Key housing conditions that diminish healthy homes among aboriginal communities in Royal Belum Park Malaysia

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KEY HOUSING CONDITIONS THAT DIMINISH HEALTHY HOMES AMONG ABORIGINAL COMMUNITIES IN ROYAL BELUM PARK MALAYSIA

Hafizah Mohd Latif[1], Emmanuel Essah[2]

[1] *School of Construction & Quantity Surveying, College of Built Environment*, UNIVERSITI TEKNOLOGI MARA, 40450 SHAH ALAM, SELANGOR, MALAYSIA
[2] *School of Construction Management and Engineering,* UNIVERSITY OF READING, UNITED KINGDOM

Abstract

Research on healthy homes has been carried out relatively little in Malaysia. The aim of this paper is to establish the relationship between key architectural elements of Aboriginal homes in Sungai Kejar, the Royal Belum State Park, and their potential health risks. The data were drawn through naturalistic observation, unstructured interviews and semi-structured interviews. Despite their green features, many Aboriginal homes lack water-tight measures, sanitation facilities and proper flooring - making the people more susceptible to diseases like Leptospirosis and Malaria. Due to their nomadic lifestyle, the people construct temporary homes using green materials like bamboo and leaves. The government-provided wooden and brick houses did not meet most of their preferences primarily due to their lifestyle, culture and belief system. These underlying issues necessitate a thorough evaluation and research to propose optimal construction methods that meet the bare minimum criteria for healthy homes while also accommodating their lifestyle and preserving cultural heritage. This could include introducing brick flooring, portable rainwater harvesting for clean water supply and healthy homes awareness campaigns.

Keywords: Aboriginal, Architectural Elements, Health, Healthy Homes, Safety

[1] Corresponding author email: hafiz017@uitm.edu.my

INTRODUCTION

Recent empirical studies have examined Aboriginal home conditions and their impacts on health outcomes (e.g.: Caldas et al., 2023; Lansbury, Hoy, & Shaw, 2023; Mashford-Pringle, Fu, & Stutz, 2023; Memmott et al., 2022; Perreault, Dufresne, Potvin, & Riva, 2023). These studies have shed insight into the health inequities among Aboriginal communities, which are typically associated to inadequate access to resources. The resources encompass provisions for water supply, sewage infrastructure, electricity and architectural elements. Australian Institute of Health and Welfare (2022) reported that Aboriginal people live in an environment with a lower standard of housing quality and services than non-Aboriginal households. This group has higher poverty rates and lower mental and physical well-being than other groups, owing primarily to unhealthy living conditions that make them more susceptible to long term chronic diseases. Mental health issues, asthma, malaria, and skin morbidity are some of the diseases associated with unhealthy Aboriginal homes. Whilst healthy homes concept has been widely utilised in Western countries as a way of assisting rural communities in developing a highly healthy systems, studies on healthy homes, especially for the Aboriginal people in Malaysia remain limited. Many studies focus primarily on indoor air quality or space, rather than the overall elements of healthy homes.

The Royal Belum State Park is one of the world's oldest rainforests, believed to have existed for more than 130 million years old (Tourism Malaysia, 2023). The Park which is managed by the Perak State Parks Corporation (PSPC) is commonly peopled by the Jahai tribe, the original settlers - living along Sungai Tiang and Sungai Kejar areas (Bernama, 2023). An initiative undertaken by the government to support the Aboriginal people in Sungai Tiang involved the provision of permanent housing. Despite this effort, numerous traditional bamboo houses in the area still lack basic utilities such as water and electricity (Mohamad, 2015). However, there is a dearth of comprehensive documentation regarding the housing condition and architectural elements of the Aboriginal houses in the Royal Belum State Park. PSPC has identified this research as the pioneering investigation into the construction of the houses, with a specific focus on the architectural elements that pose health and safety risks to the Aboriginal people in Sungai Kejar.

Ensuring that homes are healthy is not a luxury; it is an essential element of promoting optimal physical and mental health for all individuals, including the Aboriginal people. Improving housing conditions can significantly reduce social inequalities that impact the rates of illness across all demographics within the overall community, particularly individuals from lower socioeconomic backgrounds who often encounter additional challenges when seeking adequate healthcare services. Consequently, these individuals face escalating risks over time due to limited access to affordable preventive treatments, if available at all.

