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**AGA KHAN UNIVERSITY**

School of Nursing and Midwifery

**Exploring Midwives' Challenges and Strategies to Provide Care in Maternity Settings during the Harsh Winter Weather in the Northern Areas of Pakistan: A Qualitative Study.**

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Student of Master of Science in Nursing (MScN)

A thesis submitted in partial fulfillment of the requirements for the degree of

**[Master of Science in Nursing]**

Karachi / Pakistan

15<sup>th</sup> November 2023

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**Aga Khan University**

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Submitted In partial fulfillment of the requirements for the degree of

[Master of Science in Nursing]

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15<sup>th</sup> November 2023

## **Dedication**

I dedicate this thesis to my beloved parents, Shahnaz Sultan and Sultan Ali, and my dearest siblings, Sohail Sultan, and Sumaira Sultan, who are the pillars of my life and whose constant support, motivation, and prayers encouraged me to accomplish my academic goals.

Lastly, I would like to dedicate this to my loving husband, Moiz Munir, whose endless and unconditional support has been the bedrock of my achievements. His love and understanding have been my source of strength.

## **Abstract**

### **Background**

Midwives play a vital role in enhancing the quality of care and achieving substantial reductions in maternal and newborn mortality rates. However, in Gilgit Baltistan, the harsh winter weather and frequent heavy snowfall present distinct challenges for midwives providing essential maternal care. These challenges can lead to an increased risk of maternal infections and newborn hypothermia. Consequently, the limited accessibility to healthcare facilities due to frequent harsh winter weather and the resulting scarcity of resources like heating, electricity, and water exacerbate the situation.

### **Objective**

The study aims to explore the challenges and barriers midwives face in maternity settings and the strategies they use to overcome those challenges during winter weather in the Northern Areas of Pakistan.

### **Methodology**

The qualitative exploratory design was used in this study. A total of 9 midwives were purposely selected. Data were collected using individual semi-structured interviews and analyzed through qualitative content analysis.

### **Results**

Five main themes emerged from the data analysis. These themes included; 1) Harsh Winters: Hindrances & Adversities. 2) Indigenous Strategies for Warmth and Wellness. 3) Coldness Jeopardizing Midwives' Well' Being. 4) Midwives' Resilience and Struggles: Harsh Winters. 5) Future Directions for Advancement.

## **Conclusion**

Midwives experience numerous challenges in delivering maternal care, especially in remote areas with harsh winter conditions. Effectively addressing these challenges demands a comprehensive approach. This approach should include providing adequate resources and infrastructure improvements, including the prevention and management of hypothermia, the implementation of telemedicine services, the availability of dedicated emergency transport services, the establishment of maternity health centers in each remote area, and specialized training for midwives to enhance their capacity to handle winter emergencies, including cases of hypothermia.

## **Keywords**

Midwives' challenges, Harsh Winter Weather, Maternal health, Newborn Hypothermia

## **List of Abbreviations**

ANC	Antenatal Care
BMONC	Basic Maternal and Obstetric Newborn Care
EMONC	Emergency Obstetric and Newborn Care
ERC	Ethical Review Committee
KMC	Kangaroo Mother Care
NICU	Neonatal intensive Care Unit
PNC	Postnatal Care
UNICEF	United Nations International Children's Emergency Fund
WASH	Water, Sanitation, and Hygiene
WHO	World Health Organization

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Thank you all

## Declaration

*I declare that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university and to the best of my knowledge it does not contain any material previously published or written by another person, except where due reference has been made in the text.*

*The editorial assistance provided to me has in no way added to the substance of my thesis which is the product of my own research endeavors”.*

A handwritten signature in black ink, consisting of a stylized 'N' followed by a flourish and a dot.

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(Signature of Candidate)

15<sup>th</sup> November 2023

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## **Chapter One: Introduction**

The study describes the challenges faced by midwives and the strategies they use to overcome those challenges, in maternity settings in the harsh winter weather conditions. The chapter gives a geographical overview, background of the study, problem statement, study purpose, study question, and significance of the study. The study ends with a summary.

