. Indeed, fear and concern for patient safety are evident in the findings from several audit and interview studies (Dobia, Ryan, Abutaleb et al., 2019; Dobia, Ryan, Grant, et al., 2019). For this reason, cultural issues should be paramount when developing national guidelines for Saudi Arabia.

8.3.4 Ethnicity differences

Most guidelines developed in other countries are based on national ethnicities. A study that investigated whether clinical practice guidelines in the US, Canada, the UK, and the Netherlands take ethnic differences into consideration, and assessed the scientific foundation of such ethnic-specific recommendations, found that US

guidelines contained the most ethno-specific statements and the Dutch guidelines the least. These statements were supported by evidence, usually taken from descriptive studies or narrative reviews (Manna, Bruijnzeels, Mokkink et al., 2003) conducted in their home countries. The recommendations of these guidelines are countries where the guidelines were developed. In addition, none of the published guidelines for insomnia include statements about ethnicity to explain differences between people. Thus, it can be argued that Saudi nationals need specific guidelines adapted and developed from best-practice international guidelines but tailored to address Saudi ethnicity, social norms and culture.

8.3.5 Lack of standardization

The management of the majority of patients in Western countries differs from the management of patients in Muslim countries, including Saudi Arabia. In the United States, for example, most patients can be managed without physicians needing to understand their cultures or traditions because these are taken into consideration when developing the guidelines. In Saudi Arabia, however, many professionals come from outside the country (more than 54% of physicians are non-Saudis), and many physicians were trained in countries such as Germany, the US, the UK, France and Canada, leading to a lack of standardization of practice (Amna Puri-Mirza, 2019). This means that many physicians manage patients based on what they were taught in college, which the interview study confirms (Dobia, Ryan, Abutaleb et al., 2019). Such practices can affect the quality of healthcare because patients are often treated differently, according to where the doctors undertook their medical studies.

8.3.6 Stigma

Social stigma is generally described as discrimination against or disapproval of an individual based on perceived social traits that distinguish one person or a group of people from others. Stigma plays a crucial role in attitudes towards mental illness and insomnia, as well as other medical conditions. Indeed, patients suffering from insomnia are often reluctant to seek psychological and psychiatric services because of the social stigma attached to these services (Alamri, 2016).

In Saudi Arabia, people living with poor mental health face considerable social stigma (Alamri, 2016), as do people with insomnia. Furthermore, most psychologists who provide cognitive behavioural therapy (CBT) work in psychiatric hospitals. Women face even higher levels of stigma because they cannot go to male psychologists without a companion, even though Islam allows this when necessary. This might be an inhibiting factor for physicians who would otherwise refer patients to psychologists for CBT-I, which many guidelines recommend (Schutte-Rodin et al., 2008; Qaseem et al., 2016). Our audit study reveals that this type of treatment is not used in Saudi Arabia (Dobia, Ryan, Grant, et al., 2019). Because stigma, which discourages many physicians from referring patients to psychiatric hospitals to receive CBT-I, was often raised in the interviews (Dobia, Ryan, Abutaleb et al., 2019), it is important for Saudi authorities to develop country-specific guidelines that take into consideration such issues and help patients overcome social and cultural barriers to their treatment.

In summary, this research shows that current practice in Saudi Arabia concerning the management of primary insomnia is poor, partly the result of the country lacking country-specific guidelines for treating primary insomnia and having limited adherence to international guidelines. Many physicians believe that international guidelines are

inappropriate for Saudi Arabia and resist using them. Adherence to cultural roots, different sleep patterns, a patient-safety culture enhanced by healthcare governance, a non-Western ethnicity, the lack of standardization of practice, and stigma—these are the most significant cultural, religious and social factors that call for the development of Saudi specific guidelines.

8.4 Strengths and Limitations

8.4.1 Strengths

This research has several strengths. It is the first of its kind to explore the management of insomnia in Saudi Arabia, and so provides a base upon which researchers can conduct further investigations into insomnia treatment.

The research was conducted at KFCH, a major regional hospital in Saudi Arabia, which provides a representative example of what happens (or likely happens) in most hospitals across the country. Analysis of interview data enabled the identification of key themes surrounding the views of physicians in KSA and their attitudes towards their practices. Although it was conducted at a single facility, we believe the study reflects a common medical culture in the KSA health system.

The study of physicians' perceptions about treating insomnia by referencing international clinical guidelines is also the first of its kind. Because the researcher worked in a different medical sector from the interviewees and because there was no previous contact between the researcher and the participants, the latter were encouraged to speak freely about their experiences. The researcher asked only for clarifications to some questions, never questioning or judging the participants' answers.

The survey study is also the first of its kind to explore the patients' knowledge, experiences and perceptions of using hypnotics to treat primary insomnia in Saudi Arabia. Using an online survey allowed patients from across the country to participate in the study.

8.4.2 Limitations

The research studies have several limitations. The audit study was retrospective in nature, relying on old records, which raises the possibility of information being incomplete or out-of-date. Also, the study was conducted at a single facility, so there is a need for further research at other facilities to determine whether the recorded practices occur nationwide. With the e-Delphi technique, the absence of face-to-face meetings denied the experts an opportunity to exchange information with one another, such as clarifying reasons for disagreements and formulating alternative understandings. Furthermore, using services such as Twitter to recruit participants in the fourth study—the survey—was elective and therefore a possible limitation. Because the responses we obtained came from respondents with access to Twitter, the sample is limited to those users. This necessarily excludes those without access to Twitter or those who have no interest in this particular social networking represents an effective way to gain an initial understanding of patient perspectives that can subsequently be validated over a broader patient population.

8.5 Recommendations

The research yields several recommendations, most notable of which is for the Saudi Ministry of Health to evaluate practices and review the availability of medicines on the Drug List. The Ministry should also offer suitable training to prescribing physicians

about best practice guidelines for managing insomnia and introduce an electronic care plan that encourages prescribers to consider CBT-I as an initial treatment for insomnia. Physicians should be encouraged to recognise the place of CBT-I in the introduction of managing chronic insomnia.

The Ministry should also develop a mechanism to help physicians choose the best drug, dose and duration for the patient, and review the patient's medical history. Hospital computerized systems will need to be improved and physicians trained to use them. This should be accompanied by a robust system of record-keeping for patient care, which would provide comprehensive documentation for physicians treating patients for other conditions. It is imperative for patients to have weekly and/or monthly check-ups so that the treatment process and the effects of medicines are determined expeditiously.

Above all, the Ministry of Health should consider implementing national clinical guidelines for the treatment of primary insomnia and hold physicians accountable for their medical practice. The development and implementation of these guidelines should take into account Saudi Arabia's history, traditions and culture, which were foremost in the patients' perspectives about pharmacological and non-pharmacological treatments.

8.6 Conclusion

This research shows that healthcare professionals at KFCH failed to comply with (or, indeed, ignored) guidelines developed in the U.S. for using benzodiazepines and Z-drugs for treating chronic primary insomnia. What is more, there is poor documentation of interventions by physicians for this condition. Although there are cultural factors in the form of beliefs and attitudes that affect the behaviour of patients and physicians,

Saudi adults are at risk of experiencing serious consequences from primary insomnia treatments because both physicians and patients lack awareness of sleep disorders and their treatment and because national evidence-based clinical guidelines are unavailable.

There has been little urgency in Saudi Arabia to develop practical guidelines for managing insomnia and sleep disorders, particularly with the pharmacological management of primary insomnia using benzodiazepines and Z-drugs. Developing such guidelines for best-practice management of primary insomnia from identified and agreed statements, together with a review of service delivery for sleep disorders across the country, while taking into account the country's social norms, religion and culture, and the perspectives of patients and physicians, point the way to optimising sleep disorder healthcare in Saudi Arabia.

References

Agravat, A. 2018. "'Z'-hypnotics versus benzodiazepines for the treatment of insomnia." *Progress in Neurology and Psychiatry* 22 (2):26-29.

Ahmed, A.E. 2014. "Validation of Arabic versions of three sleep surveys." *Qatar Medical Journal* 2014 (2):130-136. https://doi.org/10.5339/qmj.2014.20

Ahmed, A.E., Al-Jahdali, F., AlALwan, A., Abuabat, F., Salih, S.B., Al-Harbi, A., Baharoon, S., Khan, M., Ali, Y.Z., and Al-Jahdali, H. 2017. "Prevalence of sleep duration among Saudi adults." *Saudi Medical Journal* 38 (3):276-283. https://doi.org/10.15537/smj.2017.3.17101

Ahmed, A.E., Al-Jahdali, H., Fatani, A., Al-Rouqi, K., Al-Jahdali, F., Al-Harbi, A., Baharoon, S., Ali, Y.Z., Khan, M., and Rumayyan, A. 2017. "The effects of age and gender on the prevalence of insomnia in a sample of the Saudi population." *Ethn Health* 22 (3):285-294. https://doi.org/10.1080/13557858.2016.1244624

Ait-Daoud, N., Hamby, A.S., Sharma, S., and Blevins, D. 2018. "A review of alprazolam use, misuse, and withdrawal." *Journal of addiction medicine* 12 (1):4-10. https://doi.org/ 10.1097/ADM.0000000000000350

Al Ghamdy, Y., Qureshi, N., Abdel Ghadir, M., Al Habeeb, T., and Ahmad, S. 1999. "Psychotropic drugs prescriptions in Al-Qassim region, Saudi Arabia." *Eastern Mediterranean health journal* 5 (1):27-34.

Al-Eisa, E., Buragadda, S., and Melam, G.R. 2014. "Association between physical activity and psychological status among Saudi female students." *BMC Psychiatry* 14 (1):238. https://doi.org/10.1186/s12888-014-0238-3

Al-Jahdali, H. 2011. "A comparison of sleep disturbances and sleep apnea in patients on hemodialysis and chronic peritoneal dialysis." *Saudi Journal of Kidney Diseases and Transplantation* 22 (5):922-930.

Al-Jahdali, H. 2012. "Prevalence of sleep apnea and excessive day time sleepiness in patients with end-stage renal disease on dialysis." *Saudi Journal of Kidney Diseases and Transplantation* 23 (2):251-261.

Al-Jahdali, H.H., Al-Qadhi, W.A., Khogeer, H.A., Al-Hejaili, F.F., Al-Ghamdi, S.M., and Al Sayyari, A.A. 2009. "Restless legs syndrome in patients on dialysis." *Saudi Journal of Kidney Diseases and Transplantation* 20 (3):378-385.

Al-Jahdali, H.H., Khogeer, H.A., Al-Qadhi, W.A., Baharoon, S., Tamim, H., Al-Hejaili, F.F., Al-Ghamdi, S.M., and Al-Sayyari, A.A. 2010. "Insomnia in chronic renal patients on dialysis in Saudi Arabia." *Journal of Circadian Rhythms* 8:7. https://doi.org/10.1186/1740-3391-8-7

Alahmadi, H. 2010. "Assessment of patient safety culture in Saudi Arabian hospitals." *Qual Saf Health Care* 19 (5):e17-e17.

Alamri, Y. 2016. "Mental illness in Saudi Arabia: Stigma and acceptability." *International Journal of Social Psychiatry* 62 (3):306-307.

Alharbi, M., Almutairi, A., Alotaibi, D., Alotaibi, A., Shaikh, S., and Bahammam, A.S. 2009. "The prevalence of asthma in patients with obstructive sleep apnoea." *Primary Care Respiratory Journal* 18 (4):328-330. https://doi.org/10.4104/pcrj.2009.00020

Aljamal, M.S., Ashcroft, D., and Tully, M.P. 2016. "Development of indicators to assess the quality of medicines reconciliation at hospital admission: An e-Delphi study." *Int J Pharm Pract* 24 (3):209-216. https://doi.org/10.1111/ijpp.12234

Aljawadi, M.H., Khoja, A.T., Alhammad, A.M., AlOtaibi, A.D., Al-Shammari, S.A., and Khoja, T.A. 2018. "The prevalence of benzodiazepines utilization and its association with falls among Saudi older adults; results from the Saudi national survey for elderly health (SNSEH)." *Saudi Pharmaceutical Journal* 26 (8):1112-1119. https://doi.org/10.1016/j.jsps.2018.05.022.

Almeneessier, A.S., Alamri, B.N., Alzahrani, F.R., Sharif, M.M., Pandi-Perumal, S.R., and BaHammam, A.S. 2018. "Insomnia in primary care settings: Still overlooked and undertreated?" *Journal of Nature and Science of Medicine* 1 (2):64-68. https://doi.org/10.4103/JNSM.JNSM_30_18

Almeneessier, A.S., and BaHammam, A.S. 2017. "Sleep medicine in Saudi Arabia." *Journal of Clinical Sleep Medicine* 13 (4):641-645. https://doi.org/10.5664/jcsm.6566

Almohaya, A., Qrmli, A., Almagal, N., Alamri, K., Bahammam, S., Al-Enizi, M., Alanazi, A., Almeneessier, A.S., Sharif, M.M., and Bahammam, A.S. 2013. "Sleep medicine education and knowledge among medical students in selected Saudi Medical Schools." *BMC Medical Education* 13:133. https://doi.org/10.1186/1472-6920-13-133

Almutairi, K.M., Alhelih, E., Al-Ajlan, A.S., and Vinluan, J.M. 2016. "A cross-sectional assessment of quality of life of colorectal cancer patients in Saudi Arabia." *Clinical and Translational Oncology* 18 (2):144-152. https://doi.org/10.1007/s12094-015-1346-3

Almutairi, K.M., Mansour, E.A., and Vinluan, J.M. 2016. "A cross-sectional assessment of quality of life of breast cancer patients in Saudi Arabia." *Public Health* 136:117-125. https://doi.org/10.1016/j.puhe.2016.03.008

Alotair, H., and Bahammam, A. 2008. "Gender differences in Saudi patients with obstructive sleep apnea." *Sleep & Breath* 12 (4):323-329. https://doi.org/10.1007/s11325-008-0184-8

Alsaadi, S.M., McAuley, J.H., Hush, J.M., Bartlett, D.J., McKeough, Z.M., Grunstein, R.R., Dungan, G.C., 2nd, and Maher, C.G. 2014. "Assessing sleep disturbance in low back pain: The validity of portable instruments." *PLoS One* 9 (4):e95824. https://doi.org/10.1371/journal.pone.0095824

Alsaggaf, M.A., Wali, S.O., Merdad, R.A., and Merdad, L.A. 2016. "Sleep quantity, quality, and insomnia symptoms of medical students during clinical years. Relationship with stress and academic performance." *Saudi Medical Journal* 37 (2):173-182. https://doi.org/10.15537/smj.2016.2.14288

Amna Puri-Mirza. 2019. "Number of physicians working in Saudi Arabia from 2011 to 2018, by nationality." statista, accessed 7 July. https://www.statista.com/statistics/629028/saudi-arabia-number-of-physicians-by-nationality/.

Anderson, K.N. 2018. "Insomnia and cognitive behavioural therapy—how to assess your patient and why it should be a standard part of care." *Journal of thoracic disease* 10 (Suppl 1):S94.