CAUSES OF ABORIGINAL UNHEALTHY HOMES

Homes serve as vital spaces, encompassing both physical and psychological aspects, fostering the development and nurturing of intimacy and providing people with the opportunity to express their true selves (Bonnefoy, 2007). A healthy home provides conducive facilities, spaces and elements that promote the physical, mental and social well-being of people within the household and its vicinity (Nasir et al., 2021). Poor living conditions in houses and communities tend to cluster together, thereby amplifying the probability of adverse health consequences in the future (Arshard et al., 2022; Khalid et al., 2022; Miller et al., 2011). There are numerous and diverse factors that contribute to the unhealthy homes. The factors can originate from both internal and external environments, including unsanitary bathrooms, polluted water, poor waste management, insufficient air flow, overcrowding and improper space design (Vanhoutteghem et al., 2015).

Ali et al. (2018) conducted a comprehensive narrative literature review to identify the role of housing in the transmission of infectious disease among Aboriginal people in Australia. They highlighted that various factors contribute to disease, including the hygiene practices of the people, the cleanliness of clothes and bedding, the handling of wastewater, spaces for storage and cooking, overcrowding, the presence of animals, insects and vermin, the accumulation of dust, temperature conditions, the functionality of sanitary hardware, electrical supply management, sewage and maintenance. The aforementioned factors are also among the elements that the (World Health Organization, 2019) highlighted as crucial components for healthy homes.

In addition to the aforementioned factors, Wheeler et al. (2016) offers various architectural components that contribute to healthy homes. These include materials, lighting, spaciousness, comfort, durability, sensory features, bedrooms, colour schemes, security measures, storage options, flourishing elements, kitchen amenities, sound insulation, living areas and windows. According to Wheeler et al. (2016) numerous factors, ranging from indoor air quality, the amount of accessible space and light, and the quantity of available storage space, can significantly impact the health and well-being of people. In addition, the selection of construction materials, the installation of equipment or the size and design of individual homes can all contribute to various health problems (Bonnefoy, 2007; Latif et al., 2022).

Ali et al. (2018) discovered that the majority of studies indicate that Aboriginal people have elevated rates of infectious diseases affecting intestines, skin, eyes and respiratory system, which are mainly associated with overcrowding. Windi & Whittaker (2012) indicated that the limited number of doors and windows in Aboriginal homes, along with the presence of indoor air pollution caused by internal fires, lead to a compromised respiratory health due

to the inadequate ventilation. Not only that, indoor air pollution is also linked to cardiovascular health issues and can trigger allergies (World Health Organization, 2018). Ahmed et al. (2011) emphasised that living in temporary homes with dirt or earth flooring, poor sanitation, and poor water provision are contributing factors that heighten the susceptibility to soil-transmitted helminths among Aboriginal people. Adu-Gyamfi et al. (2023) affirmed that the absence of proper sanitation in Aboriginal communities led to the spread of cholera and dysentery. Kaur (2009) found an association between the presence of malaria disease and bamboo-walled homes with gaps that allow mosquitoes to enter, specifically among Aboriginal people.

These elements are essential for evaluating Aboriginal homes and they serve as crucial criteria for this study. The aim of this paper is to establish the relationship between key architectural elements of Aboriginal homes in Sungai Kejar, the Royal Belum State Park and their potential health risks.

RESEARCH METHODOLOGY

A qualitative research methodology was used to investigate home conditions and their relationship to possible health issues. Qualitative methods are appropriate for uncovering and comprehending previously unexplored issues in a poorly understood context (Strauss & Corbin, 1990). This research was approved by the ethics committee of Universiti Teknologi MARA. As this research involved the Aboriginal people, permission was also obtained from the Department of Orang Asli Development (JAKOA) and Gerik District Council. Subsequently, the permission letters were presented to the PSCP in order to obtain an entry permit for the state park. This permit was essential for hiring a licenced boatman and allowing the boat to pass through the Royal Malaysian Army checkpoint, enabling the research teams to access the Aboriginal communities.

Data collection commenced with a semi-structured group interview involving three PSCP staff members. The purpose of this interview was to gain a comprehensive understanding of the various aspects related to the Aboriginal communities within the state park. This understanding was sought prior to the researchers' visit to these communities. The decision to centre on Sungai Kejar was based on its relatively underdeveloped condition compared to Sungai Tiang. Data was gathered from six villages in Sungai Kejar, specifically Jerai 1, Jerai 2, Jerai 3, Bongor, Terapong/Terapong Darat and Tan Hain.

