

*“Why isn’t fibre mentioned more often?”
Conducting focus groups with an ageing
population to promote dietary fibre-related
awareness and starting the conversation*

Article

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“Why isn't fibre mentioned more often?” Conducting focus groups with an ageing population to promote dietary fibre-related awareness and starting the conversation

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ABSTRACT

The UK population is ageing and promoting healthy eating is a key priority. Dietary fibre fits this remit; however, despite the well-proven benefits, intake is substantially below the UK-based (Scientific Advisory Committee on Nutrition; SACN) 30 g/d recommendations. Face-to-face activities are a means to drive engagement with the topic and identify viable age-suitable strategies to modulate future intake. Community living older adults (n = 34; 65+) were recruited to partake in focus groups to: (1) discuss healthy eating and challenges; (2) raise awareness of dietary fibre and understand knowledge levels; (3) co-design and develop a dietary fibre-based infographic; and (4) gain initial insights into the food environment. Older adults associated healthy eating with cooking from scratch and challenges were related to age, increasing costs, access to unhealthy foods and interpreting terminology. Key dietary fibre knowledge gaps were poor identification of appropriate foods, lack of benefit awareness beyond digestive and confusion with recommendations. The practical task highlighted the “fibre gap” in action and volume of food required to meet 30 g/d as well as difficulty with visualising portion sizes. Positively, older adults liked the circular co-designed infographic and were keen for more visual resources, food substitution support and practical examples coupled with mandatory labelling, clearer information, more shop-level support and cost incentives in a dietary fibre context. Going forwards, such insights will be fundamental to designing future wide-reaching public health initiatives requiring a combination of approaches benefiting from government, academia, industry and civil society to help embed dietary fibre into everyday eating habits.

1. Introduction

The UK population is ageing with approximately 19% being aged 65 years and over (Barton et al., 2024). Lifestyles choices (including diet) have a central role in supporting healthy ageing (WHO, 2020). However, older adults are typically not meeting UK dietary recommendations confounded by limited age-specific guidelines for this population (Clegg et al., 2023; Dorrington et al., 2020). In addition, this can translate into poor uptake of relevant nutrients to promote “added life years” (Calligaris et al., 2022; Clegg et al., 2023). The eating experience can be influenced in this cohort by age-related changes (e.g., loneliness, ill-health, poor appetite, sensory acuity, oral health, etc.); accordingly, designing foods with older adults’ needs in mind is fundamental

(Volkert et al., 2019; Calligaris et al., 2022).

Dietary fibre intake was cited as an area for improvement in an ageing population in the recent report by Scientific Advisory Committee on Nutrition (SACN) (SACN, 2021). McKeown et al. (2022) noted insufficient consumption of fruits, vegetables, legumes and wholegrains coupled with misconceptions associated with food quantity can all contribute to lower intake. This is despite dietary fibre having well-cited health benefits such as reduced risk from cardiovascular disease, coronary events, stroke, type 2 diabetes and cancer (colorectal) (SACN, 2015). Older adults (in line with the general population) are recommended to consume 30 g/d of dietary fibre as set out by SACN in 2015; however, the magnitude of change required is approximately 11.7 g/d in this age-group (SACN, 2015; Norton, Kaimila, et al., 2024). For example,

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cross-sectional data relating to dietary fibre from the National Diet and Nutrition Survey (NDNS) using a large cohort of older adults ($n = 1863$; aged 65–96 years) identified: (i) poor compliance with 30 g/d recommendations (5.7%); (ii) inadequate dietary fibre intake (18.3 g/d); and (iii) common dietary fibre-rich foods were baked beans, bread and potatoes (Norton, Kaimila, et al., 2024). Such findings can be explained by low dietary fibre derived awareness and confusion relating to key areas: intake recommendations, benefits beyond digestive and identification of suitable foods (McMackin et al., 2013; Barrett et al., 2020; Kissock et al., 2022; Norton, Lovegrove, et al., 2024; Norton, Wagstaff, et al., 2024). This suggests more practical implementation support (such as education and dietary assessments preferences) are necessary to bridge the knowledge gap with a translation into actual behaviour. In addition, modulating the food environment could be key to facilitating increased dietary fibre intake by reducing cost, improving sensory appeal, increased availability and better communication (Meynier et al., 2020). The components of a dietary fibre rich diet (e.g., eating at least five-a-day of fruit and vegetables, selecting wholegrain versions (pasta, rice, bread, cereals), eating more beans and pulses, snacking on nuts and seeds, etc.) are also integrated into the healthy eating principles (BDA, 2023; Lockyer et al., 2016; OHID, 2024). However, consuming such a diet is not considered reflective of UK consumption habits where socioeconomic status and increasing food insecurity can exacerbate this challenge (Goudie, 2023). Accordingly, it is relevant to discuss dietary fibre within the context of a healthy eating and food environment to provide a holistic picture to shift everyday consumption patterns and achieve widespread societal impact (Lovegrove et al., 2025).

