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Innovative Applications of the Mongolian Ger Dwelling and Health Adaptation in Relation to Natural Conditions: An Education and Literacy Studies Perspective

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ABSTRACT

In the era of globalization, nations worldwide have abundant opportunities to share their unique identities for the sustainable well-being of humanity and to preserve national traditions. This study focuses on the innovative application of Mongolian yurts as a resilient and healthy living environment for nomadic people, examining both physical and psychological aspects, particularly from educational and literacy perspectives. To achieve this objective, the study delves into the innovative application of Mongolian yurts as dwellings and their adaptive health benefits in relation to natural conditions, as well as educational and literacy perspectives. The specific objectives are: (1) to study the natural characteristics and fundamentals of Mongolian yurts, (2) to explore the physical and psychological attributes of yurts as healthy dwellings for nomads, adapting to continental climates, and (3) to examine the process of transmitting knowledge about constructing Mongolian yurts. Research data was collected through document reviews, observations, inquiries, and personal interviews with local families. The findings reveal that Mongolian yurts facilitate the informal transmission of knowledge about constructing dwellings suitable for the environment and promoting health. This is achieved through storytelling, verbal explanations, demonstrations, and hands-on experiences, reflecting the close-knit relationships within families and communities. These relationships extend to the environment, animals, plants, and weather conditions. The study emphasizes the use of indigenous technologies and locally sourced materials, enabling communities to effectively construct yurts tailored to their climatic needs. Moreover, the use of traditional medicine and the knowledge of natural resources are integral parts of the intergenerational transmission of knowledge.

Key words: Perspectives on Education and Literacy, Mongolian Dwellings, Educational Innovation, Healthcare, Healthy Lifestyle

INTRODUCTION

The wisdom of traditional house-building is a cultural heritage passed down through generations. The transmission process often occurs through hands-on learning, such as assisting elders in construction, observing building processes, and engaging in practical activities. Additionally, storytelling, legends, and historical narratives related to house-building play a significant role in knowledge transfer. The use of various media, including drawings, diagrams, and models, further enhances learners' understanding of the different stages involved. In contemporary times, digital technology has facilitated knowledge transmission through videos, social media, and applications, making it more accessible. However, community-based learning remains the core of knowledge transfer, as learners can immerse themselves in the community's atmosphere and culture simultaneously (The Architectural Association of Thailand, 2020).

Human basic needs consist of physical needs such as food, clothing, shelter, and health products, all of which play a significant role in promoting health and well-being. These needs are influenced by climate, agriculture, and the lifestyle of each region. Maintaining health is essential and is linked to the provision of these basic factors appropriately. For example, Mongolians have a traditional dwelling called a "Ger" which reflects adaptation to the environment and the maintenance of health in the ancient nomadic lifestyle. Such dwellings are not merely shelters but also protect the body from harsh weather conditions and support the well-being of people in that area. Due to the continental climate with large temperature differences between summer and winter, as well as the diversity of geographical zones such as forests,

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mountains, steppes, and deserts (Fernández-Galiano & Bravo, 2020). The Mongolian Ger has evolved into a unique cultural and architectural icon, perfectly adapted to the harsh living conditions and health requirements of the environment. Initially, after leaving caves, ancient tents (urts) were the first settlements. These have been historically refined, with the addition of arched wooden tops and constructed wooden walls to enhance stability and comfort, eventually leading to the residential structures we see today. The Mongolian Ger has developed into a dwelling capable of withstanding extreme weather conditions and providing warmth in winter, while also facilitating ventilation in summer. This distinctive structure not only fulfills basic needs but also aligns with maintaining people's health, with accumulated knowledge, skills, and experiences playing a crucial role in its design and the efficient use of natural resources (Bai et al., 2019). Therefore, Ger is a work of art. For this reason, Ger Mongolia was inscribed on the UNESCO Representative List of the Intangible Cultural Heritage of Humanity in 2013 under the nomination 'Traditional Craftsmanship of the Ger and Related Customs'. The purpose of this nomination was to safeguard this intangible cultural heritage beyond their exceptional craftsmanship, the Kazakh people of Mongolia have demonstrated remarkable adaptability in fostering healthy lifestyles within harsh climatic conditions. The preservation of communal health and well-being has been paramount in safeguarding their cultural heritage, a cherished tradition passed down through generations (National Center for Biotechnology Information, 2021).

This research delves into the innovative applications of the Mongolian tent (Ger) within the context of nomadic life, specifically its impact on health and adaptation to Mongolia's harsh climate. The core issue is the lack of knowledge regarding the relationship between housing structures and the health of nomads living in ever-changing environments. Additionally, there's a lack of research on the transmission of knowledge about building and utilizing Gers for health within nomadic communities. In-depth analysis of the physical and psychological aspects of living in a Ger is also lacking, particularly its impact on health, such as the risk of respiratory diseases and the effects on the mental well-being of those residing in this environment. Furthermore, there's a gap in research on policies related to preserving the culture and housing of nomads, a group that plays a vital role in Mongolia's ecosystem and economy. Therefore, this research aims to address these issues by exploring the unique features of the Ger, studying the knowledge transfer process, and analyzing the impact of this housing style on both physical and mental health. This will lead to a deeper understanding and promote sustainable approaches to preserving local wisdom.

Research Objectives

1. To explore the natural characteristics and basic structure of a Mongolian Ger (yurt)
2. To explore the physical and psychological aspects of a Ger as a dwelling that promotes the health of nomadic people by adapting to a continental climate.
3. To investigate the process of transmitting the wisdom of constructing a Mongolian Ger.