### **Geographical Overview**

The Northern Areas of Pakistan are known for their spectacular natural beauty, including the towering Karakoram, Hindukush, and Himalayan mountain ranges. It is also frequently referred to as the "Third Pole" due to the abundance of its glaciers (Sökefeld, 2014). In these areas, geography and various factors, such as rough roads, harsh weather, and the dispersion of a large population, make healthcare delivery extremely difficult (Majeed et al., 2020). Moreover, heavy snowfall in some places blocks the entire area for over half of the year, making access to health facilities and providing essential services profoundly difficult and expensive (Zeenat & Jan, 2015). Therefore, in the Northern Areas of Pakistan, where temperatures fall below freezing point during the winter months, midwives, as primary caregivers during childbirth, face unique challenges during the harsh winter weather in providing care to mothers and newborns.

Gilgit-Baltistan is situated in the Northern part of Pakistan. The region is characterized by its rugged and mountainous terrain, with temperatures in the valley bottoms ranging from the extreme heat of 40°C in the summer to sub-zero temperatures of -10°C or below in the winter (Aboramadan & Dahleez, 2020). Gilgit-Baltistan with a total area of 72,971 km and an estimated population of nearly 1.5 to 2 million people. The region is divided administratively into three parts: Gilgit (including Gilgit, Ghizar, Hunza, and Nagar districts), Baltistan (with Skardu, Ghanche, Shigar, and Kharmang districts), and Diamer (covering Diamer and Astore districts). The landscape is marked by snowy mountains, glaciers, and highlands, giving rise to springs, waterfalls, lakes, and rivers. (Ahsan, Rasheed, Ashraf, & Anwaar, 2021).

## **Background**

Extreme winter weather conditions and climate events often result in disruptions to essential infrastructure, financial losses, and population displacement, which can then cause various health problems (Bell et al., 2018). These severe weather events can overwhelm or interfere with the availability and operation of critical infrastructure, like public health facilities, transportation systems such as roads, energy networks, and water processing plants (Bell et al., 2018). Likewise, Gilgit-Baltistan encounters several difficulties during harsh winters that can paralyze the day-to-day routine of its residents and health facilities. There is a dearth of gas, electricity, and water during the winter weather, as everything gets frozen. Because of the frozen pipes and the scarcity of heating fuel, even cooking, bathing, and washing become a challenge (Tribune, 2017). As a result, people rely on firewood and coal for heating and cooking purposes, leading to indoor air pollution and a high incidence of acute respiratory infections (WorldHealthOrganisation, 2022). The situation exacerbates during the period from December to April, when the temperature drops to 11 degrees below freezing point, causing water in the lakes and channels to freeze, resulting in frequent power outages lasting up to 20 hours regularly (TheExpressTribune, 2016).

The absence of electricity is one of the frequently overlooked obstacles in providing adequate healthcare in many rural regions, particularly in maternity settings. Numerous accounts describe the challenges faced by midwives due to the absence of lighting during childbirth, coupled with inadequate refrigeration for blood and vaccines, and insufficient power to sterilize equipment, use electric warms, operate basic medical equipment such as ultrasound machines and incubators, and provide emergency services during night time hours (World Health Organization, 2015). These challenges are further compounded by the scarcity of water that freezes during harsh winters, which can impact the availability of warm water needed during labor and delivery.

Due to extreme freezing temperatures, successive administrations in the region have been facing a significant challenge for in ensuring the availability of potable water (Ahmed, Waqas, Khan, Rashid, & Saqib, 2021). As a result, the shortage of warm water creates myriad challenges for midwives, as proper hygiene and sterilization procedures are essential in maternity care. Without access to adequate potable water, midwives may struggle to maintain basic hygiene standards, such as hand washing, and post-delivery bed baths; this can impede maternal and newborn care, increasing the risk of infections and other related complications and also compromise hospital cleanliness (Asif, 2017). According to the statistics, worldwide, infections contribute to a minimum of 9% of maternal fatalities and 16% of neonatal mortalities. The incidence of maternal sepsis is significantly higher in countries with lower- and middle Level -incomes, due to the scarcity of water in healthcare facilities (Arowosegbe, Ojo, Shittu, Iwaloye, & Ekpo, 2021).