Previous research addressing the “dietary fibre gap” have utilised either qualitative or quantitative designs but lack relevance for an ageing population by not including their voice and/or conducted online (McMackin et al., 2013; Barrett et al., 2020; Kissock et al., 2022; Norton, Kaimila, et al., 2024; Norton, Wagstaff, et al., 2024). To overcome this limitation, face-to-face activities could help to drive engagement with the topic, identify common misconceptions and explore viable age-suitable strategies to modulate future intake. Focus groups provide an ideal approach using group interaction to stimulate conversation by exploring knowledge and experiences including what, how and why (Kitzinger, 1995). This new qualitative investigation involved the conduct of focus groups with older adults (aged 65+) to: (1) discuss healthy eating and related challenges; (2) understand dietary fibre derived knowledge levels and raise awareness of dietary fibre (including future study design for measuring intake); (3) co-design and develop a dietary fibre-based infographic; and (4) gain initial insights into the food environment.

2. Methods

2.1. Cohort summary

Community living healthy older adults (65 years and over) with no allergies or intolerances as well as willing to discuss and share ideas were recruited (via word of mouth, departmental databases, community groups, posters distributed in the local area) to participate in food-based discussions (between 75-min and 90-min) during April and May 2025. Older adults were fully informed of the study nature, completed a screening questionnaire and provided written consent prior to participation. The pseudo-anonymised aspect of data collection and their right to withdraw was also explained. The School of Chemistry, Food and Pharmacy Research Ethics Committee (University of Reading; study number: 15/2023) provided a favourable opinion for conduct and performed in accordance with the Declaration of Helsinki.

Five sessions (on average six older adults per focus group) were conducted at the University of Reading to gain in-depth insights with thirty-four older adults (mean \pm SD: 72.7 \pm 4.6 years; range: 66–85 years; 35.3% male and 64.7% female). This was considered sufficient for data saturation and within guidelines for recommended sample sizes

for qualitative research (Braun & Clarke, 2021; Hennink et al., 2019; Morgan, 1997). The focus group design was based on four key topics (Fig. 1) informed by our previous work (Norton, Lovegrove, et al., 2024) utilising a semi-structured discussion guide. The same moderator (VN) facilitated all five sessions and recorded for transcription purposes (in addition to field notes) by Microsoft Teams (Version 25093.2105.3614.8220, Washington, USA).

2.2. Focus group design

A range of different activities was utilised to help drive engagement with the topic and identify viable age-suitable strategies to modulate future intake. The first activity was a “pre-task” where older adults were asked to take two photographs using their own camera (if not possible then relevant support was provided by the research team) capturing: (i) healthy eating and (ii) consumption-derived challenges to stimulate discussion (photo-voice style; Wang & Burris, 1997) during the session. The received photographs were printed (Polaroid Lab Instant Printer, Amsterdam, Netherland) resulting in a white-frame Polaroid (Color i-Type Film; 107 \times 88 mm) using a format that would resonate and provide nostalgia for this age-group. All focus groups were conducted in a welcoming environment (Sensory Science Centre, University of Reading) and started with relevant housekeeping including how the session will work and a reminder that there were no right or wrong answers as well as encouraging all to actively contribute to the discussions. The ice-breaker task (e.g., what is your favourite hobby and food?) was used at the beginning of the session to encourage conversation between older adults. The polaroids from the pre-task were pinned up on the wall and used to initiate a conversation on defining healthy eating and consumption-related challenges. Older adults were then provided with an activity booklet and asked to complete various tasks during the session supplemented by discussion (or vice versa).

- **Task one:** record consumption habits (past two weeks: never to always and typical number of portions: one to five or more portions) from ten key dietary fibre food categories (wholemeal bread, fibre-rich cereals, wholemeal pasta + rice, potatoes, dried fruits, fresh fruits, vegetables, pulses, nuts + seeds and fibre-rich snacks) using a newly developed dietary fibre screening tool (SCREEN-IT) (Fig. S1) (Norton et al., 2026).
- **Task two:** test dietary fibre knowledge using quiz (4-item) recording recommendations (awareness and actual value), dietary fibre-rich foods and benefits via series of yes or no, multiple choice and check-all-that-apply type questions.
- **Task three:** exercise to help with visualising 30 g/d dietary fibre recommendations. Older adults were provided with fifteen foods (Fig. S2; purchased from Sainsburys, Oxford, UK) varying in dietary fibre and asked to select how many foods (based on their typical portion size) were needed to meet 30 g/d of dietary fibre. Ten foods were needed to achieve the daily recommendations (representing three meals and snacks).

The first three tasks were conducted without prior specific reference to dietary fibre by the moderator, so that older adults existing knowledge and awareness could be captured. This then facilitated a discussion on dietary fibre (including why it is important, recommendations, food-based examples, benefits, labelling) and the associated challenges.

- **Task four:** discussion on willingness to measure food intake and explore barriers/enablers to measuring biomarkers (e.g., blood, hair, urine, saliva, stool, etc.) in this population and linking with food intake. Older adults also had space in their activity booklet to jot down additional thoughts not captured in the group discussion. This information will be used to help our research team design future experiments for the ageing population.