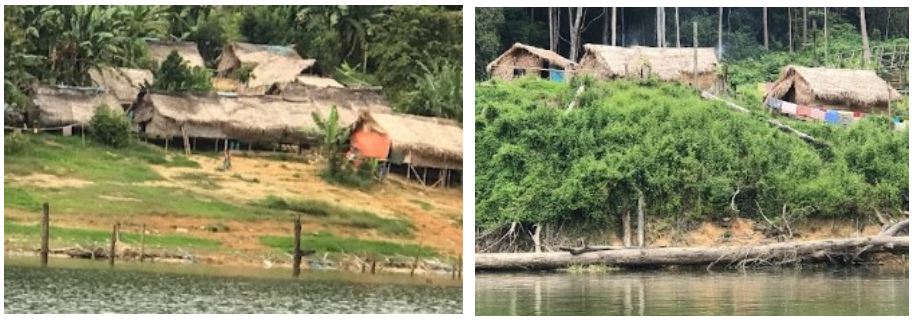
Naturalistic observations were conducted in all villages, as they immerse the researchers in real-world settings and yield extensive data that are unlikely to be obtained through surveys. Concurrently, the researchers conducted unstructured interviews with all the village heads except Jerai 3 for being unavailable. With the assistance of two PSCP staff and two boatmen, the researchers managed to gain the trust of the people to engage in conversations.

Additionally, unstructured interviews were conducted with people who either approached us first or were willing to engage in a conversation when we approached them.

Recording was permitted; therefore, the interviews, photographs and video footages were captured using the iPhone 7 Plus, Samsung A52 and Samsung Galaxy S23. Note-taking was essential when participating in group conversations as voice recordings may become indistinct at certain intervals. Likewise, unstructured interviews were conducted with the boatmen and two PSCP staff who were also there, in order to gain a deeper understanding of certain situations.

FINDINGS AND DISCUSSIONS

The aboriginal population in Sungai Kejar, Royal Belum in majority, erected temporary homes due to their nomadic or semi-nomadic lifestyle. The design of their homes was influenced by the architectural styles they encountered while travelling and the environments they were accustomed to inhabiting. Typically, their homes were erected with identical designs, materials and construction techniques as shown in the pictures below.



a) Tan Hain Village b) Terapong Darat Village

Figure 1: The villages situated along Sungai Kejar

Aboriginal homes made from environmentally friendly materials

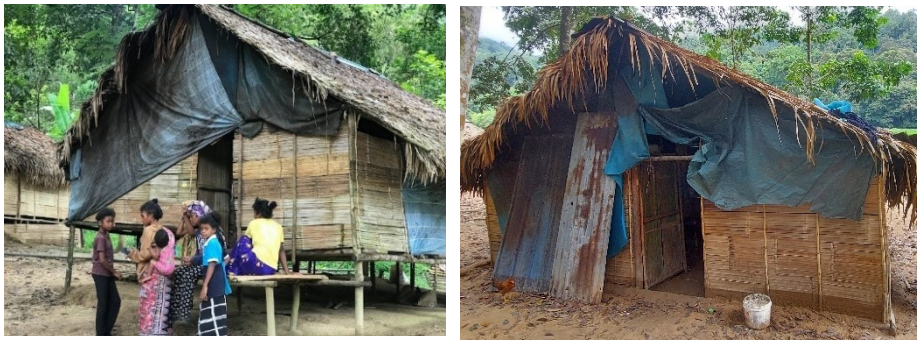
The structural components, specifically the posts and roof framework of the homes were erected using various types of suitable timber sourced from available locations. Although green, the structure of Aboriginal homes is susceptible to damage by elephants due to their lack of strength, posing a significant safety risk. In Tan Hain, the footprints and destruction on the plantation caused by a female elephant searching for food the previous night in close proximity to a home with children were observed. The people were busy building new homes on the opposite side of the river due to the apprehension of fatal trampling by elephants.

According to the people and PSCP, elephants were the primary wildlife species in Royal Belum Park, causing issues and even fatalities among the Aboriginal people. The risks of wild animal attacks are high, which are also encountered by other tribal communities (see: Brumm, 2022).