The substantial negative effects of winter weather, on both maternal and newborn health, are cold-related health conditions, which are one of the major causes of neonatal mortality in several developing nations (Scalone & Samoggia, 2018). In low-resource settings, neonatal mortality and morbidity are often attributed to hypothermia as a significant factor, meaning that healthcare systems in these areas do not reach the baseline standards established by the World Health Organization (Kyokan, Jirapaet, Rosa-Mangeret, Pisoni, & Pfister, 2022). Further, a study discovered that 42% of the mothers of hypothermic newborns had a lower body temperature. This highlights the role of the cold environment and limited resources as major factors contributing to the high prevalence of hypothermia among newborns (Kumar, Shearer, Kumar, & Darmstadt, 2009).

Newborns can become hypothermic if they are exposed to the outside environment soon after birth, especially if they are premature, have a low birth weight, have low APGAR scores, require cardiopulmonary resuscitation, are unwell, or are born during the winter season (Jaffer, Jan, Kaufman, Lakhani, & Shahid, 2017). There are several factors that contribute to hypothermia in preterm babies, including the absence of



warmed and humidified oxygen in most Neonatal intensive care unit (NICUs), the room not being thermo neutral for these infants, and inadequate availability of radiant warmers (Demtse et al., 2020). Moreover, in South Asia, most cases of hypothermia in newborns occur during the winter months. Hence, it is essential to identify and treat neonatal hypothermia because it can result in various health issues, such as seizures, infections, low blood sugar, heart rhythm problems, gastrointestinal bleeding, sclerema, low blood volume, metabolic acidosis, jaundice, breathing difficulties, lung bleeding, and even death (Ali et al., 2012).

To mitigate maternal and neonatal mortality rates and to improve quality care, World Health Organization (WHO) developed a vision in which every expectant mother and newborn receive quality care throughout the pregnancy, childbirth, and the postnatal phase. For this, WHO proposed a set of Standards to enhance the quality of care for mothers and newborns in healthcare facilities; as per standard 8, all health facilities must provide basic infrastructure and facilities, such as water, hygiene, and electricity, as well as necessary medicines, supplies, and equipment to fulfill the healthcare requirements of women and newborns. Furthermore, the areas designated for labor, childbirth, and postnatal care must be clean, comfortable, and logically structured to ensure continuity of care (WHO, 2016a).

However, weather conditions are frequently identified as obstacles to accessing health services, particularly in rural and remote regions of Northern Pakistan, experiencing harsh winter weather that poses unique challenges for maternal and newborn health (Skinner, Yantzi, & Rosenberg, 2009). Midwives in northern areas play a crucial role in providing maternity care to pregnant women, but, transportation difficulties due to weather, and limited resources can hinder their ability to provide timely and adequate care during winter weather. Heavy snowfall and resulting road closures complicate the transportation issue and force midwives to manage complicated cases instead of referring them (Jan et al., 2019).

The World Health Organization appraises midwives as having a special ability to offer vital healthcare services to women and newborns in the most challenging and vulnerable settings, including those

impacted by conflicts, humanitarian crises, and fragile conditions (WorldHealthOrganisation, 2020). Additionally, a worldwide study found that social, economic, and professional factors create barriers for midwives in providing quality care in lower and middle-income nations. These barriers have been previously studied and are considered crucial for improving maternal and child health (Bremnes, Wiig, Abeid, & Darj, 2018).

International studies have also determined that midwives have an essential role in delivering prenatal and childbirth services in countries with low to moderate levels of income (Adatara et al., 2021). Previous research has demonstrated that having access to skilled birth attendants like midwives, who can provide appropriate and equitable maternity care, is considered to be a significant aspect in reducing maternal mortality and improving health outcomes during pregnancy (Adatara et al., 2021). However, despite the importance of midwifery services in improving maternal and neonatal health outcomes, the available literature suggests that several factors may hinder midwives from providing standard care. The associated factors include 1) unfavorable working conditions, 2) complex infrastructure, and 3) inadequate transportation facilities (Jaffer et al., 2017). Hence, In order to enhance maternal and newborn health outcomes, it is essential to identify and address the barriers that impede access to high-quality maternal health services across all levels of the healthcare system (WorldHealthOrganisation, 2014).

In spite of the harsh winter challenges, and limited access to basic necessities, midwives in Gilgit Baltistan continue to provide essential care in maternity settings. Therefore, this research can provide a comprehensive understanding of the challenges and the strategies used by midwives to provide maternal and neonatal care during harsh winters.