RELATED LITERATURE

There have been studies on the cultural context of Mongolia's "geer" by both domestic and foreign experts. Researchers Charlote Paddock and John Schofield conducted a study titled "Authenticity and Adaptation: Mongolian Geer as a Contested Contemporary Cultural Heritage," aimed at exploring the actual situation of the authenticity of geer and how it adapts to the continental climate within local and global contexts (Charlotte Paddock, 2017). Jianhao Zhang's research, "Cultural Heritage Revitalization: Integrating Prefabricated Components in the Design of Mongolian Ger Extensions," explores the integration of traditional craftsmanship with modern architectural principles and the application of prefabricated components in Ger extensions. This research significantly contributes to cultural heritage conservation, extending its impact beyond Mongolian Gers. These dwellings, situated within diverse social and cultural contexts, offer a comprehensive cross-section of their architectural heritage, spanning from ancestral times to the present (Zhang, 2024). In a research paper authored by Ayurzana (2017) titled 'A Preliminary Thermal Analysis of Mongolia Employing the Lattice Boltzmann Method' a model was developed to balance the airflow and heat distribution within a Ger using the Boltzmann equation. According to the study, the placement of the fireplace within the Ger is highly suitable for balancing heat dissipation through elements such as the roof vent and door, a distinctive feature of Mongolian Gers. The article "Unfolding Cultural Heritage in Mongolia: Images of Mongolian Ger" by Ganchimeg Altangerel presents specific details of Mongolian Gers and examines the varying perceptions of this traditional dwelling in Mongolia's recent history. (Altangerel, 2020) Researchers have suggested that it is desirable for Mongolian policies to consider multiple perspectives, taking into account ecological, social, cultural, and economic factors.

There has been extensive research into heating systems for Mongolian yurts (Gers) due to the need to adapt to Mongolia's harsh climate. A study titled "Comparative Analysis of Traditional Yurts Using Thermal Dynamic Simulation in Mongolian Climate" by Gantumur Tsovoodavaa and Istan Kistelegdi investigated energy and comfort performance in the search for the optimal dwelling for Mongolia's extreme climate, with a focus on various types of round yurts. Results showed that heating and cooling systems varied significantly among different yurts, depending on the structure and design of the dwelling (Tsovoodavaa & Kim, 2019). In a study that focused on utilizing vacuum tube technology and tubular heat storage as a heating system for Mongolian Gers, Sainbold and Bat-Erdene (2013) conducted experiments and measurements on traditional Mongolian Gers equipped with solar heating systems. Another study was conducted on heat loss in Mongolian homes, improving convenience, and keeping heating quality in Ger in Winter (Center for Environmental Building and Design, Innovation Center for Children Fund, & Ger Urguu NGO, 2021). As

seen in previous studies, some researchers have focused on the unique characteristics of Mongolian yurts (Gers) in terms of design, traditions, and the need to explore their identity in a diverse world. Similarly, many experts have proposed modern technological advancements to manage the heating system in Mongolian yurts, as a solution to the challenges posed by the climate (Figure 1).

METHODOLOGY

A comprehensive review of 2023 annual statistics was conducted to compile data pertaining to the current health status of nomadic populations, with a particular focus on prevalent diseases in Mongolia, such as cardiovascular diseases (CVDs), respiratory diseases (RDs), and digestive system diseases (DSDs).

A purposive sample of 12 participants were recruited from a nomadic tribe population aged between 30 and 50. Inclusion criteria required participants to be free from risky behaviors like smoking and alcohol consumption, and to be willing to provide honest answers without feeling offended.

Observation, in-depth interviews, and descriptive data collection were conducted with the target sample group in Seal Subdistrict, Tuuf Province (Central Province) to gather data related to Mongolian yurts (Gers), including their structure, components, unique characteristics, natural features, and health implications of living in them.

In-depth data analysis in the data analysis process focused on using classification methods to identify and determine factors that affect human health. The emphasis was on linking environmental, economic, and social factors related to the lifestyles of populations who live in temporary or nomadic settings, such as tents. The key steps were as follows:

1. Classification Analysis for Quantitative Data to Group Factors: For instance, we can classify factors such as climate, population density, length of residence, and infrastructure (e.g., access to healthcare and drinking water quality). Statistical tools and technologies, including machine learning algorithms like Decision Trees and Random Forest, can be employed to identify patterns and trends that may impact population health.
2. Qualitative research methods will be employed to collect in-depth data through semi-structured interviews and observational studies. The aim is to understand the specific context of the target group, including cultural adaptation, health beliefs, and daily resource utilization. Responses from interviewees will be categorized to interpret the relationship between qualitative factors and health outcomes.
3. Descriptive analysis will be used to describe the analysis results, linking the relationship between living environment and health. For example, the risk of exposure to extreme cold in winter or lack of adequate nutrition. This analysis will also describe the lifestyles of the nomadic population that contribute to disease, as well as analyzing resilience or adaptation in resource-constrained situations.
4. The health context of nomadic populations living in tents will be explored. This context encompasses physical factors such as air quality, population density in confined spaces, as well as psychosocial factors such as stress, insecurity, and lack of support from the health system. The study will also focus on the long-term effects of living in an unstable environment, such as the prevalence of respiratory diseases or hygiene-related diseases.