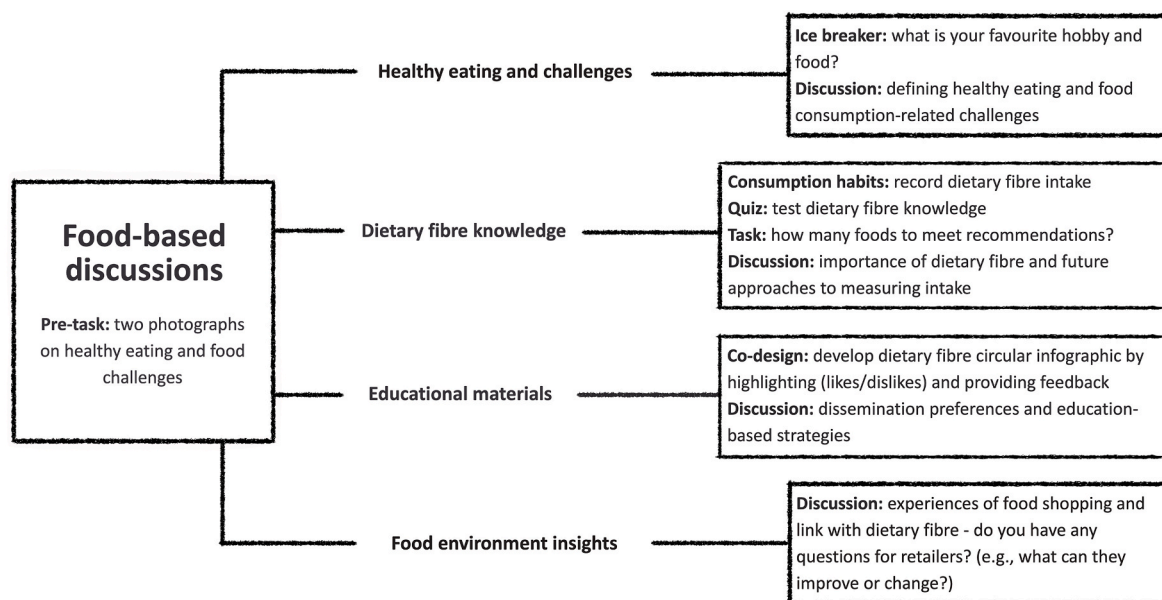


Fig. 1. Focus group summary by key topics and relevant tasks.

- **Task five:** focused on how this cohort wanted to learn more on dietary fibre – feedback from a group of older adults was initially used to inform infographic design (pre-focus groups) (Norton, Lovegrove, et al., 2024). This was then co-designed during the focus groups by editing and highlighting likes/dislikes (individually and then as a group) – key elements included: (1) central concept (“what”) – defining dietary fibre; (2) evidence (“why”) – dietary fibre benefits; (3) context (“how”) – recommendations and examples of dietary fibre-rich foods; (4) awareness – labelling; (5) practical application – meal ideas and simple swaps; and (6) big picture – Eatwell Guide. Four impact derived questions were asked using a five-point agreement scale (‘strongly disagree’ to ‘strongly agree’): learning something new, change future intake, content engaging and usefulness of approach. Flash cards ($n = 24$; 85×55 mm) were created to provide examples of different dietary fibre-rich foods to demonstrate variety and corresponding dietary fibre content. There was also a discussion on dissemination preferences and future education-based strategies. The goal was to design a circular style infographic providing an overview of dietary fibre so post focus groups the design could be finalised and shared with the cohort.
- **Task six:** centred on gaining initial insights into the food environment – what are your experiences of food shopping (including common type, frequency, challenges) and questions for food retailers such as what can they improve or change.

2.3. Data analyses

NVivo (release 14.24.3, Denver, USA) was used to conduct thematic analysis using an inductive data-driven approach by identifying, analysing and reporting emerging themes (Braun & Clarke, 2006; Thomas, 2006). The transcribed data was analysed by utilising the step-by-guide in accordance with best practices (fives key processes: transcription, coding, analysis, overall and report) suggested by Braun and Clarke (2006); in summary, data familiarisation, initial codes generation, themes development, reviewing themes, defining/naming themes and reporting. The codebook was reviewed by another researcher (SL) to check for data representation, codes (including relevant themes) and inclusion (minimum of five mentions) were discussed one-by-one to ensure consensus agreement. In brief, the quantitative data captured in the activity booklet was collated and expressed as dietary fibre: (1) consumption habits (g/d) were quantified in accordance with Norton

et al. (2026); and (2) knowledge via a quiz where the scores were converted into binary responses and summed up. The remaining outputs (e.g., willingness to measure food intake, biomarkers, feedback on infographic and insights on the food environment) were reported in percentage format.

3. Results

3.1. Defining healthy eating and challenges

The pre-task polaroids (Fig. 2) focused on two perspectives (1) **healthy eating** was centred on starting the day right such as breakfast consisting of cereals/porridge with yoghurt, fruit, nuts and/or seeds. Meals utilised classic British combinations (eggs on toast, meat or fish with vegetables, jacket potatoes with fillings, “healthy” recipe cards) and foods associated with variety, full fridge, colourful salads, fruit bowls and tinned fish; and (2) **challenges** were based on various aspects: snacks are readily available, increasing cost of healthy foods, packaging can be difficult to open and for some a trade-off between food preferences vs wastage.