## **Problem Statement**

Midwives are trained professionals, offering vital services in maternal and newborn care, including care during delivery and antenatal and postnatal care. Midwives are the only healthcare providers in remote

and underserved areas. However, delivering high-quality care in such areas can be incredibly challenging due to a lack of resources and infrastructure. Moreover, in regions such as Gilgit-Baltistan, where temperatures are dropping, it is even more challenging for midwives to provide maternal and newborn care. In these harsh conditions, midwives face shortages of medical supplies, transportation difficulties, and limited access to electricity and heating facilities, which makes their work immensely challenging. Thus, there is a critical need to explore the challenges they face in such a difficult climate.

### **Purpose of the Study**

The purpose of the study was to explore the challenges that midwives, faced in maternity settings and the strategies they used to overcome those challenges during the winter weather.

### **Research Questions**

The following research questions guided the study:

- What challenges do midwives face in maternity settings during the harsh weather in the Pakistan's Northern Areas?
- What strategies do midwives employ to overcome the challenges in maternity settings, during the winter weather in the Northern Areas Pakistan?

### **Significance of the Study**

The study has contributed to the existing knowledge by filling the gap identified in the current literature review. Till date, no such studies have been conducted in Pakistan, to the researcher's best knowledge, focusing on midwives' challenges and strategies during the harsh winter weather. Furthermore, the findings of the study have been valuable in learning about the strategies, utilized by midwives in maternity settings to provide quality maternal care despite the challenging weather conditions. These strategies can help healthcare providers, policymakers, and communities working to improve maternal

health outcomes in the Northern Areas of Pakistan. Moreover, acknowledging the suggestions of midwives, based on their firsthand experiences, can enhance their motivation and lead to improved working conditions. This, in turn, may have a positive impact on the health of mothers and children in the region. By incorporating the suggestions of midwives, appropriate actions can be taken in response to various situations, ultimately contributing towards the improvement, of maternal and newborn well-being, and also progress towards the achievement of the Sustainable Development Goals (SDGs).

## **Summary**

This chapter highlighted the significant challenges that midwives face while providing maternal and newborn care in Gilgit-Baltistan during extreme winter weather conditions. The lack of electricity, which is a common occurrence during winter, affects the availability of warm water and proper lighting during labor and delivery, as well as the proper sterilization of equipment, refrigeration of blood and vaccines, and operation of basic medical machinery. The scarcity of water during winter also creates challenges for midwives to maintain hygiene standards, such as hand washing and post-delivery bed baths, which can impede maternal and newborn care, leading to an increased risk of infections and related complications. Moreover, transportation difficulties, due to heavy snowfall and road closures can hinder midwives' ability to provide timely and adequate care, while hypothermia resulting from cold weather and limited resources contributes to neonatal mortality and morbidity.

The study gap has been identified, and the study purpose, questions, and significance have been thoroughly discussed. It is essential to address these challenges to improve maternal and newborn health in Gilgit-Baltistan.