Asnis, G.M., Thomas, M., and Henderson, M.A. 2015. "Pharmacotherapy treatment options for insomnia: A primer for clinicians." *International Journal of Molecular Science* 17 (1):50. https://doi.org/10.3390/ijms17010050

Avella, J.R. 2016. "Delphi panels: Research design, procedures, advantages, and challenges." *International Journal of Doctoral Studies* 11:305-321. https://doi.org/10.28945/3561

BaHammam, A. 2006. "Sleep in acute care units." *Sleep & Breathing* 10 (1):6-15. https://doi.org/10.1007/s11325-005-0044-8

BaHammam, A.S. 2011. "Sleep from an Islamic perspective." *Annals of Thoracic Medicine* 6 (4):187.

Bahammam, A.S., Alsaeed, M., Alahmari, M., Albalawi, I., and Sharif, M.M. 2014. "Sleep medicine services in Saudi Arabia: The 2013 national survey." *Annals of Thoracic Medicine* 9 (1):45-47. https://doi.org/10.4103/1817-1737.124444

Baker, J., Lovell, K., and Harris, N. 2006. "How expert are the experts? An exploration of the concept of 'expert' within Delphi panel techniques." *Nurse Researcher* 14 (1):59-70. https://doi.org/10.7748/nr2006.10.14.1.59.c6010

Bartlett, G., Abrahamowicz, M., Grad, R., Sylvestre, M.-P., and Tamblyn, R. 2009. "Association between risk factors for injurious falls and new benzodiazepine prescribing in elderly persons." *BMC family practice* 10 (1):1. https://doi.org/ 10.1186/1471-2296-10-1

Bassiony, M.M. 2008. "Stages of progression in drug abuse involvement across generations in Jeddah, Saudi Arabia." *Neurosciences* 13 (1):37-40.

Basta, M., Chrousos, G.P., Vela-Bueno, A., and Vgontzas, A.N. 2007. "Chronic insomnia and the stress system." *Sleep medicine clinics* 2 (2):279-291. https://doi.org/ 10.1016/j.jsmc.2007.04.002

Beckmann, U., Bohringer, C., Carless, R., Gillies, D.M., Runciman, W.B., Wu, A.W., and Pronovost, P. 2003. "Evaluation of two methods for quality improvement in intensive care: Facilitated incident monitoring and retrospective medical chart review." *Critical care medicine* 31 (4):1006-1011. https://doi.org/10.1097/01.CCM.0000060016.21525.3C

Bhaskar, S., Hemavathy, D., and Prasad, S. 2016. "Prevalence of chronic insomnia in adult patients and its correlation with medical comorbidities." *J Family Med Prim Care* 5 (4):780-784. https://doi.org/10.4103/2249-4863.201153

Birrenbach, T., Kraehenmann, S., Perrig, M., Berendonk, C., and Huwendiek, S. 2016. "Physicians' attitudes toward, use of, and perceived barriers to clinical guidelines: A survey among Swiss physicians." *Adv Med Educ Pract* 7:673-680. https://doi.org/10.2147/amep.s115149

Blanco, C., Han, B., Jones, C.M., Johnson, K., and Compton, W.M. 2018. "Prevalence and correlates of benzodiazepine use, misuse, and use disorders among adults in the United States." *The Journal of clinical psychiatry* 79 (6). https://doi.org/10.4088/JCP.18m12174.

Blau, G.and DiMino, J. 2019 "Prepared for Counseling: Introducing a Short Scale and Correlates. " *Measurement and Evaluation in Counseling and Development* 1-11. https://doi.org/10.1080/07481756.2019.1595816.

Bouland, D.T., Fine, E., Withers, D., and Jarvis, M. 2015. "Prescription medication obtainment methods and misuse." *Journal of addiction medicine* 9 (4):281-285. https://doi.org/10.1097/ADM.0000000000000130.

Bowling, A. 2014. *Research Methods in Health: Investigating Health and Health Services* 4th ed. Maidenhead, GB: McGraw Hill; Open University Press.

Bowling, A., and Ebrahim, S. 2005. "Handbook of Health Research Methods: Investigation, Measurement and Analysis." In. Maidenhead, UK: Open University Press. http://eprints.kingston.ac.uk/id/eprint/17786.

Brandt, J., and Leong, C. 2017. "Benzodiazepines and Z-drugs: An updated review of major adverse outcomes reported on in epidemiologic research." *Drugs in R & D* 17 (4):493-507. https://doi.org/10.1007/s40268-017-0207-7

Braun, V., and Clarke, V. 2006. "Using thematic analysis in psychology." *Qualitative research in psychology* 3 (2):77-101.

Britten, N. 1995. "Qualitative research: Qualitative interviews in medical research." *British Medical Journal* 311 (6999):251-253.

Bronstein, A.C., Spyker, D.A., Cantilena, L.R., Jr., Rumack, B.H., and Dart, R.C. 2012. "2011 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 29th Annual Report." *Clinical Toxicology* 50 (10):911-1164. https://doi.org/10.3109/15563650.2012.746424

Brown, M.T., and Bussell, J.K. 2011. "Medication adherence: WHO cares?" Mayo clinic proceedings.

Bryman, A. 2012. *Social Research Methods*. 4th ed. New York: Oxford University Press

Bunniss, S., and Kelly, D.R. 2010. "Research paradigms in medical education research." *Medical education* 44 (4):358-366. https://doi.org/10.1111/j.1365-2923.2009.03611.x

Cadogan, C., and Ryder, S. 2015. "An audit of prescribing practices for benzodiazepines and Z-drugs." *Ir Med J* 108 (3):84-86.

Calem, M., Bisla, J., Begum, A., Dewey, M., Bebbington, P.E., Brugha, T., Cooper, C., Jenkins, R., Lindesay, J., and McManus, S. 2012. "Increased prevalence of insomnia and changes in hypnotics use in England over 15 years: Analysis of the 1993, 2000, and 2007 National Psychiatric Morbidity Surveys." *Sleep* 35 (3):377-384. https://doi.org/10.5665/sleep.1700

Cappuccio, F.P., D'Elia, L., Strazzullo, P., and Miller, M.A. 2010. "Sleep duration and all-cause mortality: A systematic review and meta-analysis of prospective studies." *Sleep* 33 (5):585-592.

Charan, J., and Biswas, T. 2013. "How to calculate sample size for different study designs in medical research?" *Indian journal of psychological medicine* 35 (2):121.

Charmaz, K. 2001. "Qualitative interviewing and grounded theory analysis." In *Handbook of Interview Research*, edited by Jaber F. Gubrium & James A. Holstein, 347-365. Serial Analysis of Gene Expression.

Cheung, J.M., Bartlett, D.J., Armour, C.L., Laba, T.-L., and Saini, B. 2019. "Patient perceptions of treatment delivery platforms for cognitive behavioral therapy for insomnia." *Behav Sleep Med* 17 (1):81-97.

Cho, Y.W., Shin, W.C., Yun, C.H., Hong, S.B., Kim, J., and Earley, C.J. 2009. "Epidemiology of Insomnia in Korean Adults: Prevalence and Associated Factors." *J Clin Neurol* 5 (1):20-23.

Corkery, J., Claridge, H., Loi, B., Goodair, C., and Schifano, F. 2013. Drug-related deaths in the UK: January-December 2012: Annual report 2013. London, United Kingdom: St George's University of London.

Countries and their Cultures Forum. 2019. "Culture of Saudi Arabia ", accessed July 13.

Creswell, J.W. 2009. "Mapping the field of mixed methods research." *Journal of Mixed Methods Research* 3 (2):95-108. https://doi.org/10.1177/1558689808330883

Creswell, J.W., and Clark, V.L.P. 2011. *Designing and Conducting Mixed Methods Research*. 2nd ed. United States of America: SAGE Publications.

Creswell, J.W., Plano Clark, V.L., Gutmann, M.L., and Hanson, W.E. 2003. "Advanced Mixed Methods Research Designs." In *Handbook of mixed methods in social and behavioral research*, edited by Abbas and Teddlie Tashakkori, Charles, 240. Thousad Oaks, London and New Delhi: SAGE Publications.

Crotty, M. 1998. *The Foundations of Social Research: Meaning and Perspective in the Research Process*. London, Thousand Oaks and New Delhi: SAGE Publications.

Cunnington, D., and Junge, M. 2016. "Chronic insomnia: Diagnosis and non-pharmacological management." *British Medical Journal* 355:i5819. https://doi.org/10.1136/bmj.i5819

Cunnington, D., Junge, M.F., and Fernando, A.T. 2013. "Insomnia: Prevalence, consequences and effective treatment." *Med J Aust* 199 (8):S36-40.

Custer, R.L., Scarcella, J.A., and Stewart, B.R. 1999. "The modified Delphi technique - A rotational modification." *Journal of Career and Technical Education* 15 (2):50-58.

Daugherty, J.L., Hendricks, L., and Simpson, C. 2014. "Sleep aids: Sedative-hypnotic drugs in America." *National Forum Journal of Counseling and Addiction* 3 (1):1-5.

Davies, J., Rae, T.C., and Montagu, L. 2017. "Long-term benzodiazepine and Z-drugs use in the UK: A survey of general practice." *The British Journal of General Practice* 67 (662):609-613. https://doi.org/10.3399/bjgp17X691865

Day, J., and Bobeva, M. 2005. "A generic toolkit for the successful management of Delphi studies." *Electronic Journal of Business Research Methods* 3 (2):103-116.

Dimsdale, J. E., Norman, D., DeJardin, D. and Wallace, M. S. 2007 "The effect of opioids on sleep architecture" *Journal of clinical sleep medicine* 3 (01):33-36.

Dobia, A., Ryan, K., Abutaleb, M., and Edwards, A. 2019 "Perceptions of physicians in Saudi Arabia on the use of international clinical guidelines for managing primary insomnia."*PLoS ONE* 14(8):e0220960. https://doi.org/10.1371/journal.pone.0220960.

Dobia, A., Ryan, K., BaHammam, A. S. and Edwards, A. 2019 "Using benzodiazepines and Z-drugs for managing primary insomnia in adults in Saudi Arabia: An e-Delphi study to aid the development of clinical guidelines" *Sleep and Breathing*. https://doi.org/10.1007/s11325-019-01794-7.

Dobia, A., Ryan, K., Grant, D., and BaHammam, A. 2019. "Current clinical practice for the use of hypnotics to manage primary insomnia in adults in a tertiary hospital in Saudi Arabia: An audit study." *Pharmacy* 7 (1). https://doi.org/10.3390/pharmacy7010015

Doyle, L., Brady, A.-M., and Byrne, G. 2009. "An overview of mixed methods research." *Journal of Research in Nursing* 14 (2):175-185. https://doi.org/10.1177/ 1744987108093962

Dworkin, R.J. 1987. "Hidden bias in the use of archival data." *Evaluation & the health professions* 10 (2):173-185. https://doi.org/10.1177/016327878701000202

Elmontsri, M., Almashrafi, A., Banarsee, R., and Majeed, A. 2017. "Status of patient safety culture in Arab countries: a systematic review." *BMJ Open* 7 (2):e013487.

Engels, T.C., and Kennedy, H.P. 2007. "Enhancing a Delphi study on family-focused prevention." *Technological forecasting and social change* 74 (4):433-451. https://doi.org/10.1016/j.techfore.2005.11.008

Eubank, B.H., Mohtadi, N.G., Lafave, M.R., Wiley, J.P., Bois, A.J., Boorman, R.S., and Sheps, D.M. 2016. "Using the modified Delphi method to establish clinical consensus for the diagnosis and treatment of patients with rotator cuff pathology." *BMC Med Res Methodol* 16:56. https://doi.org/10.1186/s12874-016-0165-8

Farquhar, C.M., Kofa, E.W., and Slutsky, J.R. 2002. "Clinicians' attitudes to clinical practice guidelines: A systematic review." *Medical Journal of Australia* 177 (9):502-506.

Fink, A., Kosecoff, J., Chassin, M., and Brook, R.H. 1984. "Consensus methods: Characteristics and guidelines for use." *American journal of public health* 74 (9):979-983.

Fox, B.I., Flynn, A.J., Fortier, C.R., and Clauson, K.A. 2011. "Knowledge, skills, and resources for pharmacy informatics education." *American journal of pharmaceutical education* 75 (5):93. https://doi.org/10.5688/ajpe75593

Gabe, J., Williams, S.J., and Coveney, C.M. 2017. "Prescription hypnotics in the news: A study of UK audiences." *Social Science & Medicine* 174:43-52. https://doi.org/10.1016/j.socscimed.2016.11.029

Gee. 2013. "Post Your Surveys on Twitter to Improve Response Rates." SmartSurvey, accessed 23 May 2019. https://blog.smartsurvey.co.uk/post-your-surveys-on-twitter-to-improve-response-rates.

Geist, M.R. 2010. "Using the Delphi method to engage stakeholders: A comparison of two studies." *Eval Program Plann* 33 (2):147-154. https://doi.org/10.1016/j.evalprogplan.2009.06.006

Gerhard, T. 2008. "Bias: Considerations for research practice." *American Journal of Health-System Pharmacy* 65 (22):2159-2168. https://doi.org/10.2146/ajhp070369

Gill, F.J., Leslie, G.D., Grech, C., and Latour, J.M. 2013. "Using a web-based survey tool to undertake a Delphi study: Application for nurse education research." *Nurse Educ Today* 33 (11):1322-1328. https://doi.org/10.1016/j.nedt.2013.02.016

Gould, D. 2008. "Audit and research: similarities and differences." *Nursing Standard* 22 (37).

Greenblatt, D.J., and Roth, T. 2012. "Zolpidem for insomnia." *Expert opinion on pharmacotherapy* 13 (6):879-893. https://doi.org/10.1517/14656566.2012.667074

Gunja, N. 2013. "The clinical and forensic toxicology of Z-drugs." *Journal of Medical Toxicology* 9 (2):155-162. https://doi.org/10.1007/s13181-013-0292-0

Hadi, M.A., Alldred, D.P., Closs, S.J., and Briggs, M. 2014. "Mixed-methods research in pharmacy practice: Recommendations for quality reporting (part 2)." *International Journal of Pharmacy Practice* 22 (1):96-100. https://doi.org/10.1111/ijpp.12015

Hajak, G., Müller, W., Wittchen, H.-U., Pittrow, D., and Kirch, W. 2003. "Abuse and dependence potential for the non-benzodiazepine hypnotics zolpidem and zopiclone: A review of case reports and epidemiological data." *Addiction* 98 (10):1371-1378.

Hasanain, R., Vallmuur, K., and Clark, M. 2014. "Progress and challenges in the implementation of Electronic Medical Records in Saudi Arabia: A systematic review." *Health Informatics- An International Journal* 3 (2). https://doi.org/10.5121/hiij.2014.3201

Hayward, R., Jordan, K.P., and Croft, P. 2010. "Healthcare use in adults with insomnia: A longitudinal study." *The British Journal of General Practice* 60 (574):334-340. https://doi.org/10.3399/bjgp10X501822

Heale, R., and Twycross, A. 2015. "Validity and reliability in quantitative studies." *Evidence Based Nursing* 18 (3):66-67. https://doi.org/10.1136/eb-2015-102129

Heinemann, S., Weiß, V., Straube, K., Nau, R., Grimmsmann, T., Himmel, W., and Hummers-Pradier, E. 2016 "Understanding and reducing the prescription of hypnotics and sedatives at the interface of hospital care and general practice: a protocol for a mixed-methods study. " *BMJ open* 6 (8):e011908

Hennekens CH, and Buring JE. 1987. *Epidemiology in Medicine,* . First ed. Philadelphia, Baltimore, New York, London: Lippincott Williams & Wilkins,.