The discussions highlighted that older adults associate **healthy eating** with terms such as fresh, raw ingredients, variety, balanced and eating together and defined as “cooking from scratch” and “for our generation – eat your vegetables! like meat and two vegetables is more the norm for us compared with other generations”. Consumption-related challenges resulted in six interlinked themes: (i) **age-related changes** were present such as decline in appetite “I am not able to eat so many carbohydrates as before – less potatoes, pasta – I don’t like that feeling of being too full” and “how do I fit it all in?”; (ii) **cost** was ever-present part of the conversation “I am glad I am no longer needing to feed a family everyday!” and “cost really gone up!”; (iii) **environment** with increasing access to processed foods “fast food outlets typically don’t provide you with vegetables” and “if you look at any ready meal – the first four ingredients you recognise then the rest is all chemicals, emulsifiers ...”; (iv) getting the **munchies** was cited as common challenge “I associate a cup of coffee with a snack” and “can avoid in supermarket but not in house”; and (v) **terminology** is unclear “portion size is guess work” and “food labelling is confusing”.

3.2. Dietary fibre knowledge and awareness

Older adults dietary fibre consumption habits highlighted

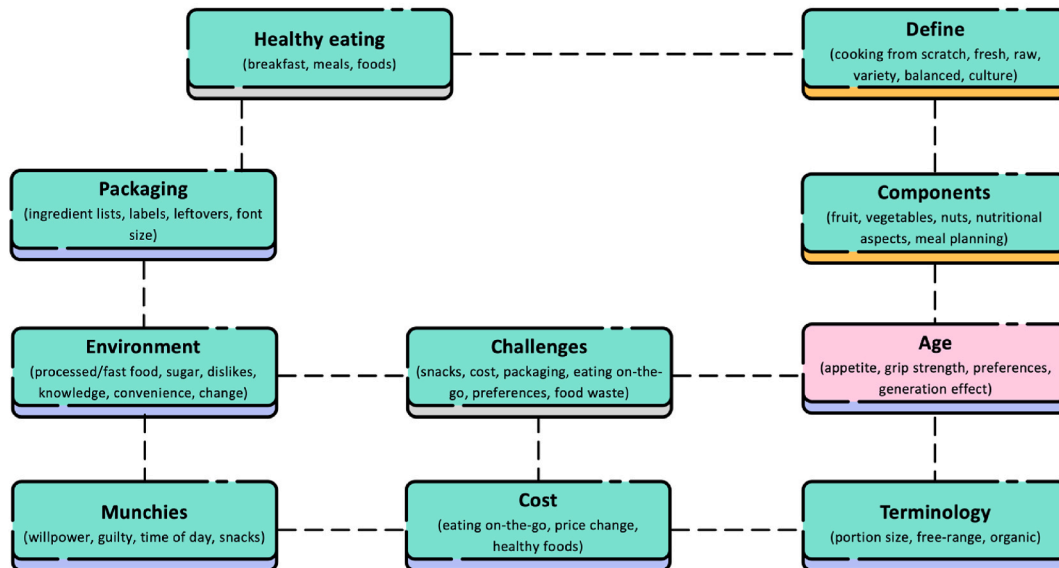
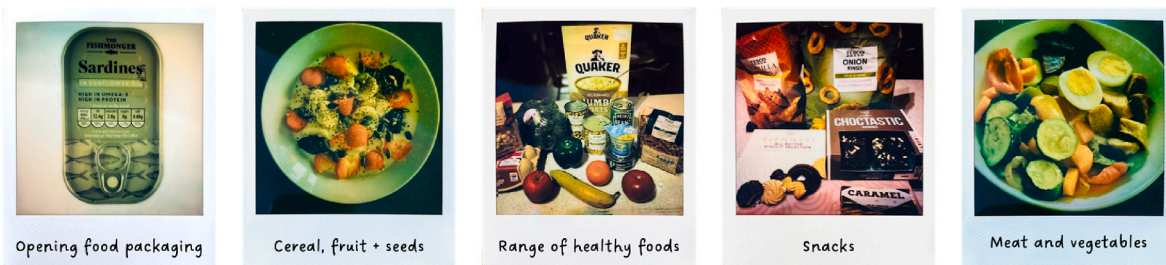


Fig. 2. Healthy eating and derived challenges from pre-task (polaroids) and emerging themes from discussions.

insufficient intake (mean: 18.9 g/d and range: 10.0 to 27.9 g/d) (Fig. 3). The quiz identified knowledge gaps (mean score: 49.2%) relating to recommendations, foods and benefits. This translated into overriding lack of awareness: (i) **uncertainty** on dietary fibre-rich foods “I am surprised by chickpeas - WOW” and “what foods are highest in fibre?”; (ii) **benefits** beyond digestion “type 2 diabetes is new to me” (iii) **confusion** on recommendations: “no – I wasn't sure” and “I cannot picture 30g”.

The practical task (e.g., how many foods are needed to meet the 30 g/d recommendations?) demonstrated no older adults were able to correctly guess and on average selecting six foods (range: 3.0 to 9.0). Two key challenges emerged: (1) **volume** of food “sounds like a lot of food” and “I think this demonstrates why so few people are meeting the 30 g/

d recommendations” and (2) **visualising** portion size “hard to estimate how much fibre present in a portion size” and “I didn't realise fibre wasn't included on traffic lights – that's interesting”.