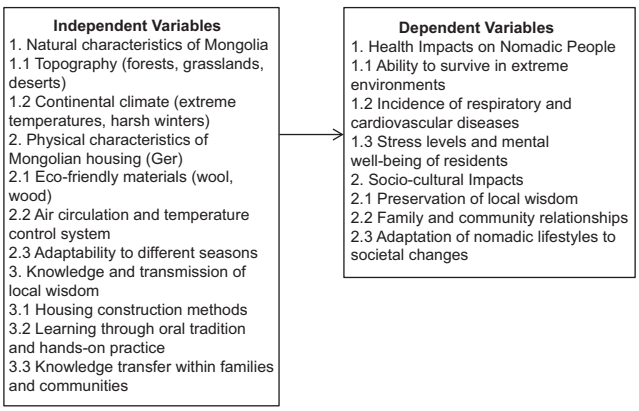


Figure 1. Conceptual Framework of the Research

FINDINGS

Natural Characteristics and Fundamentals of Mongolian Yurts

Mongolia, situated between China and Russia in East Asia, possesses a distinctive geographic and climatic landscape. Spanning 1,553,560 square kilometers (599,833 square miles), the country is divided into four primary regions: mountains, forest-steppes, steppes, and deserts. Mongolia experiences an extreme continental climate characterized by significant temperature fluctuations, rapid seasonal changes, and low precipitation. Summers, from June to mid-August, are short and arid, while winters, from mid-October to mid-March, are cold and prolonged. Spring and autumn exhibit significant variability from year to year. Temperatures can fluctuate dramatically throughout the year; in winter, the absolute minimum temperature ranges from -28°C to -54°C (-18.4°F to -65.2°F), whereas in summer, it can reach a maximum of 30°C to 45°C (86°F to 113°F) (Climate Change and Resources Research Division, 2017).

As of the end of 2023, Mongolia's total population stood at 3,504,700, with a female population of 51% and a male population of 49%. The population density is a mere 2 people per square kilometer (6 people per square mile) (eagle-news, 2024). Approximately half of the population resides in Ulaanbaatar, the capital city, while 52% lives in rural areas, as shown in Table 1. According to the 2023 census, there are 189,300 households engaged in livestock herding in rural areas, as further detailed in Table 1.

Table 1. Population statistics

Population	2022	2023	Percentage
Country total	**3 457.5**	**3 504.7**	**100%**
Ulaanbaatar (Capital city)	1 691.8	1 734.8	48%
Rural	1 765.7	1 769.9	52%

The extreme weather conditions in Mongolia have created significant challenges for survival during the harsh winter months. Residents are particularly susceptible to certain illnesses associated with severe weather. Statistics regarding health issues among Mongolians are presented in Table 2.

Table 2 shows the number of male and female deaths in rural and urban areas from non-communicable diseases (NCDs) including cardiovascular diseases (CVDs), cancers (RDs), and diabetes (DSDs) in 2023.

Overall Mortality: Rural areas exhibit the highest mortality rates due to cardiovascular diseases (CVDs), while cancer (RDs) and diabetes (DSDs) have lower rates.Gender and Age: Males and those aged 40 and above have higher mortality rates compared to females and those aged 30 and above, respectively.Causes of Death: CVDs account for the highest number of deaths at 744, while cancer (RDs) has the lowest at 125. Percentage of Overall Mortality: Rural areas are estimated to have a lower mortality rate than urban areas (Ulaanbaatar) by approximately 45.4% and 54.6%, respectively.

Mongolian Nomadic Lifestyle Mongolians traditionally engage in a nomadic lifestyle, herding livestock. Nomadic tribes dedicate their lives to raising livestock, particularly sheep, goats, horses, cattle, and camels. Due to this lifestyle, nomadic Mongolians frequently relocate throughout the year in search of suitable pastures for their animals. As a result, the temporary dwelling known as a Ger is a fundamental necessity for Mongolians and a hallmark of their nomadic culture. Gers are circular in shape and are always oriented towards the south to provide protection from the Siberian winds coming from the north. The components of a Ger are lightweight, making them easy to transport and assemble or disassemble within 30 minutes to an hour. All parts of the Ger are made from natural materials such as wood, including a type of willow (Salix), pine, aspen, and birch, for the walls, roof rings, poles, door, and supports (Figure 2).

Insulation in mongolian yurts: A masterpiece of nature and design

Mongolian yurts are renowned for their ingenious design that perfectly adapts to the extreme climate conditions of the Mongolian steppe. The insulation materials used, primarily sheep's wool and other animal fibers, possess extraordinary properties that enable them to respond effectively to both scorching summers and frigid winters.

Unique properties of yurt insulation

Temperature-Regulating Fibers: Sheep's wool and other animal fibers contain microscopic fibers that exhibit "intelligent" behavior, adjusting to temperature fluctuations. In hot weather, the fibers expand, creating air pockets that facilitate airflow and cool the yurt's interior. Conversely, in cold weather, the fibers contract to seal gaps, minimizing heat loss and keeping the yurt cozy. Eco-Friendly and Sustainable: Derived from animals such as sheep, horses, and goats, these insulation materials are environmentally friendly, requiring no chemical processing and offering a long lifespan. Enhanced Heat Retention: The thickness of the felt or cover made from sheep's wool can be adjusted according to the season, providing additional insulation during colder months. Wind Protection: Sheep's wool and other animal fibers serve as excellent wind barriers, mitigating the impact of strong Siberian winds, especially during winter. Moisture Control: Wool fibers have a remarkable ability to absorb moisture without feeling damp. This prevents condensation and creates a comfortable living environment. Conversely, the fibers can quickly release moisture in dry conditions, maintaining optimal humidity levels. Health Benefits: The insulation's ability to regulate temperature and humidity reduces the risk of respiratory ailments like colds and pneumonia. Moreover, the cozy and well-ventilated environment promotes relaxation and positive mental health. Durability and Longevity: Natural materials like sheep's wool are exceptionally durable and can be reused for many seasons without losing their effectiveness. Their use also reduces reliance on synthetic materials with shorter lifespans.