With regards of the roof of Aboriginal homes, the thatched roof made from *Cucuh* leaves were well-suited for hot and humid climate of Malaysia's tropical region. The thatched roof's layers were meticulously folded, tied and arranged in a neat stack. This method aided the preservation of a comfortable indoor climate during hot weather conditions and offered insulation to prevent heat loss at night. Nevertheless, these materials are highly susceptible to fire, as evidenced by a burnt house in Jerai 2. This has the potential to spread fire, endangering the safety of the occupants and nearby Aboriginal people, and posing a life-threatening situation (Gilbert et al., 2006).

The wall finishes in each village were found to differ slightly, ranging from the use of bamboo to layers of *Cucuh* leaves. The arrangement of these materials created gaps that naturally facilitate ventilation, improved air flow and natural lighting, particularly in the case of the small type of bamboo, which was predominantly utilised. These natural materials and methods contributed to the preservation of a pleasant and energy-efficient and healthy homes environment.

While natural sources for the aboriginal home construction were easily available, sustainable, provided natural insulation properties and environmentally friendly, they did possess certain disadvantages. The gaps in the roof and wall enabled the flow of rainwater into the homes, contributing to the dampening of certain parts of the house and causing a higher moisture level. Consequently, numerous houses were discovered to improve their roofs and walls by adding canvas, metal decks or zinc sheets as shown in Figure 2 (a) and (b).



a) Canvas we used on the wall; Raised floor using bamboo

b) Canvas and zinc sheet used on the wall and roof; Dirt flooring, no floor finishes

Figure 2: The general roof, wall and floor elements of aboriginal houses

The presence of water had enabled the proliferation of mould and moss on certain walls and structures. Potential health risks linked to dampness include respiratory issues, sleep disturbances, skin irritation, fungal infections (Tiesler et al., 2015) and rhinitis (Jaakkola et al., 2013).

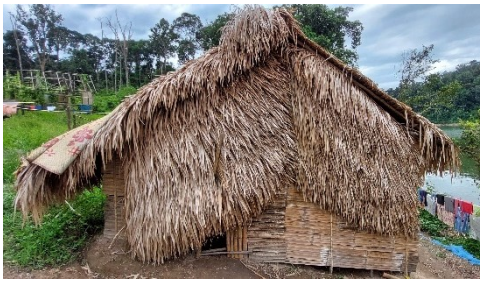
The aboriginal homes were discovered to be either erected directly on the ground without any floor finishes (Figure 2b) or suspended using bamboo as the flooring material (Figure 2a). The homes on the ground that had dirt floors had a small section of raised bed made of wood or bamboo for the sleeping area. The occupants did not sleep on the ground, which reduced their health risks. However, coming into direct contact with dirt floors, particularly when walking barefoot, is associated with the presence of parasites and bacteria. This can lead to serious health issues, including parasitic infections, respiratory problems and helminths as highlighted by (Ahmed et al. (2011). Meanwhile, the suspended bamboo-flooring exhibited gaps. Aside from water, the gaps in the walls, floors and roofs allowed the ingress of mosquitoes, birds, insects and rodents. Some individuals in Jerai 2 Village had pointed out the presence of rats. The health risks to this encompass vector-borne diseases such as malaria (Kaur, 2009) and leptospirosis, which can be transmitted by mosquitoes, birds and other primates. According to the Research Officer of PSPC:

> "*Malaria, it is a kind (of disease with) high-profile cases… Human interact with the primates, then it will spread… I know there are quite a few cases, even among our staff (had) leptospirosis. Leptospirosis, it's called [rat's urine] but a lot of the other animals could be the carriers as well, even the deer... It could be in the water, river water, yes."*

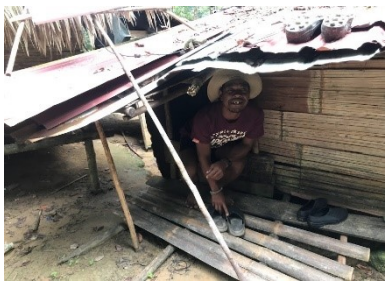
Certain houses had apparent windows, while others had hidden windows and some omitted windows entirely. Those without windows showed a lack of natural lighting and air flow, although there were gaps between the bamboo materials. They decided not to have the windows due to their dislike of them. This resulted in poor air flow, especially when the fire was lit. And this could lead to respiratory, cardiovascular and allergic problems (Windi & Whittaker, 2012; World Health Organization, 2018).