Overall, older adults were not typically monitoring food intake; however, cited barriers such as **time** “BUT not for a long time (e.g., for a week would be fine, possibly another week later but certainly not months at the time)” and impacting **enjoyment** of food “it takes away the pleasure of the meal”. In addition, various practical considerations both positive and negative: (1) **eating on-the-go** “do I bring my scales?”; (2) **learn and adapt** “help highlight potential issues and increase my knowledge”; (3) **bias** “not natural weighing food/drinks!”; (4) **stop-go criteria** “driver for me – do I feel healthy within myself?”; and (5) **cooking methods** “if you

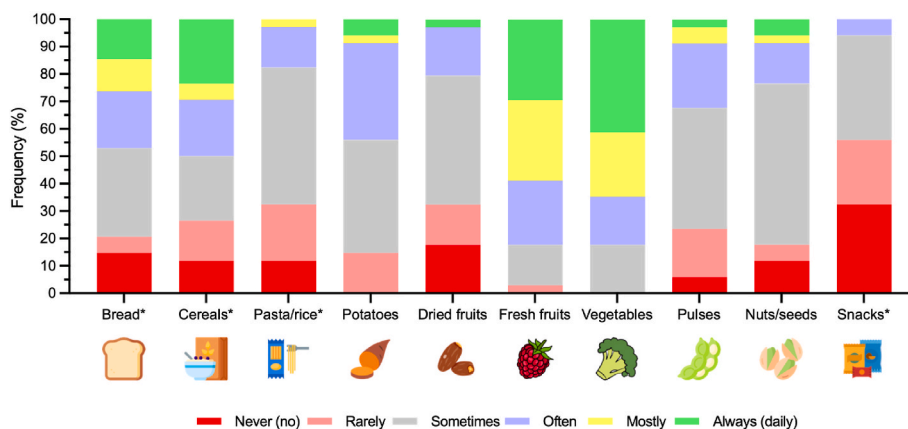


Fig. 3. Older adults' (n = 34) dietary fibre consumption habits (*wholemeal/grain bread, dietary fibre-rich cereals, wholegrain pasta/rice, pulses and dietary fibre-rich snacks) in the past two weeks – all data expressed as percentages.

overcook a food will it lose some of the nutrients”.

Most older adults (85% selected maybe or yes) to measuring food intake but there was a strong consensus on **purpose** “no, only for research NOT day-to-day” and need for **resources** “not measuring or weighing every food – basic cheat sheet of quantities/visuals”. Commonly cited “**how**” methods included: household measures, apps, weighing food, diaries (write & eat, audio, photos) and scanning foods. Older adults liked the **objective** nature of biomarkers to capture dietary intake “much prefer the option of dietary biomarkers feel this is more reliable information” but would like **reassurance** “I had bad experience so requires someone good to take the measurements” and **feedback** “results would give me information on my general health - am I in good shape for years to come or do I need to adjust what I am eating/drinking?”. Overall, older adults were relatively willing to provide biological samples (stool: 61.8%; blood: 73.5%; urine: 79.4%; hair: 91.2%; saliva: 94.1%) for research with increasing compliance associated with level of invasiveness.

3.3. Educational materials

Older adults liked the circular infographic approach combining text with graphics “I marked it all green [like] – no red [dislike] at all”: (1) **clear messaging** “bitesize information – so you can focus on different areas”; (2) **learning effect** “a lot of this I am learning, some I have an idea about BUT very informative without being too formal”; (3) **useful** “in the short-term I could stick it up in my kitchen”; (4) **design** “cartoons are engaging and good graphics”; and (5) **signposting** “I think to emphasis the benefits is crucial”. More broadly, the discussions helped raise **awareness** of classic British foods as dietary fibre-rich “I didn't realise eating potatoes with skins was a good source fibre” and “it's interesting what a healthy and relatively cheap food baked beans is – most people put it down as a last resort”. Older adults cited the **trade-off** between sugar and dietary fibre as an ongoing concern “sugar the enemy as far as I can see”. Similarly, one aspect from the Eatwell guide (e.g., select low fat and sugar options) was

considered misleading for some; it was apparent sugar and impact on health was a concern (forefront of mind) with increasing age. Finding the **balance** with terminology, volume of information and purpose “who is your target audience?“, “it's very busy” and “fibre definition needs to be bolder – a vocal point and draw you in!”. This feedback was used to finalise the infographic (Fig. 4) and then shared with older adults after the focus groups.

Going forwards, visual cues are key such as: (i) **dietary fibre equation** “some people may think 30 g/d a slice of bread = 30 g/d of fibre so breaking things down would be helpful”; (ii) **portion size** “how to accurately convey a portion size via an image?”; and (iii) **improved labelling** “if so important – why is fibre NOT on pack?“. More **practical examples** “I would like more meal ideas” and **substitution support** “making one swap at a time might be easier”. Flash cards were considered a useful **grab and go type** resource “I think the flash cards are brilliant” and “easier way to add up fibre intake”. The communication preferences were based on future **education** “I would like a public service campaign on fibre” and need to reach **wide audiences** “places we visit”. Collectively, schools (including pester-power via children), GP surgery's, NHS centres, Nursery's, workplaces, supermarkets, bus stops and train stations were identified as viable options. Positively, at least 76% of older adults said they learnt something new, would change their future intake, found content engaging and that it was a useful approach after interacting with the infographic (Fig. S3).