Hess, D.R. 2004. "Retrospective studies and chart reviews." *Respiratory care* 49 (10):1171-1174.

Hill, R. 1998. "What sample size is "enough" in internet survey research." *Interpersonal Computing and Technology: An electronic journal for the 21st century* 6 (3-4):1-10.

Hofer, B.K., and Pintrich, P.R. 2012. *Personal Epistemology: The Psychology of Beliefs about Knowledge and Knowing*. Mahwah, New Jersey, US: Lawrence Erlbaum Associates.

Hoffmann, F. 2013a. "Benefits and risks of benzodiazepines and Z-drugs: Comparison of perceptions of GPs and community pharmacists in Germany." *German Medical Science* 11:Doc10. https://doi.org/10.3205/000178

Hoffmann, F. 2013b. "Perceptions of German GPs on benefits and risks of benzodiazepines and Z-drugs." *Swiss Medical Weekly* 143:13745. https://doi.org/10.4414/smw.2013.13745

Hong, I.S., and Bishop, J.R. 2014. "Sedative-hypnotics for sleepless geriatric patients: Choose wisly: Age-related physiologic changes, risk of adverse effects guide your prescribing." *European Cardiology* 13 (10):36-52.

Hood, S.D., Norman, A., Hince, D.A., Melichar, J.K., and Hulse, G.K. 2014. "Benzodiazepine dependence and its treatment with low dose flumazenil." *Br J Clin Pharmacol* 77 (2):285-294.

Huedo-Medina, T.B., Kirsch, I., Middlemass, J., Klonizakis, M., and Siriwardena, A.N. 2012. "Effectiveness of non-benzodiazepine hypnotics in treatment of adult insomnia: Meta-analysis of data submitted to the Food and Drug Administration." *The British Medical Journal* 345:e8343. https://doi.org/10.1136/bmj.e8343

Hughes, L.D., Raitt, N., Riaz, M.A., Baldwin, S.J., Erskine, K., and Graham, G. 2016. "Primary care hypnotic and anxiolytic prescription: Reviewing prescribing practice over 8 years." *J Family Med Prim Care* 5 (3):652-657. https://doi.org/10.4103/2249-4863.197312

Jacob, L., Rapp, M.A., and Kostev, K. 2017. "Long-term use of benzodiazepines in older patients in Germany: A retrospective analysis." *Therapeutic advances in psychopharmacology* 7 (6-7):191-200. https://doi.org/10.1177/2045125317696454

Johnson, C.F., Frei, C., Downes, N., McTaggart, S.A., and Akram, G. 2016. "Benzodiazepine and z-hypnotic prescribing for older people in primary care: A cross-sectional population-based study." *The British Journal of General Practice* 66 (647):e410-e415. https://doi.org/10.3399/bjgp16X685213

Jones, I.R., and Sullivan, G. 1998. "Physical dependence on zopiclone." *The British Medical Journal* 316 (7125):117. https://doi.org/10.1136/bmj.316.7125.117

Kapil, V., Green, J., Le Lait, C., Wood, D., and Dargan, P. 2014. "Misuse of benzodiazepines and Z-drugs in the UK." *The British Journal of Psychiatry* 205 (5):407-408. https://doi.org/10.1192/bjp.bp.114.149252

Kaufmann, C.N., Spira, A.P., Alexander, G.C., Rutkow, L., and Mojtabai, R. 2016. "Trends in prescribing of sedative-hypnotic medications in the USA: 1993–2010." *Pharmacoepidemiology and drug safety* 25 (6):637-645. https://doi.org/10.1002/pds.3951

Keeney, S., McKenna, H., and Hasson, F. 2010. *The Delphi Technique in Nursing and Health Research*. Chichester, United Kingdom: John Wiley & Sons.

Kennedy, H.P. 2004. "Enhancing Delphi research: Methods and results." *J Adv Nurs* 45 (5):504-511.

King, M. B., Gabe, J., Williams, P., and Rodrigo, E. K. 1990 "Long term use of benzodiazepines: the views of patients" *The British Journal of General Practice* 40 (334):194.

Knutson, K.L., and Van Cauter, E. 2008. "Associations between sleep loss and increased risk of obesity and diabetes." *Annals of the New York Academy of Sciences* 1129 (1):287-304. https://doi.org/10.1196/annals.1417.033

Koenig, H.G., Al Zaben, F., Sehlo, M.G., Khalifa, D.A., Al Ahwal, M.S., Qureshi, N.A., and Al-Habeeb, A.A. 2014. "Mental health care in Saudi Arabia: Past, present and future." *Open Journal of Psychiatry* 4 (02):113-130. https://doi.org/10.4236/ojpsych.2014.42016

Koop, P., and Strang, V. 2002. "Prospective and retrospective research: Considerations and questions." *Canadian Oncology Nursing Journal* 12 (3):142-145.

Korstjens, I., and Moser, A. 2018. "Series: Practical guidance to qualitative research. Part 4: Trustworthiness and publishing." *European Journal of General Practice* 24 (1):120-124. https://doi.org/10.1080/13814788.2017.1375092

Krefting, L. 1991. "Rigor in qualitative research: The assessment of trustworthiness." *American journal of occupational therapy* 45 (3):214-222. https://doi.org/10.5014/ajot.45.3.214

Kripke, D.F. 2000. "Chronic hypnotic use: Deadly risks, doubtful benefit." *Sleep Med Rev* 4 (1):5-20. https://doi.org/10.1053/smrv.1999.0076

Kripke, D.F. 2006. "Risks of chronic hypnotic use." In *Sleep and Sleep Disorders*, 141-145. Boston: Springer.

Krystal, A.D. 2009. "A compendium of placebo-controlled trials of the risks/benefits of pharmacological treatments for insomnia: The empirical basis for US clinical practice." *Sleep Med Rev* 13 (4):265-274. https://doi.org/10.1016/j.smrv.2008.08.001

Krystal, A.D. 2012. "Psychiatric disorders and sleep." *Neurologic clinics* 30 (4):1389-1413. https://doi.org/10.1016/j.ncl.2012.08.018

Lacks, P., and Rotert, M. 1986. "Knowledge and practice of sleep hygiene techniques in insomniacs and good sleepers." *Behaviour research and therapy* 24 (3):365-368.

Lader, M. 2011. "Benzodiazepines revisited—will we ever learn?" *Addiction* 106 (12):2086-2109. https://doi.org/10.1111/j.1360-0443.2011.03563.x

Lee, G.H., McGrath, C., and Yiu, C.K. 2016. "Developing clinical practice guidelines for caries prevention and management for pre-school children through the ADAPTE process and Delphi consensus." *Health research policy and systems* 14 (1):44. https://doi.org/10.1186/s12961-016-0117-0

Leech, N.L., and Onwuegbuzie, A.J. 2009. "A typology of mixed methods research designs." *Quality & quantity* 43 (2):265-275.

Leger, D., Guilleminault, C., Bader, G., Levy, E., and Paillard, M. 2002. "Medical and socio-professional impact of insomnia." *Sleep* 25 (6):625-629.

Leger, D., and Poursain, B. 2005. "An international survey of insomnia: under-recognition and under-treatment of a polysymptomatic condition." *Curr Med Res Opin* 21 (11):1785-1792. https://doi.org/10.1185/030079905x65637

Leger, D., Poursain, B., Neubauer, D., and Uchiyama, M. 2008. "An international survey of sleeping problems in the general population." *Curr Med Res Opin* 24 (1):307-317. https://doi.org/10.1185/030079907X253771

Liebrenz, M., Schneider, M., Buadze, A., Gehring, M.-T., Dube, A., and Caflisch, C. 2015. "High-dose benzodiazepine dependence: a qualitative study of patients' perceptions on initiation, reasons for use, and obtainment." *PLoS One* 10 (11):e0142057.

Longo, L. P., and Johnson, B. 2000 "Addiction: Part I. Benzodiazepines-side effects, abuse risk and alternatives " *American family physician* 61 (7): 2121-2128.

Lyons, E., and Coyle, A. 2016. *Analysing Qualitative Data in Psychology*. 2nd ed. Los Angeles, London, New Delhi, Singapore, Washington DC, Melbourne: SAGE.

M. Ohayon, M., Caulet, M., and Guilleminault, C. 1997. "How a general population perceives its sleep and how this relates to the complaint of insomnia." *Sleep* 20 (9):715-723.

Mackenzie, N., and Knipe, S. 2006. "Research dilemmas: Paradigms, methods and methodology." *Issues in educational research* 16 (2):193-205.

Madea, B., and Mußhoff, F. 2009. "Knock-out drugs: Their prevalence, modes of action, and means of detection." *Dtsch Arztebl Int* 106 (20):341-347. https://doi.org/10.3238/arztebl.2009.0341

Maher, T.M., Whyte, M.K., Hoyles, R.K., Parfrey, H., Ochiai, Y., Mathieson, N., Turnbull, A., Williamson, N., and Bennett, B.M. 2015. "Development of a consensus statement for the definition, diagnosis, and treatment of acute exacerbations of idiopathic pulmonary fibrosis using the Delphi technique." *Advances in therapy* 32 (10):929-943. https://doi.org/10.1007/s12325-015-0249-6

Mahowald, M.W. 2012. "Disorders of Sleep " In *Goldman's Cecil Medicine* 2299-2304. Philadelphia: Saunders.

Makoul, G., Arntson, P., and Schofield, T. 1995. "Health promotion in primary care: physician-patient communication and decision making about prescription medications." *Social Science & Medicine* 41 (9):1241-1254.

Mann, C. 2003. "Observational research methods. Research design II: cohort, cross sectional, and case-control studies." *Emergency medicine journal* 20 (1):54-60.

Manna, D., Bruijnzeels, M., Mokkink, H., and Berg, M. 2003. "Ethnic specific recommendations in clinical practice guidelines: a first exploratory comparison between guidelines from the USA, Canada, the UK, and the Netherlands." *BMJ Quality & Safety* 12 (5):353-358.

Matthews, E.E., Arnedt, J.T., McCarthy, M.S., Cuddihy, L.J., and Aloia, M.S. 2013. "Adherence to cognitive behavioral therapy for insomnia: A systematic review." *Sleep Med Rev* 17 (6):453-464. https://doi.org/10.1016/j.smrv.2013.01.001

Mays, N., and Pope, C. 1995. "Rigour and qualitative research." *The British Medical Journal* 311 (6997):109-112.

McFall, S.L., and Garrington, C. 2011. *Understanding society: Early Findings from the First Wave of the UK's Household Longitudinal Study*. Colchester: University of Essex: Institute for Social and Economic Research.

Medalie, L., and Cifu, A.S. 2017. "Management of chronic insomnia disorder in adults." *The Journal of the American Medical Association* 317 (7):762-763. https://doi.org/10.1001/jama.2016.19004

Mellinger, G.D., Balter, M.B., and Uhlenhuth, E.H. 1985. "Insomnia and its treatment. Prevalence and correlates." *Archives of Geneneral Psychiatry* 42 (3):225-232.

Merdad, R.A., Merdad, L.A., Nassif, R.A., El-Derwi, D., and Wali, S.O. 2014. "Sleep habits in adolescents of Saudi Arabia; distinct patterns and extreme sleep schedules." *Sleep medicine* 15 (11):1370-1378.

Mitchell, M.D., Gehrman, P., Perlis, M., and Umscheid, C.A. 2012. "Comparative effectiveness of cognitive behavioral therapy for insomnia: A systematic review." *BMC family practice* 13 (1):40. https://doi.org/10.1186/1471-2296-13-40

Mokhar, A., Kuhn, S., Topp, J., Dirmaier, J., Härter, M., and Verthein, U. 2019. "Long-term use of benzodiazepines and Z drugs: a qualitative study of patients' and healthcare professionals' perceptions and possible levers for change." *BJGP Open*:bjgpopen18X101626.

Mokhar, A., Tillenburg, N., Dirmaier, J., Kuhn, S., Härter, M., and Verthein, U. 2018. "Potentially inappropriate use of benzodiazepines and z-drugs in the older population—analysis of associations between long-term use and patient-related factors." *PeerJ* 6:e4614.

Morgan, D.L. 2014. "Pragmatism as a paradigm for social research." *Qualitative Inquiry* 20 (8):1045-1053. https://doi.org/10.1177/1077800413513733

Morgan, K., Kucharczyk, E., and Gregory, P. 2011. "Insomnia: Evidence-based approaches to assessment and management." *Clinical Medicine* 11 (3):278-281. https://doi.org/10.7861/clinmedicine.11-3-278

Morin, C.M., Bélanger, L., LeBlanc, M., Ivers, H., Savard, J., Espie, C.A., Mérette, C., Baillargeon, L., and Grégoire, J.-P. 2009. "The natural history of insomnia: A population-based 3-year longitudinal study." *Arch Intern Med* 169 (5):447-453. https://doi.org/10.1001/archinternmed.2008.610

Morrell, C., and Harvey, G. 1999. "Undertaking a clinical audit project: A step-by-step guide." In *The Clinical Audit Handbook Improving the Quality of Health Care*. Oxford, UK: Baillière Tindall.

Morriss, R. 2015. "Mandatory implementation of NICE guidelines for the care of bipolar disorder and other conditions in England and Wales." *BMC Med* 13:246. https://doi.org/10.1186/s12916-015-0464-7

Morse, J.M. 2016. "Mixed Method Design: Principles and Procedures." In. New York: Routledge.

Murphy, M., Staffileno, B., and Foreman, M., eds. 2018. *Research for Advanced Practice Nurses From Evidence to Practice*. Third edition ed. New York: Springer Publishing Company, LLC.

National Institute for Care Excellence. 2002. *Principles for Best Practice in Clinical Audit*. Oxford, UK: Radcliffe Medical Press.

National Institute for Care Excellence. 2004. "Guidance on the use of zaleplon, zolpidem and zopiclone for the short term management of insomnia: Technology Appraisal Guidance." accessed 15 June 2016. Retrieved from https://www.nice.org.uk/guidance/ta77/chapter/1-Guidance.

National Institute for Health and Care Excellence. 2018. "British National Formulary: Hypnotics and anxiolytics." accessed 5 November 2018. Available from: https://bnf.nice.org.uk/treatment-summary/hypnotics-and-anxiolytics.html

National Institute of Clinical Excellence. 2015. "Hypnotics." accessed 20 June 2016. Retrieved from https://www.nice.org.uk/advice/ktt6.