In essence, the insulation used in Mongolian yurts is a testament to human ingenuity and nature's wisdom. By harnessing the unique properties of animal fibers, nomadic herders have created a sustainable and comfortable living

Table 2. Deaths statistics (*persons by age and sex*)

	Sex	Cardiovascular diseases (CVDs)				Respiratory diseases (RD)				Digestive system diseases (DSD)			
		30-34	35-39	40-44	45-49	30-34	35-39	40-44	45-49	30-34	35-39	40-44	45-49
Rural	Male	25	43	92	134	4	6	9	16	5	24	36	41
	Female	6	16	25	45	1	5	1	6	4	6	6	8
	Total	**31**	**59**	**117**	**179**	**5**	**11**	**10**	**22**	**9**	**30**	**42**	**49**
Urban (UB)	Male	22	50	74	112	6	10	21	21	15	43	59	49
	Female	9	19	34	38	5	6	4	4	4	21	15	36
	Total	**31**	**69**	**108**	**150**	**11**	**16**	**25**	**25**	**19**	**64**	**74**	**85**
State total	Male	47	93	166	246	10	16	30	37	20	67	95	90
	Female	15	35	59	83	6	11	5	10	8	27	21	44
	Total	**62**	**128**	**225**	**329**	**16**	**27**	**35**	**47**	**28**	**94**	**116**	**134**
		744				**125**				**372**			

(Center for Health Development, 2023)

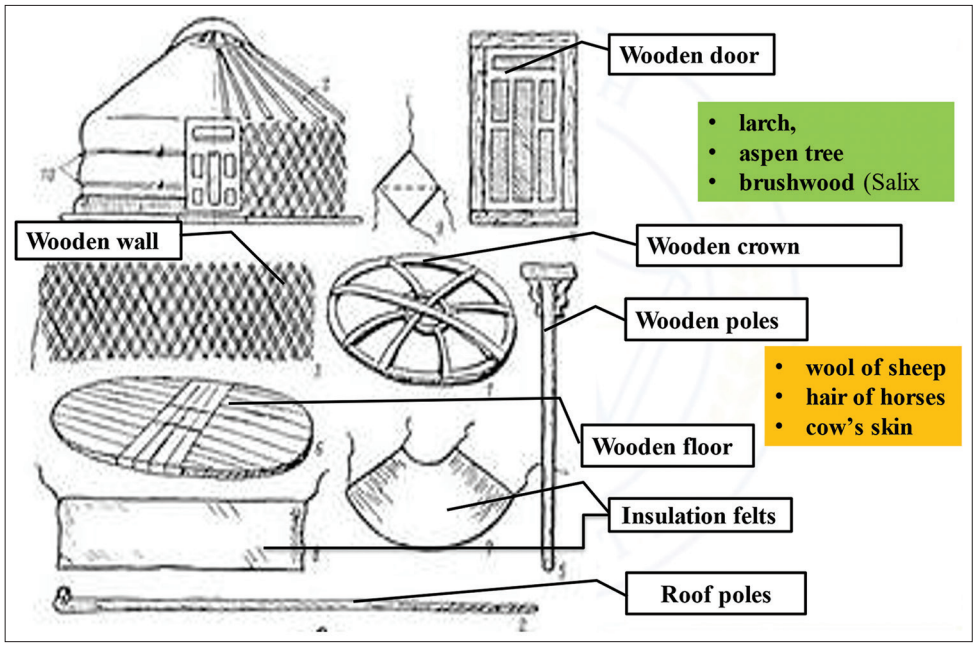


Figure 2. Components of Mongol Ger (Dewdney, 2021)

space that has withstood the test of time in one of the world's harshest climates.

Physical and Psychological Characteristics of the Ger as a Health-Promoting Shelter for Nomadic People, with Adaptation to a Continental Climate

The primary objective of this research is to explore the physical and psychological characteristics of nomadic people living in Mongolian yurts (Gers) in relation to their health. To ensure the research's coherence and rationality, the following relevant statistics are presented. Basic data on the research sample was obtained from the 2023 population statistics. The research sampling was limited to individuals aged between 30 and 50 years, as this age group constitutes the largest proportion compared to other age groups. Consequently, individuals aged 30 to 50 years were randomly selected for the survey, given that this group is the most numerous in the overall population, as shown in Table 3.

Table 3 shows the basic information we got from a survey of 12 nomadic people. There were 7 guys and 5 girls, all between 31 and 50 years old (Table 4).

Of the 12 total respondents, 4 had been hospitalized at various times with different diagnoses. Two individuals, aged 38 and 39, reported no hospitalization history despite previous medical encounters, indicating a potential disregard for specific disease histories. Another 2 individuals lacked any health records due to a lack of hospitalization. Based on this data, it can be inferred that younger individuals, particularly males, have fewer hospitalization experiences.