3.4. Food environment

Supermarkets were the main source of food shopping and the dual-purpose nature was noted (e.g., exercise and shop) “I walk as its close”; practically, this also limited the volume of food that can be purchased “what I can carry”. Older adults said they had **more time** and this resulted in a change in shopping patterns “we shop more often now but less stuff”. There were a number of challenges associated with food

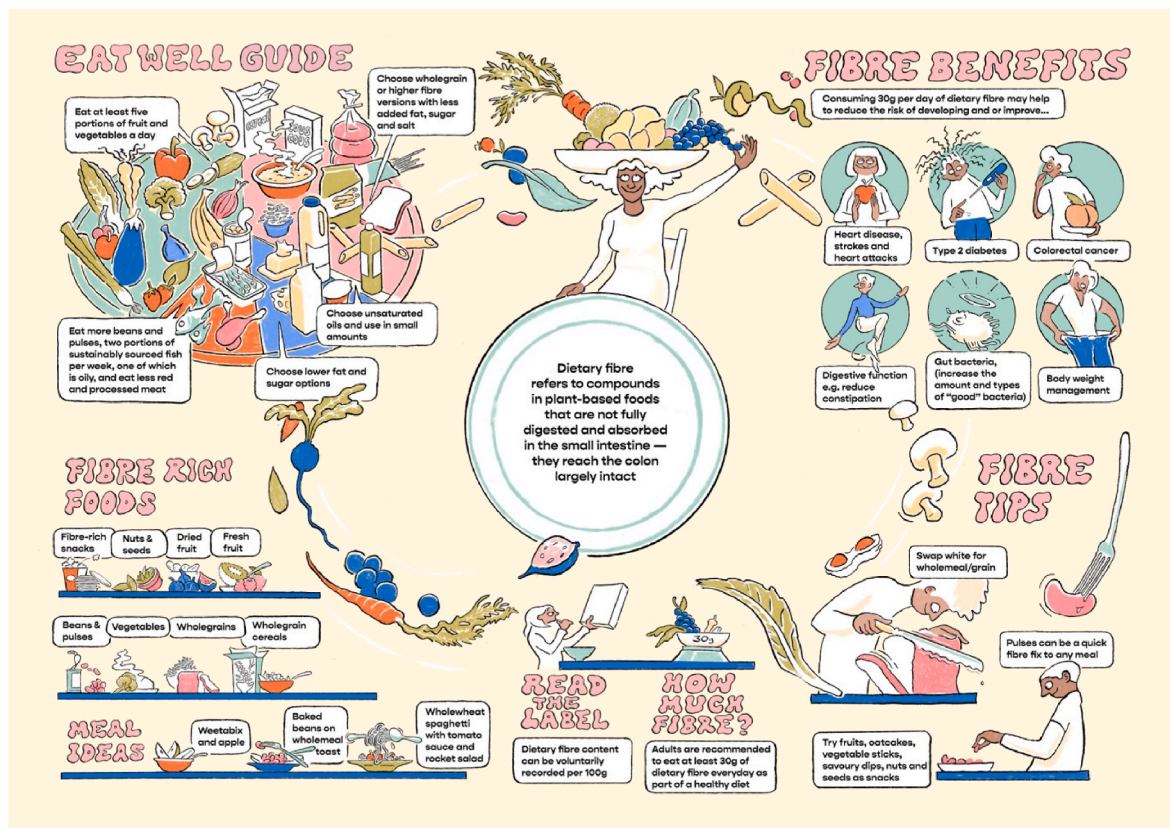


Fig. 4. Dietary fibre infographic co-designed in collaboration with older adults.

shopping such as: (1) **mixed experiences** “enjoyable vs tedious” and “prefer shopping when its quiet and wide aisles”; (2) **cost** “getting good quality food for a reasonable price” and “the food companies are quite happy to sell junk food for high profit and people often resist change”; (3) **supermarket layout** “everything keeps moving” and “I can’t always find what I am looking for”; (4) **excessive packaging** “I am always irritated by the fact that so many fresh foods items are packaged usually in plastic - this is not good for food waste or environment (difficult to recycle)” and “understanding the language on labels and I don’t like the waste in packaging - too big or too many layers”; (5) **lack of clear information** (accessibility) “the font size is so small” and “vibrant colours on packaging can make it difficult to read key information”; and (6) **improve dietary fibre messaging** “why isn’t fibre on front-of-pack” and “food producers should be much more regulated - the fact that even something as basic as the traffic lights system is voluntary shows how far we have to go”.