> *"[What is the window for? This is not a wooden house. I don't like wooden houses, stone houses. I really don't like living in it. I only want this (bamboo) house. My father, mother and grandmother lived in this (type of) house. I don't want a modern house… There is no toilet; I want to go into the river. I don't want a toilet, I want a normal way, it's not difficult]" (Woman 1, Jerai 2).*

The Aboriginal people utilised windows to enhance airflow, natural light and visual access, particularly for the purpose of ensuring safety. This corroborates with Walls et al. (2012) who asserted that widows facilitate optimal visual and auditory engagement with the surroundings while also enabling ample airflow and sunlight for effective ventilation and natural lighting. The hidden windows used *Cucuh* leaves, which were evident mostly in Terapong Darat. From a distance, it was observed that there were wide-opened windows (see Figure 3a), but upon reaching the village, both the windows and the inhabitants became invisible. This signifies the desire of the people for security and safety.



a) When closed, the hidden windows and door openings were almost invisible



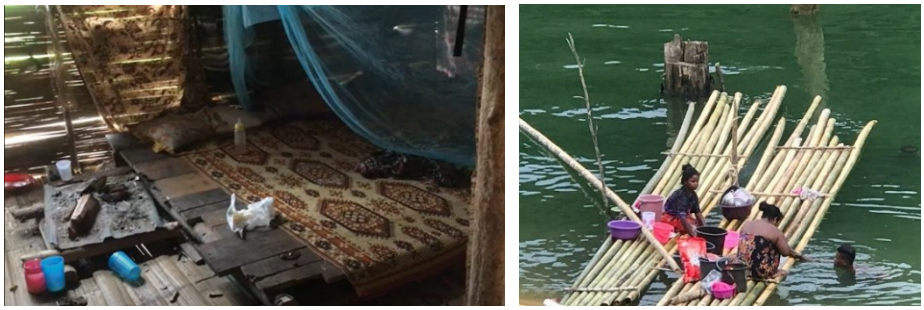
b) A small door

Figure 3: Examples of several types of windows and doors

The doors and windows were primarily used to safeguard against outsiders and wildlife, rather than individuals within their community. This is due to the absence of reported criminal offences in their communities. The people inhabited a small community and were acquainted with one another. In the event of conflicts, they would relocate and establish a new settlement. Door clearance is crucial for facilitating movement and preventing the entry of vermin (Walls et al., 2012).

Regarding space utilisation, it was ascertained that no more than five individuals occupied each house, with an average of two adults per household. The houses featured an open-concept layout, with no separate kitchen area, despite the presence of cooking activities within the house. The newly married couples were relocated to a residence in close proximity. The Aboriginal people in Sungai Kejar maintained a low population density, with each village typically comprising fewer than 10 homes, except for Bongor and Tan Hain, which had slightly more than 10. In Tan Hain, children of a specific age were allocated to reside together in separate homes rather than living with their parents. This prevents the transmission of diseases linked to overcrowding, as indicated by previous studies conducted in various tribal communities.

Several of the houses that were granted entry (see Figure 4a) exhibited traces of ash in the vicinity of the sleeping areas, affirming the use of fire for nocturnal heating and mosquito-repelling. The fire possesses the capacity to incinerate the house constructed from green materials, while the smoke exacerbates indoor air pollution and heightens the susceptibility to respiratory health complications as stated by (Windi & Whittaker, 2012). Moreover, it was discovered that mosquito nets were used among them, indicating the people's desire for safety and health by being aware of a simple solution to prevent mosquitoes.



a) The use of a mosquito net, traces of ash, rice scattered on the bamboo floor, a dirty nappy and faecal matter.

b) Absence of sanitation facilities, reliance on the river for all water-related needs including bathing, washing, brushing teeth and fishing.

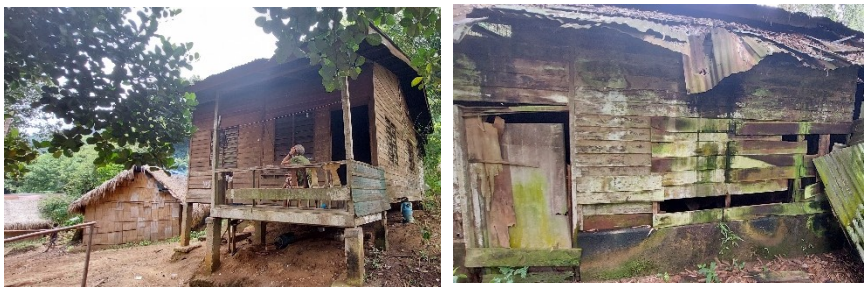
Figure 4: The cleanliness issues among the Aboriginal people

A number of Aboriginal people were found to have a lack of cleanliness awareness, which may attract rodents to their homes through the easily accessible gaps. The absence of water supply and sanitation facilities exacerbates the issue of cleanliness, where the people rely entirely on the same river (Sungai Kejar) for their daily needs (see Figure 4b). An unsanitary lifestyle endangers the Aboriginal people's health because it raises the risk of vector or water-borne disease transmission (Adu-Gyamfi et al., 2023).