As seen in the table, the most common diagnoses among participants were internal diseases such as liver disease, kidney disease, cirrhosis, and diabetes. Three males under 39 years old had never undergone annual health checkups. Respondents who had never been hospitalized provided additional insights into their self-care practices. They

Table 3. Target population

Population of Mongolia */by age group and sex/*				
Age group	**2022**		**2023**	
	Total	**Female**	**Total**	**Female**
	Thousand persons			
Total	**3 457.5**	**1 761.4**	**3 504.7**	**1 786.5**
20-24	231.5	113.9	227.1	111.7
25-29	241.7	120.2	241.5	120.0
30-34	306.1	153.2	290.0	145.1
35-39	280.0	141.6	291.4	147.2
40-44	236.8	121.3	239.6	122.7
45-49	211.5	110.6	215.7	112.8
50-54	179.2	96.1	184.2	98.4
55-59	152.1	83.6	155.2	85.4
60-64	118.8	67.9	125.4	71.6

(Mongolian Statistical Information Service, 2023)

reported never experiencing severe illnesses and relied on traditional remedies for minor ailments, avoiding medical consultations.

From this data, it can be inferred that the nomadic population may not prioritize all health issues, as they have alternative solutions such as improving tent ventilation. This suggests that rural communities still adhere to traditional practices for survival in tent-like dwellings, known as (Gers) In-depth interviews were conducted with 12 nomadic individuals to explore the reasons for their healthier lifestyles and lower hospitalization rates while living in Mongolian yurts (Gers). To ensure the research's reliability and validity, the interview results were categorized into three main themes: (1) materials used in Ger construction, (2) the authenticity of Gers in continental climates, and (3) daily labor and traditional healing practices.

Table 4. Demographic information of participants

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Age	46	32	31	38	50	49	44	41	50	39	40	50
Sex	m	f	m	m	m	f	f	m	f	m	m	f
Living in Ger	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Smoking habit	no	no	no	no	yes	no	no	no	no	yes	no	no
Drinking habit	no	no	no	mod*	mod	no	no	no	no	no	mod	no
Notebook of the medical history**	have	have	no	lost	have	have	have	no	have	lost	have	have
Preventive Check-ups	yes	yes	no	no	yes	yes	yes	yes	yes	no	yes	yes
Hospitalization	no	no	no	once	no	no	28***	no	no	9	no	3
Diagnosis	-	-	-	liver problem	-	-	cirrhosis	-	-	diabetes	-	kidney issues

* moderate use of alchohol, ** medical history is a comprehensive record that lists all illnesses and treatments a patient has had, *** 28 times
Table 5. Interview result

Based on the research findings in Table 5, it was discovered that wood possesses superior heat retention capabilities compared to other materials, contributing to a warm and comfortable interior within a Ger. This makes it an ideal and healthy dwelling. The materials used in Ger construction, such as wood and animal products, are natural and environmentally friendly, free from harmful substances, and promote a healthy lifestyle. There is a belief among Mongolians that they possess a high level of vitality due to their ability to directly absorb energy from both the sky and the earth within their Gers. This suggests that the relaxing atmosphere within the Ger contributes to the well-being and mental health of nomadic tribes. Additionally, residing in a Ger does not disrupt ecological balance, as the land can recover quickly after a family moves on.

In terms of the traditional value of the Ger, it is deeply connected to nature in terms of its shape, placement, and ventilation. This natural alignment has led to nomadic Mongolians having a lower incidence of respiratory diseases compared to urban dwellers. Further explanations include:

Warmth and Comfort The wood and animal fibers, such as sheep wool, used in Gers possess an "intelligent" ability to adapt to varying climates. During summer, the fibers expand to promote ventilation, while in winter, they contract to retain heat. This ensures a thermally comfortable environment, reducing the risk of temperature-related illnesses.

Health and Quality of Life The use of natural materials like animal fibers and dried animal dung reduces the use of chemicals and creates a safe environment, promoting both physical and mental well-being. The well-ventilated interior of the Ger enhances oxygen circulation and reduces carbon dioxide buildup. This contributes to the lower incidence of respiratory diseases among Mongolians living in Gers compared to those in poorly ventilated urban environments.

Beliefs about Sleeping in a Ger The practice of sleeping with one's head facing north and feet towards the door is linked to the belief in the Earth's magnetic center. The interviewees believe this practice helps balance the body and prevents cardiovascular diseases, reflecting a blend of psychological beliefs and the nomadic lifestyle.

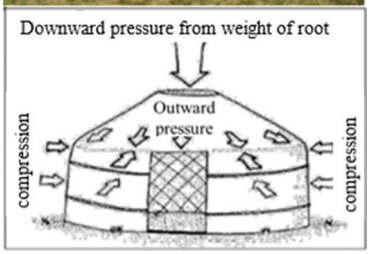
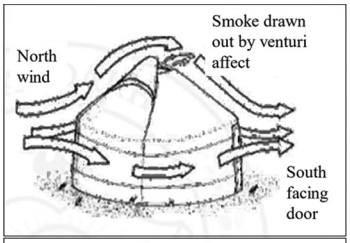
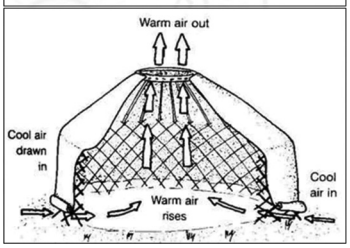
Environmental Impact The use of Ger dwellings does not have a long-term negative impact on the environment as the land used for a Ger site can quickly recover after the nomadic family moves on, demonstrating a sustainable way of life.