Neyaz, Y., Qureshi, N., Khoja, T., Magzoub, M., Haycox, A., and Walley, T. 2011. "Physicians' medication prescribing in primary care in Riyadh city, Saudi Arabia. Literature review, part 1: Variations in drug prescribing." *Eastern Mediterranean health journal* 17 (2):126-131.

O'mahony, D., and Gallagher, P.F. 2008. "Inappropriate prescribing in the older population: Need for new criteria." *Age and Ageing* 37 (2):138-141. https://doi.org/10.1093/ageing/afm189

Ohayon, M. 1996. "Epidemiological study on insomnia in the general population." *Sleep* 19:S7-S15.

Ohayon, M.M. 1997. "Prevalence of DSM-IV diagnostic criteria of insomnia: distinguishing insomnia related to mental disorders from sleep disorders." *J Psychiatr Res* 31 (3):333-346.

Ohayon, M.M. 2002. "Epidemiology of insomnia: what we know and what we still need to learn." *Sleep Med Rev* 6 (2):97-111.

Ohayon, M.M., and Bader, G. 2010. "Prevalence and correlates of insomnia in the Swedish population aged 19-75 years." *Sleep Med* 11 (10):980-986. https://doi.org/10.1016/j.sleep.2010.07.012

Ohayon, M.M., and Lader, M.H. 2002. "Use of psychotropic medication in the general population of France, Germany, Italy, and the United Kingdom." *The Journal of clinical psychiatry* 63 (9):817-825.

Olfson, M., King, M., and Schoenbaum, M. 2015. "Benzodiazepine use in the United States." *JAMA psychiatry* 72 (2):136-142. https://doi.org/10.1001/jamapsychiatry.2014.1763

Olson, L. 2008. "Hypnotic hazards: Adverse effects of zolpidem and other z-drugs." *Australian Prescriber* 31 (6):146-149. https://doi.org/10.18773/austprescr.2008.084

Ozminkowski, R.J., Wang, S., and Walsh, J.K. 2007. "The direct and indirect costs of untreated insomnia in adults in the United States." *Sleep* 30 (3):263-273.

Palmaro, A., Dupouy, J., and Lapeyre-Mestre, M. 2015. "Benzodiazepines and risk of death: Results from two large cohort studies in France and UK." *European Neuropsychopharmacology* 25 (10):1566-1577. https://doi.org/10.1016/j.euroneuro.2015.07.006

Patorno, E., Glynn, R.J., Levin, R., Lee, M.P., and Huybrechts, K.F. 2017. "Benzodiazepines and risk of all cause mortality in adults: Cohort study." *The British Medical Journal* 358:j2941. https://doi.org/10.1136/bmj.j2941

Pigeon, W.R. 2010. "Treatment of adult insomnia with cognitive–behavioral therapy." *Journal of clinical psychology* 66 (11):1148-1160. https://doi.org/10.1002/jclp.20737

Pollmann, A.S., Murphy, A.L., Bergman, J.C., and Gardner, D.M. 2015. "Deprescribing benzodiazepines and Z-drugs in community-dwelling adults: a scoping review." *BMC pharmacology and toxicology* 16 (1):19.

Qaseem, A., Kansagara, D., Forciea, M.A., Cooke, M., and Denberg, T.D. 2016. "Management of chronic insomnia disorder in adults: A clinical practice guideline from the American College of Physicians." *Ann Intern Med* 165 (2):125-133. https://doi.org/10.7326/m15-2175

Qu, S.Q., and Dumay, J. 2011. "The qualitative research interview." *Emerald Insight* 8 (3):238-264. https://doi.org/10.1108/11766091111162070

Qureshi, N.A., Al-Ghamdy, Y.S., Al-Haddad, N.S., Abdelgadir, M.H., and Tawfik, M.H. 2001. "Integration of mental health care into primary care. Preliminary observations of continuing implementation phase." *Saudi Medical Journal* 22 (10):899-906.

Rallis, S.F., and Rossman, G.B. 2003. "Mixed methods in evaluation contexts: A pragmatic framework." In *Handbook of mixed methods in social and behavioral research*, edited by A. Tashakkori, Teddlie, C. , 491-512. Thousand Oaks, California: SAGE.

Rice, P.L., and Ezzy, D. 1999. *Qualitative research methods: A Health Focus*. Oxford: Oxford University Press.

Riemann, D., Baglioni, C., Bassetti, C., Bjorvatn, B., Dolenc Groselj, L., Ellis, J.G., Espie, C.A., Garcia-Borreguero, D., Gjerstad, M., Goncalves, M., Hertenstein, E., Jansson-Frojmark, M., Jennum, P.J., Leger, D., Nissen, C., Parrino, L., Paunio, T., Pevernagie, D., Verbraecken, J., Weess, H.G., Wichniak, A., Zavalko, I., Arnardottir, E.S., Deleanu, O.C., Strazisar, B., Zoetmulder, M., and Spiegelhalder, K. 2017. "European guideline for the diagnosis and treatment of insomnia." *J Sleep Res* 26 (6):675-700. https://doi.org/10.1111/jsr.12594

Riessman, C.K. 2008. *Narrative Methods for the Human Sciences*. Thousand Oak, California: SAGE.

Ronald D. Fricker, J. 2008. "Sampling Methods for Web and E-mail Surveys." In *THE SAGE HANDBOOK OF ONLINE RESEARCH METHODS*, edited by Nigel G.

Fielding, Rymond M. Lee and Grant Blank. London, California, New Delhi & Singapore: SAGE Publications Ltd.

Roth, T. 2007. "Insomnia: definition, prevalence, etiology, and consequences." *Journal of Clinical Sleep Medicine: JCSM: Official Publication of the American Academy of Sleep Medicine* 3 (5 Suppl):S7.

Roussin, A., Bouyssi, A., Pouché, L., Pourcel, L., and Lapeyre-Mestre, M. 2013 "Misuse and dependence on non-prescription codeine analgesics or sedative H1 antihistamines by adults: a cross-sectional investigation in France" *PLOS One* 8 (10): e76499.

Ruhm, C.J. 2016. "Drug poisoning deaths in the United States, 1999–2012: A statistical adjustment analysis." *Population health metrics* 14 (1):2. https://doi.org/10.1186/s12963-016-0071-7

Russell, I.T., and Wilson, B.J. 1992. "Audit: the third clinical science?" *BMJ Quality & Safety* 1 (1):51-55.

Saddichha, S. 2010. "Diagnosis and treatment of chronic insomnia." *Annals of Indian Academy of Neurology* 13 (2):94-102. https://doi.org/10.4103/0972-2327.64628

Saines, S. 2017. "Using Social Media: Recruiting Research Participants via Twitter." The Office for Scholarly Communication, accessed 20 May. https://blogs.kent.ac.uk/osc/2017/11/03/twitter-recruiting-research-participants/.

Sanchez, A. R. and Atkinson, D. R. 1983 "Mexican-American cultural commitment, preference for counselor ethnicity, and willingness to use counselling" *Journal of Counseling Psychology* 30 (2): 215.

Sandberg, J.C., Suerken, C.K., Quandt, S.A., Altizer, K.P., Bell, R.A., Lang, W., Nguyen, H.T., Grzywacz, J.G., and Arcury, T.A. 2014. "Self-reported sleep difficulties and self-care strategies among rural older adults." *Journal of evidence-based complementary & alternative medicine* 19 (1):36-42.

Sandlund, C., Kane, K., Ekstedt, M., and Westman, J. 2018. "Patients' experiences of motivation, change, and challenges in group treatment for insomnia in primary care: a focus group study." *BMC family practice* 19 (1):111.

Sanna, E., Busonero, F., Talani, G., Carta, M., Massa, F., Peis, M., Maciocco, E., and Biggio, G. 2002. "Comparison of the effects of zaleplon, zolpidem, and triazolam at various GABAA receptor subtypes." *European journal of pharmacology* 451 (2):103-110.

Sateia, M.J., Buysse, D.J., Krystal, A.D., Neubauer, D.N., and Heald, J.L. 2017. "Clinical practice guideline for the pharmacologic treatment of chronic insomnia in adults: An American Academy of Sleep Medicine cinical practice

guideline." *Journal of Clinical Sleep Medicine* 13 (2):307-349. https://doi.org/10.5664/jcsm.6470

Schmitz, A. 2016. "Benzodiazepine use, misuse, and abuse: A review." *The Mental Health Clinician* 6 (3):120-126. https://doi.org/10.9740/mhc.2016.05.120

Schutte-Rodin, S., Broch, L., Buysse, D., Dorsey, C., and Sateia, M. 2008. "Clinical guideline for the evaluation and management of chronic insomnia in adults." *Journal of Clinical Sleep Medicine* 4 (5):487-504.

Silverman, D. 2013. "Doing Qualitative Research: A Practical Handbook." In. Los Angeles, London, New Delhi, Singapore, Washington DC: SAGE Publications Limited (accessed 30 December 2018).

Simon, G.E., and VonKorff, M. 1997. "Prevalence, burden, and treatment of insomnia in primary care." *Am J Psychiatry* 154 (10):1417-1423. https://doi.org/10.1176/ajp.154.10.1417

Singh, G., and Bhardwaj, R. 2010. "Audit on use of hypnotics for insomnia in comparison with National Institute of Clincal Excellence guidelines." *European Psychiatry* 25:991. https://doi.org/10.1016/S0924-9338(10)70981-0

Singh, P. 2016. "Insomnia: A sleep disorder: Its causes, symptoms and treatments." *International Journal of Medical and Health Research* 2 (10):37-41.

Sirdifield, C., Anthierens, S., Creupelandt, H., Chipchase, S.Y., Christiaens, T., and Siriwardena, A.N. 2013. "General practitioners' experiences and perceptions of benzodiazepine prescribing: systematic review and meta-synthesis." *BMC family practice* 14 (1):191.

Sirdifield, C., Chipchase, S.Y., Owen, S., and Siriwardena, A.N. 2017. "A systematic review and meta-synthesis of patients' experiences and perceptions of seeking and using benzodiazepines and Z-drugs: towards safer prescribing." *The Patient-Patient-Centered Outcomes Research* 10 (1):1-15.

Siriwardena, A.N., Apekey, T., Tilling, M., Dyas, J.V., Middleton, H., and Orner, R. 2010. "General practitioners' preferences for managing insomnia and opportunities for reducing hypnotic prescribing." *Journal of evaluation in clinical practice* 16 (4):731-737. https://doi.org/10.1111/j.1365-2753.2009.01186.x

Siriwardena, A.N., Qureshi, M.Z., Dyas, J.V., Middleton, H., and Orner, R. 2008. "Magic bullets for insomnia? Patients' use and experiences of newer (Z drugs) versus older (benzodiazepine) hypnotics for sleep problems in primary care." *The British Journal of General Practice* 58 (551):417-722. https://doi.org/10.3399/bjgp08X299290

Siriwardena, A.N., Qureshi, Z., Gibson, S., Collier, S., and Latham, M. 2006. "GPs' attitudes to benzodiazepine and 'Z-drug' prescribing: A barrier to implementation of evidence and guidance on hypnotics." *The British Journal of General Practice* 56 (533):964-967.

Skulmoski, G.J., Hartman, F.T., and Krahn, J. 2007. "The Delphi method for graduate research." *Journal of Information Technology Education: Research* 6:1-21. https://doi.org/10.28945/199

Smith, F. 1999. "Health services research methods in pharmacy: Triangulation." *International Journal of Pharmacy Practice* 7 (1):60-68. https://doi.org/10.1111/j.2042-7174.1999.tb00949.x

Smith, F. 2002. *Research Methods in Pharmacy Practice*. 1st ed. London: Pharmaceutical Press.

Smith, F. 2010. *Conducting your pharmacy practice research project: a step-by-step approach*: Pharmaceutical press.

Smith, R. 1992. "Audit and research." *BMJ: British Medical Journal* 305 (6859):905.

Spinewine, A., Schmader, K.E., Barber, N., Hughes, C., Lapane, K.L., Swine, C., and Hanlon, J.T. 2007. "Appropriate prescribing in elderly people: How well can it be measured and optimised?" *Lancet* 370 (9582):173-184. https://doi.org/10.1016/s0140-6736(07)61091-5

Staner, L. 2010. "Comorbidity of insomnia and depression." *Sleep Med Rev* 14 (1):35-46. https://doi.org/10.1016/j.smrv.2009.09.003

Sumsion, T. 1998. "The Delphi technique: An adaptive research tool." *British Journal of Occupational Therapy* 61 (4):153-156. https://doi.org/10.1177/030802269806100403

SurveyMonkey Inc. 2019. http://www.surveymonkey.com.

Sutton, D.A., Moldofsky, H., and Badley, E.M. 2001. "Insomnia and health problems in Canadians." *Sleep* 24 (6):665-670.

Sutton, J., and Austin, Z. 2015. "Qualitative research: Data collection, analysis, and management." *The Canadian journal of hospital pharmacy* 68 (3):226-231.

Taba, P., Rosenthal, M., Habicht, J., Tarien, H., Mathiesen, M., Hill, S., and Bero, L. 2012. "Barriers and facilitators to the implementation of clinical practice guidelines: A cross-sectional survey among physicians in Estonia." *BMC Health Serv Res* 12 (1):455. https://doi.org/10.1186/1472-6963-12-455

Taherdoost, H. 2016. "Validity and reliability of the research instrument; how to test the validation of a questionnaire/survey in a research."

Taylor, G.W., and Ussher, J.M. 2001. "Making sense of S&M: A discourse analytic account." *Sexualities* 4 (3):293-314. https://doi.org/10.1177/136346001004003002

Terrell, S.R. 2012. "Mixed-methods research methodologies." *The qualitative report* 17 (1):254-280.

The Embassy of The Kingdom of Saudi Arabia in Washington. 2019. "About Saudi Arabia." accessed 11 July. https://www.saudiembassy.net/culture-art.

The Saudi Center for Evidence Based Healthcare. 2015. "Clinical practice guidelines.", accessed Accessed 19 June 2016. http://www.moh.gov.sa/endepts/Proofs/Pages/Guidelines.aspx

Tong, A., Sainsbury, P., and Craig, J. 2007. "Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups." *International journal for quality in health care* 19 (6):349-357.

Training and Doctrine Command U.S. Army. 2006. *ARAB CULTURAL AWARENESS: 58 FACTSHEETS*. FT. Leavenworth, Kansas.

Trauer, J.M., Qian, M.Y., Doyle, J.S., Rajaratnam, S.M., and Cunnington, D. 2015. "Cognitive behavioral therapy for chronic insomnia: A systematic review and meta-analysis." *Ann Intern Med* 163 (3):191-204. https://doi.org/10.7326/M14-2841

Trevelyan, E.G., and Robinson, N. 2015. "Delphi methodology in health research: How to do it?" *European Journal of Integrative Medicine* 7 (4):423-428. https://doi.org/10.1016/j.eujim.2015.07.002

Tsang, S., Royse, C.F., and Terkawi, A.S. 2017. "Guidelines for developing, translating, and validating a questionnaire in perioperative and pain medicine." *Saudi journal of anaesthesia* 11 (Suppl 1):S80.

Twycross, A., and Shorten, A. 2014. "Service evaluation, audit and research: what is the difference?" *Evidence-based nursing* 17 (3):65-66.