Government housing initiatives

In Jerai 1, a wooden house constructed by the government remained in a state of disrepair, exhibiting signs of serious decay, as shown in Figure 5. The sole occupant of the house was an elderly man. According to the occupant, the interior of the house becomes excessively warm during the daytime. The villagers clarified that the man spent most of himself at the veranda. The house did not have a water supply, the timbers were seriously decayed, and bathroom space remained unused.

The people who lived in the vicinity of the wooden house continued to utilise the common aboriginal house made from bamboo, *Cucuh* leaves and rattan. They claimed that the Aboriginal homes were better suited to their lifestyle, with cooler temperatures and more comfortable to live in.

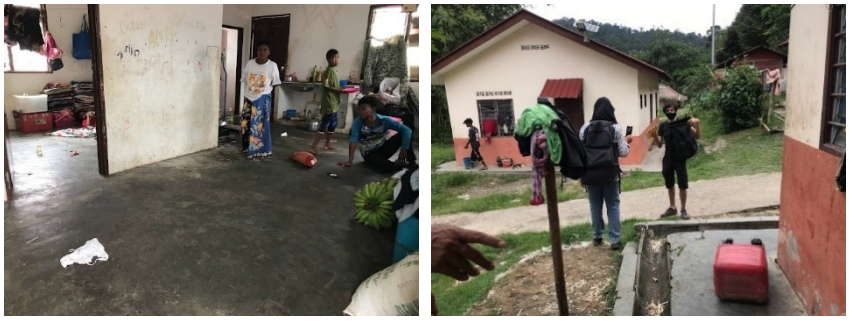


a) The condition of the decayed wooden house and surrounding bamboo homes

b) The presence of moss, mould and damaged roof were apparent

Figure 5: The condition of a wooden house initiative by the government in Jerai 1 Village

In Bongor village, the Malaysian government had built brick houses to help the Aboriginal people achieve a more comfortable and enhanced lifestyle. Brick houses may also help to protect the people from wild animal attacks because the structure is more durable.



a) The indoor condition of a brick house. The bathroom was used as the storage area.

b) The outdoor condition. A few houses were unoccupied.

Figure 6: The condition of brick houses initiative by the government in Bongor

Nevertheless, not many Aboriginal people were fond of these wooden or brick houses due to several reasons: (1) the construction materials such as the sense timber, cement render flooring and metal deck roof tend to retain heat; (2) insufficient air circulation and ventilation in the permanent house; (3) the absence of electricity prevented the use of mechanical fans, which could have aided artificial ventilation and lowered indoor temperatures; (4) the absence of water

supply and sanitation facilities made the bathroom unusable; (5) due to their *Karei* belief system, the Aboriginal people refrained from living in homes where someone had died, resulting in the presence of unoccupied houses; (6) despite being allocated a house, the people persist in living a nomadic lifestyle, often shifting to different places, with the intention of eventually coming back; they lack ownership of any property; (7) the newly married couple required a separate living area, thus necessitating their relocation. Constructing Aboriginal bamboo homes was thus regarded as the best option, particularly in terms of cost, duration and ease of relocation or modification, and; (8) permanent houses were difficult to construct and expensive to build and maintain.

Similar to the wooden house in Jerai 1, the people of Bongor continued using the traditional aboriginal houses built adjacent to the brick houses. In fact, the vast majority of the aboriginal people from the six villages harboured a strong aversion towards wooden or brick houses due to the aforementioned reasons. This helps to maintain a comfortable and energy-efficient environment. They are a renewable resource and harvested by a small population in each village and can last for a year or so. The harvested trees were not harmed and they are biodegradable, suitable for a nomadic lifestyle and can reduce the impact on the environment.