One interviewee stated, "…We believe that those who reside in a Ger should sleep with their feet towards the door and their head facing north, which is related to the Earth's magnetic center. Therefore, those living in a Ger have an advantage in preventing cardiovascular diseases…"

The Transmission Process of Traditional Mongolian Ger Construction Knowledge

The transmission of traditional Mongolian Ger construction knowledge is a learning process passed down from generation to generation through a combination of hands-on experience and storytelling. This process involves the following: *The Role of Elders* In the transmission of Ger construction knowledge, community elders play a crucial role as "teachers" who pass on their wisdom. They employ detailed explanations and demonstrations to facilitate experiential learning, allowing for a deep understanding and mastery of the craft. *Storytelling* Teachers narrate the history and significance of the Ger, such as the importance of natural materials, techniques for selecting strong and lightweight wood, and the preparation of wool insulation. They also explain design principles that harmonize with the environment, like facing the Ger south to protect against the Siberian winter winds. *Demonstration* In addition to verbal explanations, teachers demonstrate each step of the Ger construction process, including assembling the wooden frame, arranging the wool insulation, tying ropes, and installing the roof structure. This visual representation enables learners to grasp the concepts clearly and acquire essential skills through hands-on practice. *Learning through Observation and Participation* Learners begin by observing the construction process in detail and participating in tasks such as preparing materials or helping to tie ropes. As their understanding grows, they are assigned specific tasks to complete independently,

Table 5. Interview result

Materials of the *Ger* components	 	The frame components of the *Ger* have huge significances to keep *Ger* warm for long*er* time. This warm and pleasant atmosphere in the *Ger* has a great impact for nomadic people to be healthy. The insulation felts and ropes are all made of the raw materials of the livestock like wool of sheep, hair of horses and cow's skin. They are very beneficial for human health as they are non-chemical and environmentally-friendly products.
Authenticity in the continental climate	 	Shape: *Ger* is round-shaped without corners. So there is no accumulation of used air with bad energy. The Siberian wind from the north goes through the *ger* because of its round shape. Inside, the heat is located in the very center of the *ger* that allows warmt to spread evenly. Heat loss is much less in *ger* than in rectangular houses. Direction of constructing *Ger* - very important for adapting in climate condition and health care for Mongolians. The door of the Mongolian *ger* always looks to the south. It is protective location from Siberian wind and the wind does not come directy to the *ger*. The air circulation allows to keep fresh air constantly in the *ger*. Oxygen-rich fresh air is always heavier than used air with carbon dioxide mixture. Therefore, the fresh air that is coming through the door completely pushes out the bad air through the crown at the very top of the ceiling. That's why lung related disease is rare among nomadic people.
Daily labour and home remedy	 	Nomads use traditional homemade remedies to prevent from health problems. As some of interviewees expressed that collecting dried dung is good exercise to develop muscles. It is very helpful for kids to grow strong, patient and hardy person. Smelling smoke from dung is traditional remedy for neutralization of various poisonous substances. It boosts internal and external energy of human. Dung smoke is used to remove insect-pest that transfer infectious diseases.

fostering their skills and confidence in Ger construction. *Intergenerational Relationships* This method of teaching not only imparts skills but also strengthens the bond between elders and younger generations within the community. It is part of a shared learning culture that has been passed down through generations.

This learning process allows individuals to gain a genuine understanding of Ger construction and appreciate the value and significance of local wisdom. As a result, they can apply this knowledge and adapt it to suit their specific needs and environmental conditions in the future. Family Heritage and the Art of Ger Construction Knowledge of Ger construction is traditionally passed down within families. Parents teach their children about selecting natural materials such as wood, sheep's wool, and other animal fur, which are essential for building the framework and insulation of a Ger. Cultural Significance Erecting a Ger is more than just building a dwelling; it's a reflection of cultural beliefs and practices. For instance, Gers are traditionally oriented to face south to protect against Siberian winds, and occupants are

said to sleep with their heads pointing towards the Earth's magnetic north. Adapting to the Climate Knowledge about adjusting the Ger to suit the seasons is taught through hands-on experience and experimentation by community experts. For example, increasing the insulation with animal fur during winter or reducing it in summer. These practices not only preserve the cultural identity of the Mongolian people but also demonstrate their wisdom in adapting to nature and creating sustainable dwellings that suit their nomadic lifestyle. Figure 3 synthesizes the findings of the study.

DISCUSSION

Natural Characteristics and Fundamentals of Mongolian Yurts as Dwellings

Designed for a continental climate, yurts are circular in shape to minimize the accumulation of stale air and enhance ventilation, especially during cold Siberian winters. The southward orientation of yurts reduces the impact of cold winds. The yurt's structure is adaptable to seasonal changes, with features like wool insulation that can adjust airflow and heat retention in winter or release heat in summer. Materials used in yurts, such as sheep's wool, horsehair, leather, and wood, are natural and chemical-free. These materials can be reused and have minimal environmental impact, while the land used for yurts can recover quickly after relocation. Good ventilation in yurts reduces the risk of respiratory diseases like pneumonia. The constant circulation of fresh air creates a healthy living environment.

Mongolian yurts are designed to adapt to the highly variable continental climate. Their circular shape minimizes the accumulation of stale air and enhances ventilation. This design helps prevent respiratory diseases among nomadic people. The use of natural materials such as animal fur and wool blankets, which can adapt to temperature changes, keeps yurts cool in summer and warm in winter, aligning with the research of Sainbold et al., 2013; Altangerel, 2020. Additionally, orienting yurts towards the south helps protect against the Siberian winter winds, a design strategy that effectively responds to nature and is consistent with the research of Gantumur & Kistelegdi, 2019. This design reflects the harmonious relationship between humans and nature, aligning with traditional nomadic culture.