Van der Linde, H., Hofstad, C.J., van Limbeek, J., Postema, K., and Geertzen, J.H. 2005. "Use of the Delphi Technique for developing national clinical guidelines for prescription of lower-limb prostheses." *J Rehabil Res Dev* 42 (5):693-704.

Voinescu, B.I., and Szentagotai-Tatar, A. 2015. "Sleep hygiene awareness: its relation to sleep quality and diurnal preference." *Journal of molecular psychiatry* 3 (1):1.

Wade, D.T. 2005. "Ethics, audit, and research: all shades of grey." *Bmj* 330 (7489):468-471.

Wali, S.O., Krayem, A.B., Samman, Y.S., Mirdad, S., Alshimemeri, A.A., and Almobaireek, A. 1999. "Sleep disorders in Saudi health care workers." *Annals of Saudi Medicine* 19 (5):406-409.

Walia, H., and Mehra, R. 2016. "Overview of common sleep disorders and intersection with dermatologic conditions." *Int J Mol Sci* 17 (5):654. https://doi.org/10.3390/ijms17050654

Weaver, M.F. 2015. "Focus: Addiction: Prescription Sedative Misuse and Abuse." *The Yale journal of biology and medicine* 88 (3):247-256.

Weich, S., Pearce, H.L., Croft, P., Singh, S., Crome, I., Bashford, J., and Frisher, M. 2014. "Effect of anxiolytic and hypnotic drug prescriptions on mortality hazards: Retrospective cohort study." *The British Medical Journal* 348:g1996. https://doi.org/10.1136/bmj.g1996

Weinger, M.B., Slagle, J., Jain, S., and Ordonez, N. 2003. "Retrospective data collection and analytical techniques for patient safety studies." *Journal of biomedical informatics* 36 (1-2):106-119.

Wiegand, M.H. 2008. "Antidepressants for the treatment of insomnia." *Drugs* 68 (17):2411-2417. https://doi.org/10.2165/0003495-200868170-00001

Williams, J., Roth, A., Vatthauer, K., and McCrae, C.S. 2013. "Cognitive behavioral treatment of insomnia." *Chest* 143 (2):554-565. https://doi.org/10.1378/chest.12-0731

Wilson, S.J., Nutt, D., Alford, C., Argyropoulos, S., Baldwin, D.S., Bateson, A., Britton, T., Crowe, C., Dijk, D., and Espie, C. 2010. "British Association for Psychopharmacology consensus statement on evidence-based treatment of insomnia, parasomnias and circadian rhythm disorders." *Journal of Psychopharmacology* 24 (11):1577-1601. https://doi.org/10.1177/0269881110379307

Wong, S.-H., and Ng, B.-Y. 2015. "Review of sleep studies of patients with chronic insomnia at a sleep disorder unit." *Singapore medical journal* 56 (6):317-323. https://doi.org/ 10.11622/smedj.2015089

Wong, W.S., and Fielding, R. 2011. "Prevalence of insomnia among Chinese adults in Hong Kong: a population-based study." *J Sleep Res* 20 (1 Pt 1):117-126. https://doi.org/10.1111/j.1365-2869.2010.00822.x

World Health Organization. 2014. "Mental health Atlas country profile." WHO, accessed 28 October 2018. Retrieved from http://www.who.int/mental_health/evidence/atlas/profiles-2014/sau.pdf.

Zohrabi, M. 2013. "Mixed Method Research: Instruments, validity, reliability and reporting findings." *Theory & practice in language studies* 3 (2):254-262. https://doi.org/10.4304/tpls.3.2.254-262

Appendices

Appendix 1: List of Saudi Centres for Evidence-based Healthcare Clinical Practice Guidelines

- CPG 1: Clinical Practice Guideline on the Diagnosis of Suspected First Deep Vein Thrombosis of Lower Extremity
- CPG 2:Clinical Practice Guideline on the Treatment of Venous Thromboembolism
- CPG 3: Clinical Practice Guideline on Prevention of Venous Thromboembolism in Patients with Stroke
- CPG 4: Clinical Practice Guideline on Thrombolytic Therapy in Acute Stroke
- CPG 5: Clinical Practice Guideline on Antithrombotic Treatment of Patient with Non-valvular Atrial Fibrillation
- CPG 6: Clinical Practice Guideline on the Use of Screening Strategies for the Detection of Breast Cancer
- CPG 7: Clinical Practice Guideline on the Screening and Treatment of Precancerous Lesions for Cervical Cancer Prevention
- CPG 8: Clinical Practice Guideline on the Role of Vitamin D, Calcium, and Exercise in Fracture Prevention in Elderly
- CPG 9: Clinical Practice Guideline for Timing the Initiation of Dialysis
- CPG 10: Clinical Practice Guideline on Allergic Rhinitis in Asthma
- CPG 11: Clinical Practice Guideline on Management of ST-elevation Myocardial

Infarction

- CPG 12: Clinical Practice Guideline on Management of Breast Lump and Primary Breast Cancer
- CPG 13: Clinical Practice Guideline on Management of Eclampsia
- CPG 14: Clinical Practice Guideline on Management of Overweight and Obese Adults
- CPG 15: Clinical Practice Guideline on Management of Pre-eclampsia
- CPG 16: Clinical Practice Guideline on Management of Sickle Cell Disease
- CPG 17: Clinical Practice Guideline on Management of Thalassemia – Iron Chelation Therapy, Bisphosphonates and Zinc supplementation
- CPG 18: Clinical Practice Guideline on Migraine Headache Diagnosis & Management
- CPG 19: Clinical Practice Guideline on Prevention of VTE in Surgical Patients
- CPG 20: Clinical Practice Guideline on Prophylaxis of VTE in Medical Patients and Long Distance Travelers
- CPG 21: Clinical Practice Guideline on Screening for Colorectal Cancer

CPG 22: Clinical Practice Guideline on Screening for Hypertension

University of Reading

Coordinator for Quality Assurance in Research
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Professor Kath Ryan
Professor of Social Pharmacy
School of Chemistry, Food and Pharmacy
University of Reading
RG6 6AL

08 March 2017

Dear Kath

UREC 17/15: Exploration of prescribing patterns of benzodiazepine and non-benzodiazepine (Z-drug) medications in the management of insomnia in Saudi Arabia. *Favourable opinion with conditions*

Thank you for the application (email dated 08 March 2017 from Barbara Parr and including attachments refers). On the basis of these documents I can confirm that the Chair is pleased to confirm a favourable ethical opinion subject to the following condition:

> Given that the first phase of the study is an Audit, the Committee asked that reference be made to the standards against which the prescribing practices revealed in the records would be assessed/compared. They considered that the use of the term 'audit' required that the comparator be a recognised standard.

Separately (*and **not** as a condition of approval*), the Committee would like to ask you to consider the recent advice – from UREC and the University's Research Data Manager, and given via Heads of Schools – to include a statement in the Consent form that would facilitate the 'downstream' sharing of data. The advice was that the researcher should check that:

"The consent form asks the research participant for permission to preserve some or all of the data they provide over the long term, and to make the data available, in anonymised form if required, either openly or subject to appropriate safeguards, so that they can be consulted and re-used by others, in accordance with the University's Research Data Management Policy.

I would be grateful for your response to this point in due course – ***and in any case before the practical work of the study commences.***

Please note that the Committee will monitor the progress of projects to which it has given favourable ethical opinion approximately one year after such agreement, and then on a regular basis until its completion.

Please also find attached Safety Note 59: Incident Reporting in Human Interventional Studies at the University of Reading, to be followed should there be an incident arising from the conduct of this research.

The University Board for Research and Innovation has also asked that recipients of favourable ethical opinions from UREC be reminded of the provisions of the University Code of Good Practice in Research. A copy is attached and further information may be obtained here:

http://www.reading.ac.uk/internal/res/QualityAssuranceInResearch/reas-RSqar.aspx

Yours sincerely

Dr M J Proven
Coordinator for Quality Assurance in Research (UREC Secretary)
cc: Dr John Wright (Chair); Dr Becky Green, Head of Reading School of Pharmacy, Barbara Parr, Research Secretary;

University of Reading

Coordinator for Quality Assurance in Research
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Professor Kath Ryan
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25 April 2018

Dear Kath

UREC 17/15: Exploration of prescribing patterns of benzodiazepine and non-benzodiazepine (Z-drug) medications in the management of insomnia in Saudi Arabia. *Amendment favourable opinion.*

Thank you for your application (email dated 22 April 2018 and including attachments from Ali Dobia refers) requesting and detailing amendments to the above project (*submission of Information Sheet, Invitation Email and First Round Questionnaire*). I can confirm that the UREC Chair has reviewed that request and is happy for the project to continue.

Yours sincerely

Dr M J Proven
Coordinator for Quality Assurance in Research (UREC Secretary)
cc: Dr John Wright (Chair); Dr Becky Green (Head of Reading School of Pharmacy), Ali Dobia (PhD Student); Barbara Parr (Research Secretary);

University of Reading

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Professor Kath Ryan
Professor of Social Pharmacy
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University of Reading
RG6 6AL

24 July 2019

Dear Kath,

UREC 17/15: Exploration of prescribing patterns of benzodiazepine and non-benzodiazepine (Z-drug) medications in the management of insomnia in Saudi Arabia. *Amendment favourable opinion AM021715*

Thank you for your application (email dated 22 July 2019 and including attachments from Ali Dobia refers) requesting and detailing amendments to the above project (conduct questionnaire with patients who are living with primary insomnia in Saudi Arabia). I can confirm that the UREC Chair has reviewed that request and is happy for the project to continue.

Yours sincerely

Dr M J Proven
Coordinator for Quality Assurance in Research (UREC Secretary)
cc: Dr John Wright (Chair); Dr Becky Green (Head of Reading School of Pharmacy), Ali Dobia (PhD Student); Barbara Parr (Research Secretary);

Kingdom of Saudi Arabia
Ministry of Health
Jazan Health
King Fahd Central Hospital

وزارة الصحة
Ministry of Health

المملكة العربية السعودية
وزارة الصحـــــة
صحة جازان
مستشفى الملك فهد المركزي

Attach.: ..... :المشفوعات Date: ..... :التاريخ No.: ..... :الرقم

RESEARCH ETHICS COMMITTEE

J. Thani 20, 1438H
March 19, 2017G

To: Mr. Ali Mohamed Dobia
PhD student
University of Reading, UK

Re: Research Proposal

Dear Mr. Dobia,

This is in reference to the research proposal submitted to us entitled "Exploration of prescribing patterns of benzodiazepine and non-benzodiazepine (Z-drugs) medications in the management of insomnia in Saudi Arabia".

This is to inform you that the committee has approved your proposal and you can begin the study as outlined in your application.

As per policy, the Research & Ethics Committee will be following the progress of your study from the time it commences through to its conclusion. It is required then that you submit a report once your research has been concluded.

Kindly send a representative to get the Approval Form (Form #06) from the REC Secretary for the final phase of the process.

Regards,

Approved:

Dr. Hassan Ali Hakami
Chairman
Research Ethics Committee

Approved for access to hospital:

Dr. Abdullah Najmi
Hospital Director

cf: File

KFCH REC Corr Research Proposal Reply/62

Appendix 3B: REC in Jazan Ethical approval

صحة جازان
Jazan Health

Date 21 May 2019

To: Mr Ali Mohammed Dobia
PhD student
University of Reading, Reading, UK

Re: Research proposal title "Patients experiences and perceptions on using hypnotics in Saudi Arabia"

Dear Mr Dobia,

This letter will serve as confirmation that your research project titled " Patients experiences and perceptions on using hypnotics in Saudi Arabia" starting on May 2019 has been approved under our policies and procedures.

Kind regards,

Dr Awaji Qassem Al-naami

A Director General of Jazan Health Affairs for Planning and Transformation

وزارة الصحة
Ministry of Health

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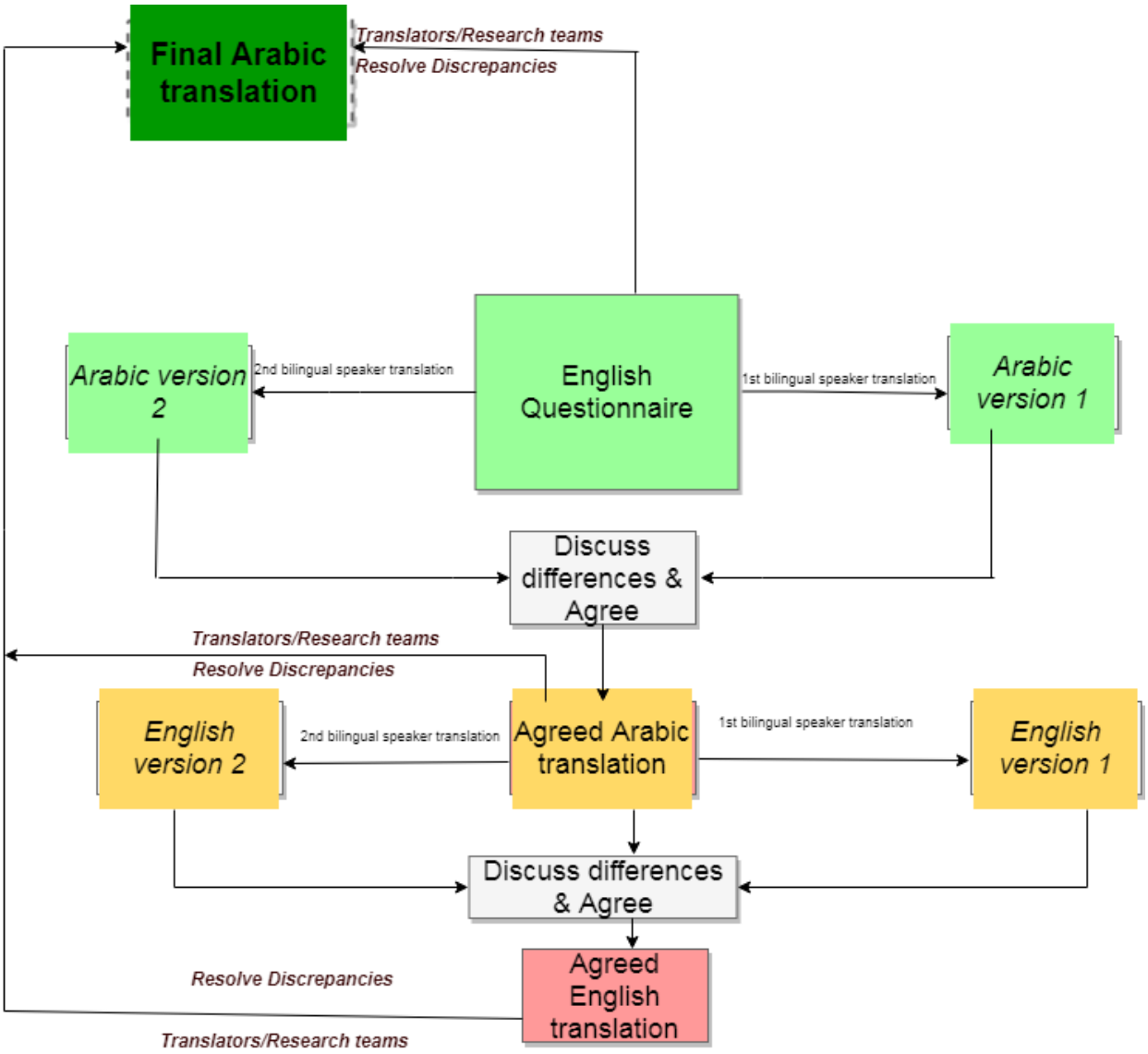
Appendix 4: Process of Translation and validation of the Arabic versions of the questionnaires



Appendix 5: Participant invitation letter

Supervisor

Dr Kath Ryan

Professor of Social Pharmacy

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Doctoral student

Email A.M.A.Dobia@pgr.reading.ac.uk

Participant invitation letter

Dear ----------

Project Title: **Exploration of prescribing patterns of benzodiazepine and non-benzodiazepine (Z-drugs) medications to manage insomnia in Saudi Arabia**

I would like to invite you to take part in a research study. I am a PhD student at the University of Reading conducting a research project entitled "Exploration of prescribing patterns of benzodiazepine and non-benzodiazepine (Z-drugs) medications to manage insomnia in Saudi Arabia." Please find enclosed an information sheet explaining the purpose of the study.