The key themes for retailer derived questions were mainly challenge related to some extent “I think we need cleaner labelling, more education for shoppers and make healthier options more affordable – what are you doing to address this?”: (i) **more shop-floor level support** “I don’t pick up packets to see if it’s got fibre – as I get older I tend to buy similar products as I trust them – I think that’s one of the issues” and “they [supermarkets] need to emphasise how to get 30 g/d of fibre”; (ii) **initiatives supporting** a collaborative approach “bigger education piece first then supported by the manufacturers” and **increasing awareness** “people need to know what it is first before they look for it”; (iii) **cost saving** “difficult for them to manage healthy eating over profits - will need government intervention but they can do special offers for healthy promotions” and “if healthier food cheaper than I am in as it saves money”; and (iv) **improve packaging** “adopt the traffic light system universally” and “real facts on fibre (regulated) on the front-of-pack”.

4. Discussion

Adhering to healthy eating practices is a widespread challenge (less 0.1% of UK population comply); however, within an ageing population this can help facilitate “added life years” (Scheelbeek et al., 2020; Calligaris et al., 2022; Clegg et al., 2023). This suggests that gaining insights into current eating practices is key to identifying areas for change using methodology that stimulates conversation. A photo-voice style task was used to illustrate older adults’ perspective visually prior to focus groups (Wang & Burris, 1997). The received photos were printed using polaroids to create a starting point for face-to-face discussions. Overall, key themes emerged such as role of breakfast (starting the day right), classic British meal combinations (meat and two vegetables), variety of foods and cooking from scratch were associated with healthy eating. This highlights the role of lived experiences within this age-group by creating awareness of key healthy eating components; although, implementation tends to be the ongoing challenge (Scheelbeek et al., 2020; Wadsworth et al., 2023; OHID, 2024). For example, older adults cited age-related challenges (e.g., decline in appetite and grip strength) as modulators of food-based decisions coupled with increasing costs, access to convenient and/or processed foods, interpreting terminology and avoiding “munchies” between meals. Such findings demonstrated the range of factors impacting consumption habits both positively and negatively to varying extents. This complex interplay is evident in the literature between biological, physiological, socio-cultural, product characteristics, situational and psychological aspects driving older adults’ food choices (Whitlock & Ensaif, 2018; Caso & Vecchio, 2022). Interestingly, dietary fibre was not mentioned by any older adults in the healthy eating discussions; therefore, getting it into future conversations, using targeted interventions, will be key to closing the dietary fibre gap for the ageing population.

As expected, dietary fibre intake was notably below the 30 g/d recommendations in line with recent NDNS findings (Norton, Kaimila, et al., 2024). It was evident that areas for improvement in the diet related to more wholegrains (brown pasta, rice), dried fruits, pulses,

nuts, seeds and a shift to alternative plant-based snacks. The quiz highlighted (in agreement with previous research) key knowledge gaps namely: confusion over dietary recommendations, identifying dietary fibre-rich foods and benefits beyond ‘digestion’ (Norton, Lovegrove, et al., 2024). Interestingly, older adults were generally confident that their diets met the recommendations supporting similar findings evident in the literature (Magalis et al., 2016; Norton, Lovegrove, et al., 2024). The practical task highlighted the extent of the challenges as no one was able to correctly identify what 30 g/d of dietary fibre represented using real food-based examples. Two key discussion points were present: (1) volume of food was unexpected and (2) confusion with visualising portion sizes. Going forwards, any strategy aiming to modulate dietary fibre intake needs to include a practical and visual element to overcome the associated “missing link” (e.g., how to get 30 g/d) subsequently helping to initiate dietary change.

Monitoring shifts in dietary habits requires commitment using a tracking-based device; however, this is not always common practice for most and is difficult to accurately capture number of “active users”. For example, a recent YouGov Survey (n = 2199; UK adults aged 18 years and over) noted only 30% of the cohort tracked weight or diet (Nguyen, 2024). Therefore, it was not unexpected that our older adults were not typically monitoring food intake and key barriers put forward were time, impacting enjoyment of food, practical challenges (e.g., scales) and bias. There was a clear consensus that older adults were happy to record food intake for research purposes but not as part of their day-to-day lives. This raises a key question how best to shift this narrative without inducing bias. Positively, older adults were keen for quick tools to monitor intake so they could “learn and adapt” as well as “how” methods (e.g., household measure, write and eat, etc.) that can be easily integrated into everyday life. In addition, there is growing interest in nutritional biomarkers to provide more objective information on consumption habits; however, it is not without its challenges especially in the context of identifying suitable total dietary fibre markers (Cuparencu et al., 2024; Natella et al., 2025). Recently, Perri et al. (2025) identified fourteen biomarkers from four key domains (physiological, inflammatory, functional and epigenetic) for use in ageing-based intervention studies. Therefore, it is important to get feedback from older adults to inform future study design; overall, the recruited older adults had mixed levels of volunteer experiences but were relatively willing to provide biological samples with cited caveats such as time, reassurance and feedback requests. The proposed compliance increased with the level of invasiveness from 61.8% (stool) to 94.1% (saliva); however, this does imply the benefit of the researchers having informal chats with this cohort, especially in community settings, as it is likely the information on the study would deter some (or most) from taking part. This is an ongoing challenge facing our research community in recruiting cohorts from “hard-to-reach” groups especially in projects with complex study designs.