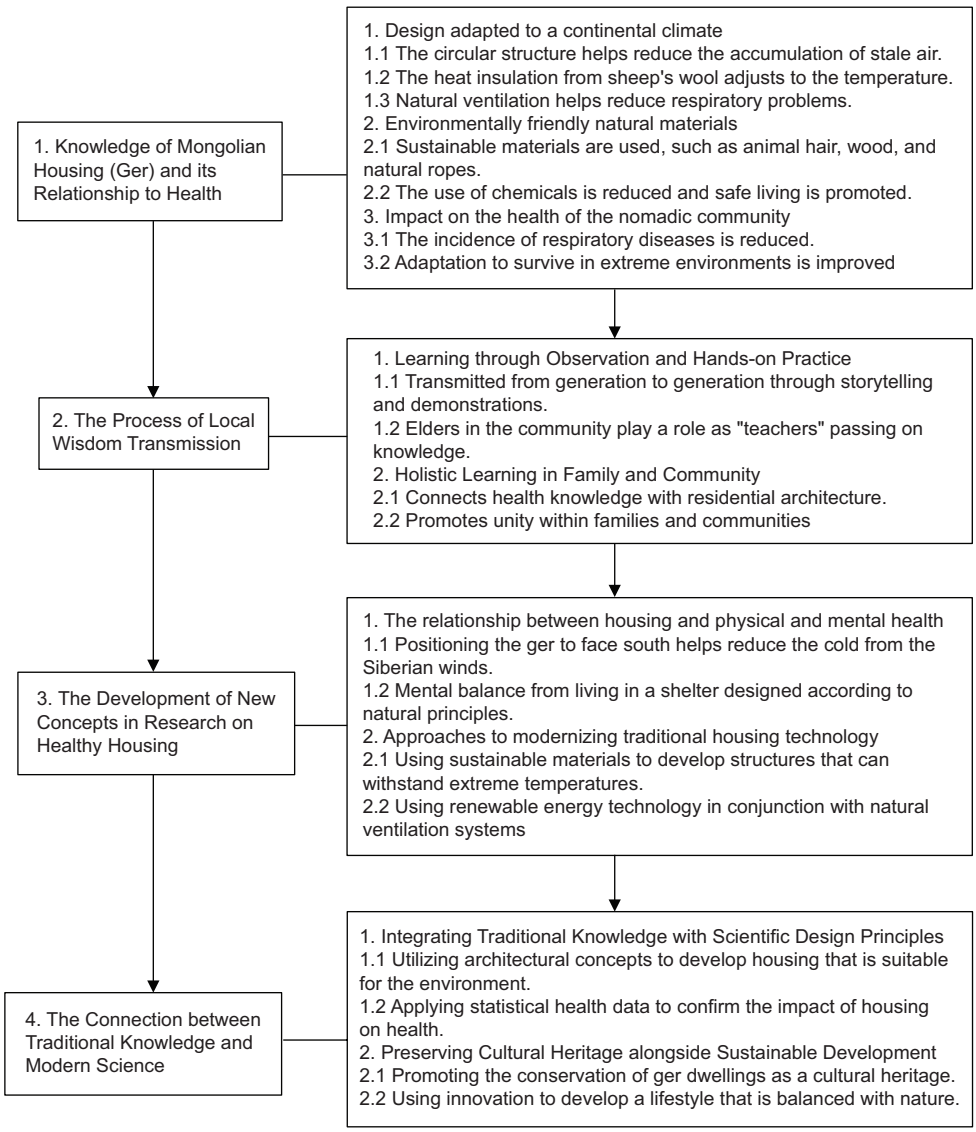


Figure 3. Synthesis of the finding

Physical and Psychological Aspects of Yurts as Healthy Dwellings for Nomads

The circular shape of yurts symbolizes balance and tranquility, positively impacting the mental health of occupants. Nomads believe that sleeping with their heads towards the north (the Earth's magnetic center) helps balance the body and reduce the risk of cardiovascular diseases. Promoting physical health Daily chores like collecting animal dung or assembling and relocating yurts develop muscle strength and physical fitness. Smoking dried animal dung helps eliminate disease-carrying insects and is believed to boost internal energy. The ventilation in yurts, created by wind passing through the door and exiting through the roof, ensures a constant supply of fresh air. This reduces the accumulation of harmful carbon dioxide. Living in yurts fosters a connection between humans and nature through the use of all-natural materials. Yurts also reflect the culture and traditions of nomadic people who live in harmony with nature. Mongolians prefer a healthy lifestyle, and nomadic families living in yurts have a unique dwelling that adapts to the natural climate. The death rate of people living in Mongolian yurts is lower than that in urban areas. Mongolian households have fewer respiratory diseases due to the well-ventilated living spaces. Mongolian yurts are always filled with oxygen for robust breathing and have the Earth's magnetic center within, leading to lower rates of cardiovascular disease. Mongolian yurts are dwellings that combine unique cultural identity with a design suitable for nature and human health. Good ventilation and safe natural materials create a suitable environment for living in extreme climates while reflecting the traditional wisdom of maintaining a sustainable balance between humans and the environment.