CONCLUSIONS

The homes and facilities found in Aboriginal villages in Sugai Kejar were immensely different from those in rural settings. Aboriginal people constructed their own homes using natural resources while taking into consideration how to best protect themselves against external threats. This enables the creation of healthier living environments that could be tailored to meet the people's specific needs and preferences. Nevertheless, the disadvantages of Aboriginal homes outweigh the benefits, particularly in terms of disease susceptibility and safety risks.

Homes are supposed to be shelters to protect the Aboriginal people. For this reason, the government has put initiatives in place such as constructing wooden and brick houses; however, these houses and their designs were less suited to the nomadic lifestyle, belief system, requirements, preferences and comfort. Moreover, the Aboriginal population living in the Royal Belum State Park appeared to be low-income and impoverished. They obtained metal decks from abandoned locations in order to seal the gaps in their homes. The transportation costs involved in delivering the materials further increase the price of building wooden and brick houses. Therefore, it is recommended that JAKOA and the state government explore alternative methods to improve the healthy homes criteria of Aboriginal homes, while simultaneously preserving their cultural heritage. For instance, installing a rainwater harvesting system,

promoting the utilisation of mosquito nets, encouraging suspended floors, preserving bamboo naturally, introducing thin brick flooring as well as creating an electric gate or a comparable device may serve as means to prevent the elephant's access. Essentially, Aboriginal homes must be adjusted to accommodate their culture and Royal Belum State Park environment, thereby enhancing the people's overall health conditions and safety.

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REFERENCES

Adu-Gyamfi, S., Adjaottor, J., & Owusu, D. (2023). Cholera Discourse Among the Asante of Ghana since the Colonial Period: Continuities and Discontinuities in Ayigya Zongo. *Australasian Review of African Studies*, *44*, 64–83. https://doi.org/10.22160/22035184/ARAS-2023-44-1/64-83

Ahmed, A., Al-Mekhlafi, H. M., & Surin, J. (2011). Epidemiology of soil-transmitted helminthiases in Malaysia. *Southeast Asian Journal of Tropical Medicine and Public Health*, *42*(3), 527–538.

Ali, S. H., Foster, T., & Hall, N. L. (2018). The Relationship between Infectious Diseases and Housing Maintenance in Indigenous Australian Households. *International Journal of Environmental Research and Public Health*, *15*(12), 2827. https://doi.org/10.3390/ijerph15122827

Arshard, W. N. R. M., Arminda, W., & Kadir, T. A. Q. R. A. (2022). INDOOR AND OUTDOOR AIR AND LIGHTING QUALITY ASSESSMENT IN HIGH-RISE LOW-COST HOUSING IN PENANG. *PLANNING MALAYSIA*, *20*. https://doi.org/10.21837/pm.v20i21.1107

Australian Institute of Health and Welfare. (2022, July 7). *Determinants of health for Indigenous Australians*. Indigenous Health. https://www.aihw.gov.au/reports/australias-health/social-determinants-and-indigenous-health

Bernama. (2023, November 1). Royal Belum, Perak's crown jewel beckons. *The Malaysian Reserve*. https://themalaysianreserve.com/2023/11/01/royal-belum-peraks-crown-jewel-beckons/

Bonnefoy, X. (2007). Inadequate housing and health: An overview. *International Journal of Environment and Pollution*, *30*(3–4), 411–429.

Brumm, A. (2022). Before Azaria: A Historical Perspective on Dingo Attacks. *Animals*, *12*(12), Article 12. https://doi.org/10.3390/ani12121592

Caldas, A. D. R., Nobre, A. A., Brickley, E., Alexander, N., Werneck, G. L., Farias, Y. N., Ferrão, C. T. G. B., Tavares, F. G., de Nazaré Pantoja, L., & da Luz Duarte, M. C. (2023). How, what, and why: Housing, water & sanitation and wealth

patterns in a cross-sectional study of the Guarani Birth Cohort, the first Indigenous birth cohort in Brazil. *The Lancet Regional Health–Americas*, *21*.