It is important to co-design educational materials with the target population; accordingly, older adults were actively involved in the design and feedback process aiming to raise awareness of dietary fibre combining text with graphics. The presented infographic was well-received with most older adults learning something new, intending to change future intake, engaging with content and considering it a useful experience. It was evident they liked the format, clear messaging, signposting aspect and learning effect as well as reminder that traditional foods can be sources of dietary fibre (e.g., potatoes with skins, baked beans, etc.). In addition, there was an element of surprise associated with the dietary fibre content of chickpeas; therefore, a promising area to exploit in the future, particularly if key barriers associated with pulses such as preparation, digestive problems and sensorial aspects can be reduced and/or incorporated into familiar foods (such as bread) (Henn et al., 2022; Lovegrove et al., 2023). Interestingly, sugar was very much at the forefront of minds resulting in older adults mentioning a trade-off between sugar and dietary fibre; accordingly, this is an area to address in future research to overcome common

misconceptions and supports the need for public health initiatives at different life-stages. Older adults were keen for more visual resources, food substitution support and practical examples in a dietary fibre context. Such design cues need to be utilised in future education-based campaigns using a wide-reaching audience (including hard-to-reach groups) in places regularly visited (e.g., supermarkets, GP surgeries, NHS clinics, workplaces, train stations, etc.) to maximise impact. It is also important to understand relevant food environment challenges from a dietary fibre perspective such as voluntary labelling resulting in a discussion around feasibility of adding dietary fibre to the traffic light system on front-of-pack, coupled with clearer information to aid easier food identification. One such approach suggested by older adults was to design a logo for “high fibre foods”. Recently, the Danish Wholegrain Partnership (DWP) used a standardised logo within its approach that positively modulated wholegrain intake; however, policy change in terms of dietary fibre labelling to include mandatory elements elsewhere will be key (Boyle et al., 2024; Hooper et al., 2015; Lovegrove et al., 2025). In addition, older adults would like more shop-floor level support; for example, ‘can supermarkets highlight ways to meet dietary fibre 30 g/d recommendations’? This may need a two-fold collaborative approach raising awareness via education with a strong implementation focus from retailers. Older adults mentioned cost savings on “healthy options” would be a key incentive for them to make changes in purchasing habits. Huangfu et al. (2024) conducted a systematic review and meta-analysis predominately focused on price reductions for fruit and vegetables with positive findings on subsequent purchases and consumption. Key areas for additional investigation include sustained impact over a long-term period and subsequent diet quality changes as well as effects on other healthy foods groups (e.g., relevant to dietary fibre) especially in hard-to-reach communities (Huangfu et al., 2024). In addition, understanding how the framework used in this study could be adapted for such groups (including minority ethnic groups) is key; for example, classic British meals examples may not be appropriate for all. The recruited cohort were healthy community living older adults as such exploring insights in older age-groups (over 80 years) or care homes might provide different viewpoints to understand the role of dietary fibre with increasing age and in different settings. Examining ways to capture relevant demographics to characterise older adults without stigma is an ongoing challenge and a balance is needed to encourage participation (e.g., how to record loneliness, mobility issues, digital literacy, etc.). It should be noted that the recruited cohort were based relatively healthy and digitally literate; therefore, providing disposal camera could help for future use of photography-based tasks in more diverse ageing populations.

5. Conclusion

This qualitative investigation enabled discussion on healthy eating and relevant challenges, raised dietary fibre awareness, co-designed education-based materials and gained insights into the food environment. Overall, it was evident that there is added-value nature to face-to-face discussions in addressing misconceptions, lack of knowledge and problems with dietary fibre intake. Healthy eating was associated with cooking from scratch and the challenges included: age-related changes coupled with increasing costs, access to unhealthy foods and interpreting terminology. Key dietary fibre knowledge gaps were uptake of appropriate foods, lack of benefit awareness beyond digestive and confusion with recommendations. Interestingly, older adults were relatively confident in the quality of their diets but the practical task highlighted the “fibre gap” in action and the volume of food required to meet 30g/d recommendations as well as challenges with visualising portion sizes. Positively, older adults liked the circular co-designed infographic and were keen for more visual resources, food substitution support and practical examples in a dietary fibre context. Next steps will explore how the framework developed in this study can be maximised to support population level health. In addition, food environment

adjustments are necessary; for example, mandatory labelling, clearer information, more shop-level support and cost incentives. These novel insights will be fundamental in designing future wide-reaching public health initiatives likely requiring a combination of approaches benefiting from government, academia, industry and civil society to help embed dietary fibre into everyday eating habits.

CRedit authorship contribution statement

Victoria Norton: Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Stella Lignou:** Writing – review & editing, Supervision, Software, Methodology, Conceptualization. **Julie A. Lovegrove:** Writing – review & editing, Supervision, Methodology.

Ethics statement

The School of Chemistry, Food and Pharmacy Research Ethics Committee (University of Reading; study number: 15/2023) provided a favourable opinion for conduct and performed in accordance with the Declaration of Helsinki.

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Declaration of competing interest

JAL is the Deputy Chair of the UK Government's Scientific Advisory Committee on Nutrition (SACN); however, this manuscript reflects the author's independent research. The other authors have no conflicts to interest to declare.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.appet.2026.108563>.

Data availability

Data will be made available on request.

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