Mongolian yurts positively impact the physical and mental health of nomads. Good ventilation reduces the risk of respiratory diseases, particularly through the management of airflow where fresh air enters through the door and pushes stale air out through the roof, consistent with Ayurzana's research in 2017. Natural materials used in yurts, such as animal fur and dried dung, not only help regulate temperature but also have traditional medicinal properties. For example, fumigation with dung helps eliminate disease-carrying insects and boosts energy, as supported by the research of Charlotte Paddock & Schofield, 2017. Psychologically, the circular shape of yurts reflects balance and tranquility, promoting mental health. Sleeping with one's head oriented towards the Earth's magnetic center helps prevent cardiovascular diseases, aligning with Altangerel's research in 2020. Moreover, the nomadic lifestyle involving daily labor, such as collecting dung, not only affects physical health but also fosters endurance and mental fortitude in nomads.

The Transmission Process of Traditional Mongolian Ger Construction Knowledge

The study of the transmission process of traditional Mongolian Ger construction knowledge relies on the intergenerational transfer of wisdom. This is primarily achieved through experiential learning, storytelling, demonstrations, and hands-on practice. Community elders serve as "teachers," imparting knowledge about natural materials, design principles, and construction methods suitable for the local climate. Learners begin by observing, assisting, and gradually practicing on their own. *Strengthening Intergenerational Bonds* The methods of storytelling and demonstration foster strong relationships between the transmitters and learners, leading to a sense of belonging within the family and community while preserving cultural and local wisdom. *Family-Based Learning* Knowledge about selecting materials such as wood and animal fur for Ger construction is passed down from parents to children through daily activities like choosing and preparing natural materials. *Adaptation and Ecological Wisdom* Mongolians have learned to adapt the Ger to suit different seasons by adding or removing insulation, such as fur layers, as needed. This process is facilitated through experimentation and guidance from community experts, ensuring sustainability and adaptability to environmental changes. *Authentic Assessment* The effectiveness of this learning is assessed through real-world application. Learners develop skills and confidence by actively participating in various construction steps, such as tying ropes or assembling wooden frames. This empowers them to build Gers independently. *Promoting Cultural Sustainability* Learning about Gers is not limited to technical skills; it also emphasizes the preservation of cultural traditions and beliefs. For instance, Gers are traditionally oriented towards the south to protect against Siberian winds, and occupants sleep with their heads facing the Earth's magnetic pole.

The study of traditional knowledge transmission aligns with Altangerel's (2020) research, indicating that the inheritance of this knowledge occurs through imitation and transmission within families and communities. This aligns with the findings of this research, which reveal that the construction of Ger dwellings is based on observation and practical experience. This type of knowledge transmission strengthens community relationships and ensures the sustainable conservation of Mongolia's traditional culture.

Health-focused design and innovation are consistent with Bai et al.'s (2019) study, which demonstrates the innovative adaptation of dwellings to extreme climates. The focus is on natural materials such as wool and leather, which help regulate the internal temperature of the Ger. This research also supports the finding that these materials are not only environmentally friendly but also promote the health of occupants, reducing respiratory diseases and creating a relaxing atmosphere.

Climate management and air circulation align with Fernández-Galiano & Bravo's (2020) research, emphasizing the importance of designing dwellings that are compatible with the climate, particularly managing indoor air to promote health. This research is consistent with the finding that the design of Gers with good ventilation through doors and roof vents reduces the risk of carbon dioxide accumulation and promotes the circulation of fresh oxygen within the Ger.

CONCLUSION

Mongolian Gers serve a greater purpose than simply providing shelter; they embody a cultural adaptation deeply intertwined with the health of their inhabitants. These traditional

dwellings reflect the wisdom of nomadic communities, showcasing how local knowledge and practices are critical in sustaining health and well-being. The transfer of such traditional wisdom from one generation to another ensures the continuity of effective health practices within these communities. Furthermore, insights gathered from studying Mongolian Gers offer valuable knowledge, which can be utilized in developing future housing designs aimed at enhancing health and promoting overall well-being. Thus, understanding and preserving this traditional knowledge can significantly influence contemporary approaches to healthy living environments. The following recommendations can be proposed based on the findings of this study:

1. In-depth Study on the Long-Term Health Impacts of Traditional Knowledge Transfer Related to Huts: A thorough research should be conducted on the long-term health impacts, both physical and mental, of living in huts. This could involve comparing the incidence of chronic diseases between hut dwellers and those residing in modern urban homes to clearly substantiate the health benefits and lifestyle advantages of living in huts. Additionally, the process of knowledge transfer regarding hut dwelling and healthcare should be studied.
2. Development of Sustainable and High-Performance Materials for Huts: Research should be carried out on alternative materials with properties similar to natural materials used in huts, such as natural fiber insulation. These materials should be combined with modern technologies while maintaining the focus on transferring knowledge about material properties and production processes. This would enhance the efficiency, durability, and sustainability of huts without compromising their cultural value.
3. Surveying Nomadic Peoples' Opinions on Lifestyle Changes and Knowledge Transfer Related to Hut Dwellings: An in-depth study should be conducted to understand how nomadic peoples perceive changes in their lifestyles and their acceptance of new technologies or approaches related to hut improvements. Additionally, the study should examine the role of knowledge transfer in developing solutions that align with their needs and lifestyles.
4. Comparing the Environmental Impacts of Huts and Permanent Houses: A comparative study should be conducted to assess the environmental impacts of using huts versus permanent houses. This could include measuring greenhouse gas emissions or the ability of hut sites to regenerate.
5. Experimental Research on Improving Ventilation Systems: Research should be conducted to develop ventilation systems for huts using technologies that enhance efficiency, such as installing air circulation systems powered by renewable energy sources. This would create a better living environment for occupants.

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