I would be very grateful if you would consider participating in my research. Please contact me directly if you are interested in participating, or if you simply want to find out more about what the study will entail. My contact details are at the bottom of this letter.

Kind regards,

Mr Ali Dobia

PhD Candidate, University of Reading

Email A.M.A.Dobia@pgr.ac.uk

Appendix 6: Participant information sheet

Supervisor
Dr Kath Ryan
Professor of Social Pharmacy
☎ 0118 378 8818
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Doctoral student

Email A.M.A.Dobia@pgr.reading.ac.uk

Participant information sheet

Title of Study: Exploration of prescribing patterns of benzodiazepine and non-benzodiazepine (Z-drugs) medications to manage insomnia in Saudi Arabia

Invitation

I would like to invite you to take part in a research study. Before you decide, I would like you to understand why the research is being carried out, and what it would involve. If you need any clarification after reading this Information Sheet, there will also be opportunities for participants to speak with me prior to taking part in the study so that any questions or concerns you have can be discussed.

Part 1 tells you the purpose of this study and what will happen if you take part.

Part 2 gives you more detailed information about the conduct of the study.

Please contact me if there is anything that is not clear.

Part 1

What is the purpose of the study?

This project will use interviews to explore current clinical practice for prescribing benzodiazepines and Z-drugs for treating insomnia in Saudi Arabia and compare this clinical practice with guidelines in other countries. Findings will be used to draw appropriate conclusions and make recommendations aimed at helping to create

clinical practice guidelines for benzodiazepine and Z-drugs used for insomnia treatment in KSA.

This research will form the basis of my PhD thesis, supervised by Professor Kath Ryan, University of Reading, UK.

Why have you been invited?

You are being invited to take part in the project because I would like to interview physicians who are authorised to prescribe these drugs to:

- Explore the reasons and justifications for various practices at the same hospital if differences were identified
- Explore the factors within the KSA that can make clinical practice for benzodiazepine and Z-drugs for insomnia different from other countries
- Identify the need for creating a national clinical guideline for treatment of insomnia in Saudi Arabia

Do I have to take part?

It is up to you to decide whether or not to join the study. You are free to withdraw at any time, without giving a reason.

What will happen to me if I take part?

I would like to interview people who are authorised to prescribe these types of medicines. This study will include 15–20 participants to obtain as broad a range of experiences as possible. If you agree to participate, I will contact you to set up a suitable date and time at your hospital to conduct a face-to-face interview with you. Prior to conducting the interview, I will request you to sign a consent form. With your permission, the interview will be audio recorded. I will bring a list of questions with me to discuss with you, but basically it will be like a conversation. If at any point you want to discuss anything else, we are flexible to do so. Each interview will be 30–60 minutes, depending on how much time you are able to allow. Each participant will only be interviewed once for this study. During the interview, you will be asked to answer questions based on your experiences, opinions and views relating to your experiences of prescribing these drugs for insomniac patients. If you are interested in taking part in this research study, please contact me via e-mail (A.M.A.Dobia@pgr.ac.uk) or phone (+966567579910).

What are the possible disadvantages and risks of taking part?

This study should not pose any risks. During the interview, you have the right not to answer any questions that you feel uncomfortable with and can stop the interview at any time. If you feel you need a break within the interview, let me know and we can take a break. The contact details of my supervisor are provided at the top of this sheet and she will be able to talk to you if you require additional support. Please note that the transcript of the interview will be completely anonymised.

What are the possible benefits of taking part?

I cannot promise the study will help you in any specific way but you might find participating and reflecting on the topic helpful to your own situation and, of course, the information we get from this study might help improve clinical practice in Saudi Arabia.

Part 2

What will happen if I don't carry on with the study?

If during the study you do not wish to proceed, this is completely acceptable and your wishes will be respected.

What if there is a problem?

If you have any complaints about the way you have been dealt with during the study, you can contact my research supervisor. For contact details, please see the header of this Information Sheet.

Will my taking part in the study be kept confidential?

Confidentiality will be ensured for all participants, and all data collected from the interviews will be used only for scientific research or education purposes. Interviews will be recorded with your permission using a digital audio recorder. All recordings made will be removed from the audio recorder and transferred to a shared drive that will be set up by the University of Reading and accessible only to the PhD student (Ali Dobia) and the PhD supervisor (Professor Kath Ryan). Participants will be anonymised; they will be assigned codes and their personal information will not be included in the interview transcripts. Participant forms, codes with the participant details and numbers will be scanned and kept on the university system in separate files. If requested, you will be given access to the transcript of your own interview, and you will have the opportunity to review this before it is finalised and used in the research. None of the personal information that you provide will be disclosed to a third party.

Who is organising and funding the research?

This study is being conducted with the University of Reading acting as the academic institution for my PhD. In addition, my research is supported by a full-time scholarship provided by the Saudi Cultural Bureau in London.

Who has reviewed the study?

This study has been reviewed and approved by the University of Reading Human Research Ethics Committee. Permission to conduct the research has been obtained from the Standing Committee for Health and Medical Research Coordination (SCHMRC), in the Ministry of Health (MoH) in Saudi Arabia.

Thank you for taking the trouble to read about my study

Mr Ali Mohamed Dobia
Doctoral student
A.M.A.Dobia@pgr.ac.uk

Appendix 7: Informed consent sheet

Supervisor

Dr Kath Ryan

Professor of Social Pharmacy

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Doctoral student

Email A.M.A.Dobia@pgr.reading.ac.uk

Title of Project: Exploration of prescribing patterns of benzodiazepine and non-benzodiazepine (Z-drugs) medications to manage insomnia in Saudi Arabia

Name of Researcher: Ali Dobia

1. I have read and have had the accompanying Information Sheet relating to the project entitled above explained to me by the researcher. ☐

2. I have had the purposes of the project and what will be required of me explained to me and any questions I had have been answered to my satisfaction. I agree with the arrangements described in the Information Sheet in so far as they relate to my participation. ☐

3. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information and ask questions, and have had these answered satisfactorily. ☐

4. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason. ☐

5. I understand that, if I feel uncomfortable in any way during the interview session, I have the right to decline to answer any question or to end the interview. ☐

6. I understand that my participation in this study involves being interviewed by a researcher from the University of Reading and that the interview will last approximately 30–60 minutes, however, some may be longer or shorter depending upon the interviewee. Each participant will only be interviewed once for this study. Interviews will be audio recorded. I give my permission to the researcher to audio record the interview by using a digital voice recorder. ☐

7. This project has been subject to ethical review according to the procedures specified by the University Research Ethics Committee and has been given a favourable ethical opinion. ☐

8. I understand that my confidentiality as a participant in this study will remain secure, and that the transcript of my interview will not contain my name. ☐

9. I have received a copy of this Consent Form and of the accompanying Information Sheet. ☐

10. I give permission to be contacted, once the study has completed, with the study results (Optional). ☐

11. I understand that the data I provide will be preserved over the long term and will be made available in anonymised form so that they can be consulted and re-used by others. ☐

12. I agree to take part in the above study. ☐

Name of participant……Signature……Date……

Name of researcher……Signature……Date……..

Appendix 8: Interview schedule

Supervisor
Dr Kath Ryan

Professor of Social Pharmacy

☎ 0118 378 8818|

k.m.ryan@reading.ac.uk |

University of Reading, Room 105d,

Food Biosciences Building,
PO Box 226, Whiteknights, Reading,

Reading School of Pharmacy
Food Biosciences building
Whiteknights, PO Box 226
Reading RG6 6AP
UK

Doctoral student

)

Email A.M.A.Dobia@pgr.reading.ac.uk

Interview schedule

Actions before interview

1. Request participant's permission to audio-record the interview.
2. Explain confidentiality arrangements.
3. Check whether participant has any further questions.
4. Ask participant to complete consent form and give participant a copy of both information letter and consent form.

Hello and how are you today?

Just to confirm once again that you will be involved in an interview for the sake of a research study on prescribing patterns of benzodiazepines and z-drugs for the treatment of insomnia in Saudi Arabia. Are you happy to proceed?

IMPORTANT – questions may be missed out depending on relevance to the interviewee.

I would like to ask you a few questions to get us started

- How do you manage patients with insomnia?
- Do you follow any guidelines when prescribing for patients with insomnia? If so, which ones?
- Where did you learn about them?

[This study, including the interview questions, will be guided by the findings from the Phase (the audit). These are just examples of what I might expect.]

- From the audit phase I found that some people do not follow the American guidelines for treating insomnia. What are the reasons for these differences in your opinion? [I can't track changes for this form so my comments are here. I think you need to keep these questions very general so that you do not look like you are accusing people of wrong doing! I actually think that just the middle question will capture what you want and you can ask it of all participants.]
- From the audit phase, I found that some people follow the American guidelines but others don't. . Why do you think this might be?
- From the audit phase I found that some people following the American guideline for treating insomnia. Could you please justify this?
- What you think Saudi physicians need to do to improve the quality of care for treating insomnia using benzodiazepines and z-drugs?

Finally, I'd like to ask you if there are any related issues that you would like to discuss, that we may have missed during the course of our conversation. Is there anything you would like me to explain?

Bring interview to a formal close

As explained during the course of our conversation, I am trying to draw appropriate conclusions and make recommendations to improve the overall management of patients with insomnia in Saudi Arabia. I'd like to thank you for your time and contributing to this work. If there is anything you want to ask me, or you need to get in touch, please feel free to contact me.

Thank you for your time.

Appendix 9: Invitation email and information sheet

Invitation email

Project Title: **Exploration of prescribing patterns of benzodiazepine and non-benzodiazepine (Z-drugs) medications to manage insomnia in Saudi Arabia**

Dear colleague,

I am a PhD student at the University of Reading and I would like to invite you to take part in my research study supervised by Professor Kath Ryan and Dr Alexander Edwards, and collaborated with Professor Ahmed BaHammam in Saudi Arabia. With your help we hope to develop a consensus around the recommended use of benzodiazepines and Z-drugs for treating insomnia in Saudi Arabia.

The study will be carried out using an electronic Delphi technique which is a common method that is used to achieve consensus from experts on a topic when there is a lack of evidence. The study consists of three rounds of questionnaires over approximately four months. Each questionnaire will take approximately 15-20 minutes to complete. Please find enclosed an information sheet explaining the purpose of the study in more detail.

Consent to participate will be implied by completing the questionnaire which can be found in this link:

https://reading.onlinesurveys.ac.uk/exploration-of-prescribing-patterns-of-benzodiazepine-and

Please feel free to forward this invitation to English-speaking colleagues in the Kingdom of Saudi Arabia whom you consider to be experts in sleep medicine or working in sleep clinics.

If you think you should not be considered as an expert or insufficiently experienced in sleep disorders, please reply to my email stating that. I will remove your email from the list and you will not receive further reminders.

To find out more about the study, please contact me using the information provided below.

Kind regards,

Mr Ali Dobia

PhD Candidate, University of Reading

Email : A.M.A.Dobia@pgr.reading.ac.uk

Supervisors
Professor Kath Ryan
Professor of Social Pharmacy
0118 378 8818
k.m.ryan@reading.ac.uk

Dr Alexander Edwards
Associate Professor in Biomedical Technology
University of Reading

Local supervisor in KSA
Professor Ahmed BaHammam
King Saud University, KKUH, Sleep Disorder Centre

Reading School of Pharmacy
Whiteknights, PO Box 226
Reading RG6 6AP
UK
Doctoral student
Ali Dobia

*Email*A.M.A.Dobia@pgr.reading.ac.uk

Participant information sheet

Title of Study: Exploration of prescribing patterns of benzodiazepines and non-benzodiazepine (Z-drugs) medications to manage insomnia in Saudi Arabia

Background

Despite the risks associated with benzodiazepines (BZDs) and Z-drugs, and their recent increased use in the Kingdom of Saudi Arabia (KSA), there are no specific national guidelines for using these medicines to treat insomnia. Nor is there any data on how they are currently prescribed.

What is the purpose of the study?

This study will use the e-Delphi technique to attempt to achieve consensus on the development of clinical practice guidelines for benzodiazepines and Z-drugs used to treat insomnia in KSA.

How have I been selected?

You are being invited to take part in the project because you have been identified as an expert in sleep medicine, you have interest and experience, and can help with other experts to attempt to achieve a consensus about recommendations that should be involved in the production of local guidelines for the management of primary insomnia in KSA. Your taking part is highly valued, but you may choose not to participate if you wish.

What is involved?

You will be asked to complete 2-3 rounds of an online survey. In the first round, a questionnaire will focus on gathering a few demographic details about you: for example, your qualifications, training, years of practice, employment (place and position) and some general information about your practice for treating primary insomnia.

The responses from the first round will be analysed qualitatively and quantitatively. Results will inform the second questionnaire in which we ask your opinion using rating scales and commentary. A third questionnaire will be completed only if needed.

There are no right or wrong responses. We are interested only in your practice and point of view and appreciate your help to ensure the integrity of the data.

What will happen to me if I take part?

You have been sent an email containing the link to the survey. To take part in the study, please click on the link given in the invitation email and follow the instructions provided. The link will be opened so that you can encourage your colleagues to take part in the study as well. For each study round, you will receive a different link. For each round you need to complete the questionnaire only once. You do not need to have completed previous questionnaires to take part in later rounds. You can complete all or any of the rounds.

Completing the questionnaire means that you have already understood the information in this information sheet and that you have agreed to take part. No separate written consent will be required. If during the study you do not wish to proceed, this is completely acceptable and your wishes will be respected. Once you click ‘’submit’’ your responses will be entered into the survey and it will not be possible to change or withdraw them. Any information that you have already provided will be retained because it will have been aggregated anonymously with all other data.

What are the possible benefits of taking part?