Gilbert, M., Dawar, M., & Armour, R. (2006). Fire-related Deaths Among Aboriginal People in British Columbia, 1991–2001. *Canadian Journal of Public Health*, *97*(4), 300–304. https://doi.org/10.1007/BF03405608

Jaakkola, M. S., Quansah, R., Hugg, T. T., Heikkinen, S. A. M., & Jaakkola, J. J. K. (2013). Association of indoor dampness and molds with rhinitis risk: A systematic review and meta-analysis. *Journal of Allergy and Clinical Immunology*, *132*(5), 1099-1110.e18. https://doi.org/10.1016/j.jaci.2013.07.028

Kaur, G. (2009). Predictors of Malaria Among Malaysian Aborigines. *Asia Pacific Journal of Public Health*, *21*(2), 205–215. https://doi.org/10.1177/1010539509331594

Khalid, N. S., Abdullah, Y. A., Nasrudin, N., & Kholid, M. F. (2022). HOW DOES THE INDOOR ENVIRONMENT AFFECT MENTAL HEALTH WHEN WORKING REMOTELY? *PLANNING MALAYSIA*, *20*. https://doi.org/10.21837/pm.v20i23.1168

Lansbury, N., Hoy, W., & Shaw, B. (2023). *What is the link between housing, crowding, infections and high rates of kidney disease in a remote Aboriginal town?*

Latif, H. M., Essah, E. A., & Donyavi, S. (2022). Creating a link between healthy homes and architectural elements: A qualitative study of modern residential buildings. In *INTERNATIONAL JOURNAL OF BUILDING PATHOLOGY AND ADAPTATION*. https://doi.org/10.1108/IJBPA-09-2021-0115

Mashford-Pringle, A., Fu, R., & Stutz, S. (2023). Mamwi Gidaanjitoomin/Together We Build It: A Systematic Review of Traditional Indigenous Building Structures in North America and Their Potential Application in Contemporary Designs to Promote Environment and Well-Being. *International Journal of Environmental Research and Public Health*, *20*(6), 4761.

Memmott, P., Lansbury, N., Go-Sam, C., Nash, D., Redmond, A. M., Barnes, S., Simpson, P. P., & Frank, P. N. (2022). Aboriginal social housing in remote Australia: Crowded, unrepaired and raising the risk of infectious diseases. *Global Discourse*, *12*(2), 255–284.

Miller, W. D., Pollack, C. E., & Williams, D. R. (2011). Healthy homes and communities: Putting the pieces together. *American Journal of Preventive Medicine*, *40*(1 Suppl 1), S48-57. https://doi.org/10.1016/j.amepre.2010.09.024

Mohamad, N. Mohd. M. N. (2015). *Perak State Parks Corporation*. Perak State Parks Corporation.

Nasir, S. N., Ismail, W. O., & Aziz, S. (2021). Information on creating a healthy home environment in Malaysia. *AIP Conference Proceedings*, *2347*(1), 020100. https://doi.org/10.1063/5.0053683

Perreault, K., Dufresne, P., Potvin, L., & Riva, M. (2023). Housing as a determinant of Inuit mental health: Associations between improved housing measures and decline in psychological distress after rehousing in Nunavut and Nunavik. *Canadian Journal of Public Health*, *114*(2), 241–253.

Strauss, A., & Corbin, J. M. (1990). *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*. SAGE Publications.

Tiesler, C. M. T., Thiering, E., Tischer, C., Lehmann, I., Schaaf, B., von Berg, A., & Heinrich, J. (2015). Exposure to visible mould or dampness at home and sleep problems in children: Results from the LISAplus study. *Environmental Research*, *137*, 357–363. https://doi.org/10.1016/j.envres.2014.11.023

Tourism Malaysia. (2023). *Royal Belum State Park*. https://www.malaysia.travel/explore/royal-belum-state-park

Vanhoutteghem, L., Skarning, G. C. J., Hviid, C. A., & Svendsen, S. (2015). Impact of façade window design on energy, daylighting and thermal comfort in nearly zero-energy houses. *Energy and Buildings*, *102*, 149–156.

Walls, R., Davy, L., Bridge, C., & Milikan, L. (2012). *Home Modification for Aboriginal Housing*.

Wheeler, J., Huggett, E., & Alker, J. (2016). *HEALTH AND WELLBEING IN HOMES* (p. 71) [Healty Homes Full Report]. UK Green Builidng Council. www.ukgbc.org

Windi, Y. K., & Whittaker, A. (2012). Indigenous round houses versus 'healthy houses': Health, place and identity among the Dawan of West Timor, Indonesia. *Health & Place*, *18*(5), 1153–1161.

World Health Organization. (2018). *WHO Housing and health guidelines*. https://www.who.int/publications-detail-redirect/9789241550376

World Health Organization. (2019). *Healthy housing; Raising standards, reducing inequalities*. https://www.who.int/publications/m/item/healthy-housing

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