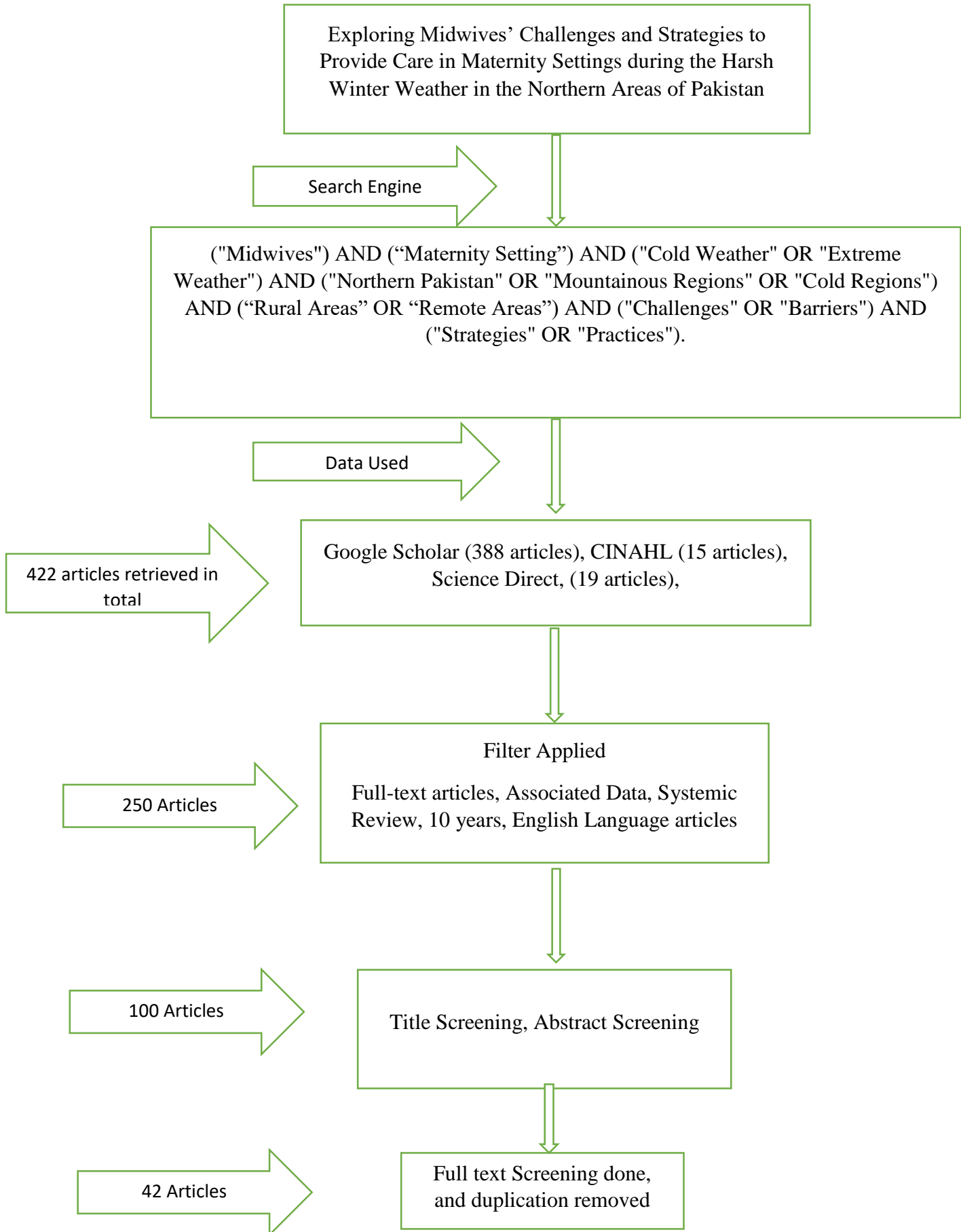
## **Chapter Two: Literature Review**

This chapter aims to thoroughly review the literature related to midwives' challenges and strategies to provide care in maternity settings during the winter weather in the Northern Areas of Pakistan. The literature review chapter, presents the search strategy, an overview of the role of midwives in maternal and newborn care, and the effects of the harsh winter weather on maternal women and newborns. Further, this chapter highlights, some challenges that midwives face, such as transportation, and maternity setting challenges. Moreover, this chapter also discusses newborn hypothermia due to the harsh winter weather. Finally, the chapter concludes with a summary.

### **Search Strategy**

The literature for this study was done using various health-related electronic databases. These included Google Scholar, (CINAHL), PubMed, Cochrane, and Science Direct. The search was initially confined to pertinent articles published in the past 10 years. However, due to the limited availability of the data that focus on the current study topic, the search was broadened to include articles published between 2008 and 2023. The search was conducted in January 2023. Further, various keywords were used to extract the required information from the database, such as ("Midwives") AND ("Maternity Setting") AND ("Cold Weather" OR "Extreme Weather") AND ("Northern Pakistan" OR "Mountainous Regions" OR "Cold Regions") AND ("Rural Areas" OR "Remote Areas") AND ("Challenges" OR "Barriers") AND ("Strategies" OR "Practices").

For relevance, the Midwifery, Nursing, and Medical Journals were accessed, such as the Midwifery Journal of Advanced Nursing, the journal *Journal of Asian Midwives*, and the *British Journal of Midwifery*. Moreover, some of the important and relevant reports from the United Nations Children's Fund (UNICEF), the World Health Organization (WHO), and the World Bank were also critically reviewed and appraised. The snowballing technique was employed in the literature search, encompassing the identification of primary research from the reference lists of secondary sources.