I cannot promise that the study will help you in any personal or professional way, but it will produce recommendations that could form best practice guidelines for treating primary insomnia in Saudi Arabia.

What are the possible disadvantages and risks of taking part?

This study should not pose any risks. Please note that the responses during all rounds will be completely anonymised but the fact that you took part will not. No record is kept if you choose not to participate.

Will my taking part in the study be kept confidential?

Due to the nature of the study, complete anonymity cannot be offered as the experts who have taken part will be acknowledged, however, individual responses will not be identifiable. All information will be kept confidential and used only for research and educational purposes. Aggregated results will be utilised from analysed data for dissemination and all individual information will be eliminated. Good care will be taken when analysing demographic data which will be broadly. For example, a range will be used to refer to participants' years of experience.

How will the data be used?

All data storage will be in line with the UK Data Protection Act 1998 and the University of Reading's data protection, data safety and data management policy.
Data will be stored for five years after completion of the project.
Electronic data will be stored on a password protected Bristol Online Survey platform and accessed only by myself and my supervisors.
The results of the study will be used to partially contribute to my PhD thesis.
Findings will be submitted for publication in a professional journal and presented at national and international conferences. You will not be identified from the data used and published but your participation in the study will be acknowledged. The data collected from you in this study will be preserved and made available in anonymised form, so that it can be consulted and re-used by others.

Who is organising and funding the research?

This study is being conducted under the auspices of the University of Reading, which acts as the academic institution for my PhD. In addition, my research is supported by a full-time scholarship provided by the Saudi Cultural Bureau in London.

Who has reviewed the study?

This study has been reviewed and approved by the University of Reading Human Research Ethics Committee (number 17/15). Permission to conduct the research was obtained from the Standing Committee for Health and Medical Research Coordination (SCHMRC), in the Ministry of Health (MoH) in Saudi Arabia on 8 March 2017.

Further Information and Contact Details

If at any stage you need further information about the project, you can contact me by email before August 2018. Details are provided below.

If you have any complaints about the way you have been dealt with during the study, you can contact either of my research supervisors, whose contact details appear in the header of this Information Sheet. In addition, the Quality Assurance in Research committee at Reading University is responsible for those involved in the research and can be contacted at qar@reading.ac.uk if there is any problem.

I would like to end by thanking you for taking the time to read this letter and for taking part, should you choose to do so, in a study that will aid research into treating insomnia in Saudi Arabia.

Sincerely,

Mr Ali Mohamed Dobia

Doctoral student

A.M.A.Dobia@pgr.reading.ac.uk

Appendix 10: Round 1 questionnaire

Exploration of prescribing patterns of benzodiazepine and non-benzodiazepine (Z-drugs) medications to manage primary insomnia in Saudi Arabia

Page 1: Welcome

Dear Sir/Madam:

Welcome to this questionnaire on the exploration of prescribing patterns of benzodiazepines and Z-drugs to manage primary insomnia in Saudi Arabia which is a part of the research for my PhD in Pharmacy at the University of Reading.

From this questionnaire we would like to gather some information about your current practice and thoughts for managing primary insomnia. Some questions will be based on two studies conducted in Saudi Arabia, the first an audit study and the second an interview-based study.

With your help we hope to find a consensus concerning the recommended use of benzodiazepines and Z-drugs for treating insomnia in Saudi Arabia.

This is the first round of a Delphi study, an expert agreement method, which is expected to run for either two or three rounds.

You can save this questionnaire at any time by clicking on the "Finish later" option at the bottom of each page. The questionnaire should take approximately 15-20 minutes to finish.

Thank you for your time and expertise in completing this questionnaire and for helping to improve our practice for managing insomnia in KSA.

Sincerely,

Ali Dobia

Researcher, PhD student, University of Reading

Supervisors: Professor Kath Ryan & Dr Alexander Edwards

Page 2: Data protection

Please be informed that data collected in this questionnaire will be stored only on a secure password-protected Bristol Online Survey (BOS) platform. All information is confidential. Demographic data will be anonymised and accessible only to me and my supervisors. Personal details will not be used in the analysis or revealed to any third party. All data, together with any information related to participants, will be stored anonymously at the University of Reading.

Page 3: How to complete the questionnaire

This questionnaire has two parts. The first part focuses on gathering a few demographic details and professional information. In the second part you will be asked some general information about your practice and thoughts for treating primary insomnia in KSA.

Please answer the questions based on your experiences, opinions and views relating to your use of these drugs for patients with primary insomnia. There are no right or wrong responses. We are interested only in your point of view and appreciate your help to ensure the integrity of the data.

You can now proceed to the main questionnaire.

Page 4: Demographics

1. **Please provide your email address to receive the feedback and the second round questionnaire.** ✱ *Required*

Please enter a valid email address.

2. **Gender.** ✱ *Required*

- Male
- Female

3. **Please state your qualifications.**

	Qualification	Year obtained	Awarding institution
1			
2			
3			

4. **Please state your training courses in sleep medicine or for treating insomnia.**

	Training	Year of training	Training institution
1			
2			
3			

5. **Please state your overall years of practice as a sleep medicine specialist or in sleep clinics.** ✱ *Required*

6. **Please state the region of Saudi Arabia where you practice.** ✱ *Required*

7. **Please state the name of the hospital or clinic/centre where you are currently working.** ✱ *Required*

8. **Please state your position.** ✱ *Required*

Page 5: Questions

9. **Which type of treatment do you use at first for primary insomnia?** ✱ *Required*

9.a. If you selected Other, please specify:

10. **Do you use Cognitive Behavioural Therapy for Insomnia (CBT-I)?** ✱ *Required*

- Yes
- No

10.a. **If no, please list the reasons why you do not use CBT-I?**

11. **What medicines do you use for treating primary insomnia? Please state them in order of preference. (1= most preferred)**

	Name of medicine	Length of use in the first instance	Maximum period of time you would prescribe medicine
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

12. **Do you use benzodiazepines or Z-drugs for treating patients with primary insomnia?** ✱ *Required*

12.a. **If yes, please complete the Table (NB. There are 5 columns)**

	Name of medicine *Optional*	Dose	Duration	
1				
2				
3				
4				
5				
6				

12.b. **If no, please list the reasons why you do not use benzodiazepines or Z-drugs. Then go to Q16.**

13. **Do you record the diagnosis when using benzodiazepines or Z-drugs for insomnia?** ✱ *Required*

- Yes
- No

13.a. **If no, please list the reasons why you do not record the diagnosis?**

14. **If benzodiazepines or Z-drugs are unsuccessful, what do you do in terms of dose?**

	Practice in terms of dose	Reasons for this practice
1		
2		

15. **If prescribed benzodiazepines or Z-drugs are unsuccessful, please list what else you use.**

	Medicine	Reasons for use
1		
2		
3		
4		
5		

16. **If you use medicines in combination for treating insomnia, please list the combinations you use.**

	Combination	Reasons for this practice
1		
2		
3		
4		
5		

17. **What do you do with patients who use substances like amphetamine, alcohol or ghatt?**

	Practice in terms of using substances	Reasons for this practice
1		
2		

18. **Please tick which guidelines you use when treating primary insomnia?** ✱ *Required*

- [ ] 1- Management of chronic insomnia disorder in adults: A clinical practice guideline from the American College of Physicians
- [ ] 2- Clinical guideline for the evaluation and management of chronic insomnia in adults. Journal of Clinical Sleep Medicine
- [ ] 3- Clinical practice guideline for the pharmacologic treatment of chronic insomnia in adults: An American Academy of Sleep Medicine clinical practice guideline
- [ ] 4- The Maudsley prescribing guidelines
- [ ] 5- National Institute for Health and Clinical Excellence. Guidance on the use of zaleplon, zolpidem and zopiclone for the short term management of insomnia
- [ ] 6- None
- [ ] 7- Other

18.a. **Reasons for your answer** ✱ *Required*

18.b. If you selected Other, please specify:

18.c. **Which of them do you think are NOT applicable in KSA?**

	Guideline Number	Reasons why not applicable
NOT applicable		

19. **Do you think specific guidelines for the management of primary insomnia in KSA should be developed?** ✱ *Required*

20. **Is there anything else you want to say?** *Optional*

Page 6: Thank you

Dear Sir/Madam:

Thank you for completing the first round of the Delphi study. We appreciate your help in developing the best possible treatment guidelines for Saudi Arabia.

Once the questionnaires have been collected and analysed, I will contact you again concerning the study's second round.

Meanwhile, if you have any questions and/or concerns, please do not hesitate to contact me (a.m.a.dobia@pgr.reading.ac.uk).

Thank you again for your time and cooperation.

Sincerely,

Researcher: Ali Dobia

Supervisors: Professor Kath Ryan & Dr Alexander Edwards

Key for selection options

9 - Which type of treatment do you use at first for primary insomnia?

Sleep hygiene
Herbs
Cognitive behavioural therapy for insomnia (CBT-I)
Medicines
Other

12 - Do you use benzodiazepines or Z-drugs for treating patients with primary insomnia?

Yes
No

19 - Do you think specific guidelines for the management of primary insomnia in KSA should be developed?

Yes
No

Exploration of prescribing patterns of benzodiazepines and non-benzodiazepines (Z-drugs) to manage primary insomnia in Saudi Arabia (Round 2)

Page 1: Welcome

Dear Dr:

Thank you for completing the first-round questionnaire. We have provided you with feedback so that you can reflect on your answers in relation to those of other participants before completing the next questionnaire.

This second round questionnaire asks questions to find out what you think are the most important criteria for our local guidelines. This questionnaire is based on existing international guidelines, your answers from the first round survey, and on two studies in Saudi Arabia, the first an audit study and the second an interview-based study, that's why at this stage in the guidelines' development, there might be some repetition and overlap.

With your help we hope to find a consensus concerning the recommended use of benzodiazepine and Z-drugs for treating primary insomnia in Saudi Arabia. This is the second round of a Delphi study, an expert agreement method. A 'consensus' will be defined as 70% or higher agreement. You can save the questionnaire at any time by clicking on the "Finish later" option at the bottom of each page. The questionnaire should take approximately 10-15 minutes to finish.

Thank you for your time and expertise in completing this questionnaire and for helping to develop the best possible treatment guidelines for patients in KSA.

Sincerely,

Ali Dobia, Researcher, PhD student, University of reading

Supervisors: Professor Kath Ryan, Dr Alexander Edwards & Professor Ahmed BaHammam

Page 2: Data protection

Please be informed that data collected in this questionnaire will be stored only on a secure password-protected Bristol Online Survey (BOS) platform. All information is confidential. Demographic data will be anonymised and accessible only to the researcher and his supervisors. Personal details will not be used in the analysis or revealed to any third party. All data, together with any information related to participants, will be stored anonymously at the University of Reading.

Page 3: How to complete the questionnaire

This questionnaire has two parts. The first part focusses on gathering general information about criteria that you want to be involved in the guidelines (page 4) and the second part asks for some brief professional information.

In the questionnaire's first part, we ask your opinion using rating scales. Please select the grade that best represents your opinion. Read each question carefully and answer all questions as accurately as you can. For each question, you may provide a short comment, if you wish, about why you gave a specific grade. For general comments, there is a "General comments" section following the main questionnaire (page 5).

There are no right or wrong responses. We are interested only in your point of view and appreciate your help to ensure the data's integrity.

You can now proceed to the main questionnaire.

Page 4: Questions

To what extent do you agree that the following statements (questions 1-21) are important for inclusion in KSA guidelines?

1. When using benzodiazepines or z-drugs for primary insomnia, diagnosis should be recorded
✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

1.a. Brief explanation of your score *Optional*

2. Cognitive Behavioural Therapy for Insomnia (CBT-I) is effective and recommended in the treatment of primary insomnia as first line treatment ✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

2.a. Breif explanation for your score *Optional*

3. Sleep Hygiene is effective and recommended in the treatment of primary insomnia as first line treatment ✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

3.a. Brief explanation of your score *Optional*

4. Benzodiazepines and z-drugs should be used to treat primary insomnia only when it is severe, disabling or causing extreme distress ✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

4.a. Brief explanation of your score *Optional*

5. Short acting benzodiazepines or z-drugs are recommended as the first line pharmacological treatment for primary insomnia ✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

5.a. Brief explanation of your score *Optional*

6. Benzodiazepines or z-drugs are recommended for primary insomnia for short term only ✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

6.a. Brief explanation of your score

7. Benzodiazepines or z-drugs should be prescribed for the first instance with the lowest effective dose ✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

7.a. Brief explanation of your score *Optional*

8. Benzodiazepines or z-drugs should not be prescribed for more than four weeks ✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

8.a. Brief explanation of your score

9. Extension beyond the maximum treatment period of benzodiazepines or z-drugs should not take place without re-evaluation of the patient ✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

9.a. Brief explanation of your score *Optional*

10. when prescribing benzodiazepines or z-drugs beyond the maximum treatment period, reasons for continuing should be documented ✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

10.a. Brief explanation of your score

11. Only z-drugs (eg. zolpidem) are recommended as the first line pharmacological treatment when treating primary insomnia ✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

11.a. Brief explanation of your score *Optional*

12. Benzodiazepines or z-drugd should not be prescribed for patients with a history of addiction or substance abuse ✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

12.a. Brief explanation of your score *Optional*

13. When prescribed benzodiazepines or z-drugs are ineffective, the dose **should not** be increased ✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

13.a. Brief explanation of your score *Optional*

14. When prescribed benzodiazepines or z-drugs are ineffective, the dose **should** be increased ✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

14.a. Brief explanation of your score *Optional*

15. When prescribed benzodiazepines or z-drugs are ineffective, alternative medicines should be used ✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

15.a. Brief explanation of your score *Optional*

16. When prescribed benzodiazepines or z-drugs are ineffective, combination with other sedative agents can be used ✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

16.a. Brief explanation of your score

17. Switching from one hypnotic to another should only occur if a patient experiences adverse effects considered to be directly related to a specific agent ✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

17.a. Brief explanation for your score *Optional*

18. When initiating benzodiazepines or z-drugs for a patient, it would be useful to inform the patient that it will be for a limited duration ✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

18.a. Brief explanation for your score *Optional*

19. When prescribing benzodiazepines or z-drugs long term, patients should be reviewed regularly at least every six months ✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

19.a. Brief explanation for your score *Optional*

20. When withdrawing patients on long term use of benzodiazepines or z-drugs, tapering should be considered ✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

20.a. Brief explanation for your score *Optional*

21. CBT-I should be supplemented with medications when possible ✱ *Required*

	1 (definitely disagree)	2 (probably disagree)	3 (neither agree or disagree)	4 (probably agree)	5 (definitely agree)
Score	☐	☐	☐	☐	☐

21.a. Brief explanation for your score *Optional*

Page 5: General comments

22. Please provide any general comments/ideas/thoughts you have *Optional*

Page 6: Demographics

23. Please state your years of practice as a sleep medicine specialist or in sleep clinics ✱ *Required*

24. Please state the region of KSA where you practise ✱ *Required*

25. Please state the name of the hospital or sleep clinic center where you practise ✱ *Required*

26. Please provide your email address to receive feedback ✱ *Required*

Please enter a valid email address.