## **Effects of Harsh Winter Weather**

In Northwest Syria, where around 4.4 million people have struggled to survive the harsh winter without sufficient fuel, heating, and medical services, WHO and its partners provided critical health services to those in need. The extreme cold weather poses a significant risk to pregnant women, children, and those with chronic illnesses. Following a snowstorm on 18 January 2022, medical professionals reported a surge in cases of respiratory illnesses among children (World Health Organization, 2022).

According to UNICEF, around seven million children in Ukraine faced severe cold during the winter of 2022-2023, when winter temperatures drop below  $-20^{\circ}\text{C}$ , due to a lack of electricity, heating, and water access. This situation put them at a higher risk as the winter deepened. Moreover, the absence of electricity not only affected the children's well-being but also impacted healthcare facilities, leaving them struggling to deliver essential services. Additionally, malfunctioning water systems further exacerbated the already elevated risks of illnesses such as pneumonia, seasonal influenza, waterborne diseases, and even COVID-19 (UNICEF, 2022). Moreover, in Pakistan, the challenging winter weather often exacerbates the ongoing drug shortages by causing delays and difficulties in transporting medicines, from one part of the country to the other (WorldBankDocument, 2011).

As per WHO, with the anticipated global temperature increase of  $1.5^{\circ}\text{C}$  and regional increases of up to  $4.5^{\circ}\text{C}$ , the climate is warming up, resulting in fewer cold days and nights and a decrease in overall occurrences of cold extremes. However, despite this trend, certain countries and regions continue to experience unusual cold waves (WHO, 2021).

## **Role of Midwives in Maternal and Newborn Care: Challenges and Responsibilities**

Midwives are integral members of the healthcare team, actively involved in ensuring the provision of quality maternity services to patients (Lumadi & Matlala, 2019). According to the World Health Organization (WHO), midwifery is characterized by the delivery of skilled, knowledgeable, and compassionate care to women during all stages of the childbirth journey, from pre-pregnancy through pregnancy, labor and delivery, postpartum, and the early weeks of the infant's life (WHO, 2023). According to the 2014 State of the World's Midwifery, midwives can offer about 90% of the needed care for mothers and newborns (Adolphson, Axemo, & Högberg, 2016). Moreover, they are essential in the fight against maternal and neonatal mortality, serving as frontline healthcare warriors. They actively strive to ensure the survival of women during childbirth and the safe delivery of babies, even in the most marginalized and underserved areas (Lumadi & Matlala, 2019). Moreover, midwives play a vital role in enhancing the quality of maternal healthcare, and encompassing multiple dimensions. This requires not only technical competencies and proficiency in utilizing equipment, but also the integration of interpersonal skills, responsiveness, and an understanding of the organizational structure and referral resources for appropriate care (Adolphson et al., 2016).

Studies on midwives and the challenges they encounter have been previously conducted, highlighting their essential role in enhancing the health outcomes of both mothers and children (Bremnes et al., 2018), as they play a vital role in ensuring safe births and in preventing maternal health complications. However, the midwives face many challenges, these challenges are especially demanding in constrained settings (Adolphson et al., 2016). Therefore, creating an enabling environment is widely regarded as the single most effective approach to prevent maternal health complications (Lerberg, Sundby, Jammeh, & Fretheim, 2014).



In rural regions, where there is a lack of midwives and other healthcare professionals specializing in maternal care, as well as limited availability of healthcare facilities, midwives are progressively finding themselves in a better position to offer care to maternal and newborns (Neiterman et al.). This is particularly evident in several low- and middle-income countries, where midwives have the primary responsibility for providing maternity care. Despite the considerable influence they can have, midwives face several challenges when it comes to delivering quality care, reducing maternal mortality rates, facing escalating litigation issues, and a scarcity of resources (Hastings-Tolsma, Temane, Tagutanazvo, Lukhele, & Nolte, 2021).