Page 7: Thank you

Thank you for completing the second round of the Delphi study. We appreciate your help in developing the best possible treatment guidelines for Saudi Arabia.

Once the questionnaires have been collected and analysed, I will contact you again concerning the study's third/last round.

Meanwhile, if you have any questions and/or concerns, please do not hesitate to contact me (a.m.a.dobia@pgr.reading.ac.uk).

Thank you again for your time and cooperation.

Sincerely,

Researcher: Ali Dobia

Supervisors: Prof. Kath Ryan, Dr Alexander Edwards & Professor Ahmed BaHammam

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Exploration of prescribing patterns of benzodiazepines and non-benzodiazepines (Z-drugs) to manage primary insomnia in Saudi Arabia (Round 3)

Page 1: Welcome

Dear Dr:

Thank you for completing the second round questionnaire. We have provided you with feedback so that you can reflect on your answers in relation to those of other participants before completing the next questionnaire.

This third (last) round questionnaire asks questions to obtain consensus on guideline statements. This questionnaire is based on your answers from the second round survey (questions that acheived 70% or higher agreement).

With your help we hope to find consensus concerning the recommended use of benzodiazepines and Z-drugs for treating primary insomnia in Saudi Arabia. This is the third round of a Delphi study, an expert agreement method. A consensus will be defined as 80% or higher agreement.

You can save the questionnaire at any time by clicking on the “Finish later” option at the bottom of each page. The questionnaire should take approximately 5 minutes to complete.

Thank you for your time and expertise in completing this questionnaire and for helping to develop the best possible treatment guidelines for patients in KSA.

Sincerely,
Ali Dobia, Researcher, PhD student, University of reading

Supervisors: Professor Kath Ryan, Dr Alexander Edwards & Professor Ahmed BaHammam

Page 2: Data protection

Please be informed that data collected in this questionnaire will be stored only on a secure password-protected Bristol Online Survey (BOS) platform. All information is confidential. Demographic data will be anonymised and accessible only to the researcher and his supervisors. Personal details will not be used in the analysis or revealed to any third party. All data, together with any information related to participants, will be stored anonymously at the University of Reading.

Page 3: How to complete the questionnaire

This questionnaire has two parts. The first part focusses on obtaining your agreement on the final statements that will be included in the guideline (page 4) and the second part asks for some brief professional information for those who did not take part in the previous rounds.

In the first part of the questionnaire, we ask your opinion using rating scales. Please select the answer that best represents your opinion. Read each statement carefully and answer all questions as accurately as you can. For general comments, there is a “General comments” section following the main questionnaire (page 5).

There are no right or wrong responses. We are interested only in your point of view and appreciate your help to ensure the integrity of the data.

You can now proceed to the main questionnaire.

Page 4: Questions

1. The following are the statements from the previous round that made the cut-off of consensus agreement. Please decide which ones to include in a guideline for managing primary insomnia using BZDs or z-drugs in KSA. ✱ *Required*

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Include	Do not include
When using benzodiazepines or z-drugs for primary insomnia, diagnosis should be recorded	☐	☐
Cognitive Behavioural Therapy for Insomnia (CBT-I) is effective and recommended in the treatment of primary insomnia as first line treatment	☐	☐
Sleep Hygiene is effective and recommended in the treatment of primary insomnia as first line treatment	☐	☐
Benzodiazepines and z-drugs should be used to treat primary insomnia only when it is severe, disabling or causing extreme distress	☐	☐
Benzodiazepines or z-drugs are recommended for primary insomnia for short term only	☐	☐
Benzodiazepines or z-drugs should be prescribed for the first instance with the lowest effective	☐	☐
Benzodiazepines or z-drugs should not be prescribed for more than four weeks	☐	☐
Extension beyond the maximum treatment period of benzodiazepines or z-drugs should not take place without re-evaluation of the patient	☐	☐
When prescribing benzodiazepines or z-drugs beyond the maximum treatment period, reasons for continuing should be documented	☐	☐
Benzodiazepines or z-drugs should not be prescribed for patients with a history of addiction or substance abuse	☐	☐

When prescribed benzodiazepines or z-drugs are ineffective, alternative medicines should be used	☐	☐
Switching from one hypnotic to another should only occur if a patient experiences adverse effects considered to be directly related to a specific agent	☐	☐
When initiating benzodiazepines or z-drugs for a patient, inform the patient that it will be for a limited duration	☐	☐
When prescribing benzodiazepines or z-drugs long term, patients should be reviewed regularly at least every 4-6 weeks	☐	☐
When withdrawing patients on long term use of benzodiazepines or z-drugs, tapering should be considered	☐	☐
Short-term hypnotic treatment should be supplemented with CBT-I when possible	☐	☐

Page 5: General comments

2. These are the statements that were excluded because they did not acheive 70% agreement in the second round. Please tick any that should be reinstated for inclusion in the guideline.

- [ ] 1- short acting benzodiazepines or z-drugs are recommended as the first line pharmacological treatment for primary insomnia
- [ ] 2- Only z-drugs (e.g. zolpidem are recommended as the first line pharmacological treatment when treating primary insomnia
- [ ] 3- When prescribed benzodiazepines or z-drugs are ineffective, the dose should not be increased
- [ ] 4- When prescribed benzodiazepines or z-drugs are ineffective, the dose should be increased
- [ ] 5- When prescribed benzodiazepines or z-drugs are ineffective, combination with other sedative agents can

2.a. Please provide reasons for reinstatement here

3. Please provide any general comments/ideas/thoughts you have

Page 6: Demographics (Only if you did not provide them previously)

4. Please state your years of practice as a sleep medicine specialist or in sleep clinics

5. Please state the region of KSA where you practise

6. Please state the name of the hospital or sleep clinic center where you practise

7. Please provide your email address to receive feedback

Please enter a valid email address.

Page 7: Thank you

Thank you for completing the third (last) round of the Delphi study. We appreciate your help in developing the best possible treatment guidelines for Saudi Arabia.

If you have any questions and/or concerns, please do not hesitate to contact me (a.m.a.dobia@pgr.reading.ac.uk).

Thank you again for your time and cooperation.

Sincerely, Researcher: Ali Dobia

Supervisors: Professor Kath Ryan, Dr Alexander Edwards & Professor Ahmed BaHammam

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Welcome

Dear Sir/Madam

Welcome to this survey that aims to explore your attitude and perception about using sleep medicines in the management of primary insomnia in Saudi Arabia. This study is part of the programme of work for a PhD degree in pharmacy practice at the University of Reading, UK.

I am interested in the treatments you have received, your experience with the use of medicines and the way you obtained them.

The questions are simple, direct and easy and it is expected that this questionnaire would not take longer than 10 minutes to complete and all responses will be completely anonymised.

The questionnaire has six parts. The first part will contain some questions about your insomnia and allow you to complete the questionnaire or to exit early. The second part asks a few questions about you, such as your gender, age and educational level. Names, addresses and other personal information will not be collected. In the remaining parts you will be asked about your knowledge about insomnia and its treatments, your experience and perception with using sleeping pills and your perceptions about non-medicine treatments.

Please answer the questions based on your experiences, opinions and views relating to your use of these medicines. There are no right or wrong responses. Completing the questionnaire will be taken as consent for your participation. If you want to withdraw your response before the survey closes or you have any questions please contact me.

Information collected in this questionnaire will be stored on a password-protected Online Survey platform. Data will be transferred from the online survey to Excel and will be stored and deposited in the University of Reading Data Archive. Once data have been exported, they will be deleted from the survey. According to the University regulations, this type of information will be kept for 5 years only and then destroyed.

All information is confidential. Your information will be anonymised and accessible only to my supervisors and me. All data, together with any information related to you, will be used for research purposes only and stored anonymously at the University of Reading. No additional use of your information will occur without your consent.

If you have any questions about data protection or if you are unhappy with how your data has been handled please contact the University Data Protection Officer in the first instance at imps@reading.ac.uk, or in writing to: Information Management & Policy Services, University of Reading, Whiteknights, P O Box 217, Reading, RG6 6AH.

You can now proceed to the main questionnaire.

Sincerely,

Ali Dobia
email: a.m.a.dobia@pgr.reading.ac.uk

Section 1: Initial questions

* Primary insomnia is lack of sleep that does not have medical, psychiatric, environmental or substance use causes.
Do you have primary insomnia?

- ◯ Yes
- ◯ No
- ◯ Don’t know or unsure

* For which of the following conditions were you prescribed sleeping pills? Please choose one of the following answers.

- ◯ Epilepsy
- ◯ Psychosis or other psychiatric disorders
- ◯ Dementia
- ◯ As part of substance withdrawal treatment (eg. alcohol)
- ◯ For terminal illness
- ◯ Because I was admitted to the intensive care unit
- ◯ None of the above

* Why do you think you cannot sleep?

- ◯ Unknown reasons
- ◯ Known reasons (please specify)

Section 2: About you

* What is your gender?

- ◯ Male
- ◯ Female

* What is your age?

- ◯ Between 18 and 44 years old
- ◯ Between 45 and 64 years old
- ◯ 65 years old and over

* What is your highest level of education?

- ◯ Secondary school or below
- ◯ University degree
- ◯ Other (please specify)

Section 3: Your knowledge about insomnia and its treatment

Please choose True or False for each statement to indicate your knowledge of insomnia and sleep medicines.

* I am satisfied with my knowledge about insomnia and related problems

- ◯ True
- ◯ False

* I know that there are different ways to treat insomnia other than using sleeping pills

- ◯ True
- ◯ False

* I would like more information about insomnia and its treatment

- ◯ True
- ◯ False

* Sleeping pills should be used when other treatments (such as counselling) are unsuccessful

- ◯ True
- ◯ False

* Sleeping pills are safe but only for a short time

- ◯ True
- ◯ False

* There are different types of sleeping pills

- ◯ True
- ◯ False

* Sleeping pills might cause dependence and other side effects

- ◯ True
- ◯ False

* Sleeping pills can be used for a long time

- ◯ True
- ◯ False

* Sleeping pills can be shared with anyone (such as friends or family members) who has the same problem

- ◯ True
- ◯ False

Section 4: Your experience with sleep medicines

* What was the first treatment you were provided?

- ◯ I was given advice for improving my sleep
- ◯ I was sent for a psychologist or sleep specialist for 6-8 counselling sessions
- ◯ I was prescribed sleep medicines

* "Sleeping pills" refers to both prescription medicines and medicines you buy from a pharmacy that are used to help you fall asleep or stay asleep. What type of sleeping pills do you currently use? (You can choose more than one answer)

- ☐ Z-drugs (e.g. Zolpidem)
- ☐ Benzodiazepines (e.g. Temazepam or Nitrazepam)
- ☐ Antihistamines (e.g. Panadol night)
- ☐ Over-the-counter herbs (e.g. Melatonin or Valerian)
- ☐ None
- ☐ Other (please specify)

* For how long have you been using sleeping pills? (Please choose one of the following answers)

- ◯ Less than 4 weeks
- ◯ 4-6 weeks
- ◯ More than 6 weeks
- ◯ More than 6 months but less than a year
- ◯ More than a year
- ◯ I have never taken sleeping pills

* Where did you get your sleeping pills in the first instance? (Please choose one of the following answers)

- [ ] Primary health care centre
- [ ] Governmental hospital
- [ ] Private hospital
- [ ] Community pharmacy without prescription
- [ ] Family or friends
- [ ] Other (please specify)

* When your medicines are finished, where do you get them from next time?

- ( ) I go to the doctor to get another prescription
- ( ) I borrow the medicines from friends or family members
- ( ) I buy them from a private pharmacy without prescription

* If your doctor refuses to give you another prescription for your medicines, what do you do? (You can choose more than one answer)

- [ ] I argue with the doctor to get the prescription
- [ ] I go to another doctor in the same hospital
- [ ] I ask someone he knows to make (Wasta)
- [ ] I go to a private hospital
- [ ] I borrow them from family or friends
- [ ] I buy them from a private pharmacy without prescription
- [ ] I buy them from outside Saudi Arabia, for example, from Egypt
- [ ] Other (please specify)

* What information did you receive when you first started using sleeping pills? (You can choose more than one answer)

- [ ] Information about insomnia
- [ ] Information about types of treatment
- [ ] The names of different sleeping pills or classes
- [ ] Explanation about the reasons for prescribed sleeping pills
- [ ] Side effects of sleeping pills
- [ ] Risks of sleeping pills
- [ ] How to use sleeping pills
- [ ] That sleeping pills should be used for short term only
- [ ] There was not enough time to discuss these issues with the doctor
- [ ] I can't remember
- [ ] Other (please specify)

* When you were prescribed sleeping pills, were you involved in your treatment decision?

- ◯ Yes
- ◯ No

* If your sleeping pills were ineffective, did you increase the dose on your own without consulting your doctor?

- ◯ Yes
- ◯ No

* If you were prescribed sleeping pills for a long time, did you see your doctor regularly?

- ◯ Yes
- ◯ No
- ◯ I have not used sleeping pills long-term

* If you were prescribed sleeping pills for a long time, did your doctor prepare a plan for discontinuation?

- ◯ Yes
- ◯ No
- ◯ I have not used sleeping pills long-term

Section 5: Perceptions about sleep medicines

Please rate to what extent you agree with the following statements:

* Sleeping pills are safe and I prefer to continue on them

Definitely disagree	disagree	Neither agree or disagree	agree	Definitely agree
○	○	○	○	○

* Sleeping pills are the best solution for treating insomnia

Definitely disagree	disagree	Neither agree or disagree	agree	Definitely agree
○	○	○	○	○

* I tried to stop sleeping pills but I couldn’t

Definitely disagree	disagree	Neither agree or disagree	agree	Definitely agree
○	○	○	○	○

* I understand that some doctors prefer not to prescribe sleeping pills

Definitely disagree	disagree	Neither agree or disagree	agree	Definitely agree
○	○	○	○	○

* Sleeping pills are harmful and I want to stop using them

Definitely disagree	disagree	Neither agree or disagree	agree	Definitely agree
○	○	○	○	○

* I usually persist to get sleeping pills

Definitely disagree	disagree	Neither agree or disagree	agree	Definitely agree
○	○	○	○	○

Section 6: Perceptions about non-medicine treatment (e.g. counselling)

Please rate to what extent you agree with the following statements:

* I prefer non-medicine treatment (eg. counselling)

Definitely disagree	disagree	Neither agree or disagree	agree	Definitely agree
○	○	○	○	○

* I don't like to go to a psychologist for counselling therapy

Definitely disagree	disagree	Neither agree or disagree	agree	Definitely agree
○	○	○	○	○

* When referred for counselling treatment I refuse and ask for medicines

Definitely disagree	disagree	Neither agree or disagree	agree	Definitely agree
○	○	○	○	○

* There is no benefit in counselling treatment

Definitely disagree	disagree	Neither agree or disagree	agree	Definitely agree
○	○	○	○	○

Thank you

Thank you for completing the survey. I appreciate your help.

If you have any questions and/or concerns, please do not hesitate to contact me (a.m.a.dobia@pgr.reading.ac.uk).

Thank you again for your time and cooperation.

Sincerely,
Researcher: Ali Dobia