In addition, every year, more than 300,000 women lose their lives during childbirth, and 2.7 million newborns die within the first 28 days of life, many of them due to preventable causes, where midwives can play a fundamental role in reducing these fatalities (WHO, 2016b). However, this can only be achieved when midwives receive education and training, that adheres to international standards and when they are regulated and supported adequately. According to the results of an online survey, midwives expressed that their demanding and lengthy work hours have a detrimental impact on their families (WHO, 2016b). More than one-third of the respondents reported that they had no choice but to leave their children under the age of 14 alone while they were at work. In light of this, organizations emphasize the importance of providing midwives with professional support, including improved working condition (WHO, 2016b).

Although they face various contextual, professional, and personal challenges, midwives strive to fulfill their role to the best of their capacity within the limitations of available resources. However, due to insufficient basic resources and unfavorable working conditions, they are unable to guarantee the delivery of quality care, a situation that is common in low-resource settings (Louazi, Frías-Osuna, López-Martínez, & Moreno-Cámara, 2022). Some of the challenges that midwives face due to harsh weather are discussed below.

***Transportation Challenges.*** Adverse weather conditions are frequently mentioned as obstacles to accessing healthcare services, particularly in rural and isolated areas (Skinner et al., 2009). Challenges related to transportation and challenging terrain are often cited as barriers to healthcare access, contributing to poor health outcome (Kaphle & Newman, 2020). Several studies mention that community midwives face challenging situations due to poor roads and harsh weather conditions. As evidence, a qualitative descriptive research study conducted in Chitral, one of the key findings revealed that the topography of the district, characterized by bare rocks, barren ground, and snow-clad mountains, presented significant challenges for community midwives' work in the region, particularly during the winter blizzards. These severe weather conditions often disrupt communication and transportation, making it difficult for midwives to reach their patients. As a result, midwives may have to walk for up to two hours on difficult roads to reach the homes of women in need (Jaffer et al., 2017).

Another study conducted in Aotearoa/New Zealand, elucidates that rural midwives face various challenges when providing care to women in remote areas; these challenges include economical, topographical, and meteorological factors. Moreover, issues related to communication, such as poor cell phone coverage and power outages due to adverse weather, further exacerbate the difficulties (Daellenbach et al., 2020). Additionally, access to emergency transport may be inconsistent, which is another factor that rural midwives must take into account. Another finding from the same study, in which one of the participants highlighted the challenges of working in her area of rolling hill country, showed that snow, high winds, slips, and debris on the roads were among the major challenges faced during the winter months. Furthermore, as the frequency of severe weather events continues to rise due to climate change, this issue is expected to become even more pressing for rural midwives in the future (Daellenbach et al., 2020). Similarly, in a 2014 study in Kenya, midwives in the western and central provinces highlighted the challenges of long distances and poor roads. Participants expressed exhaustion, burnout,

and fatigue due to the demanding nature of their work and the extensive travel it required (Mannah, Warren, Kuria, & Adegoke, 2014).

In order to overcome the obstacles faced by midwives, alternative methods of providing healthcare must be developed. One such method is to invest in outreach and mobile clinics. The provision of a wider range of services must be ensured through the existing primary and secondary health care facilities, and qualified personnel must be stationed in villages. Moreover, health outcomes can be improved through advancements in other fields, such as transportation, communication, and water and sanitation (WorldBankDocument, 2011).

***Lack of Availability of Resources.*** The impacts of harsh winters include the disruption of the supply chain for medical and non-medical products and services, reduced access to potable water and energy supplies, damage to infrastructure and settlements, and increased human morbidity and mortality, also an overall reduction in human well-being. These consequences are particularly relevant to healthcare facilities, which have limited preparedness in some countries, at all levels of development (WHO, 2021).

In developing countries, healthcare facilities are at a higher risk of vulnerability, as they often lack the necessary infrastructure. Every year, women in Nepal die due to complications related to pregnancy. One of the major causes behind these deaths is the lack of necessary equipment in health centers located in rural areas (Sitaula et al., 2021). A study conducted in India, found that scarcity of physical resources acts as a barrier to the effective provision of obstetric and neonatal emergency care at its optimal level (Nishimwe, Conco, Nyssen, & Ibisomi, 2022). Similarly, the absence of proper equipment, insufficient supply of necessary resources, limited infrastructure, unreliable access to electricity, including lack of fuel for generators, and inadequate water availability have all contributed to the challenges faced by health workers in providing quality care to mothers and their babies.

The lack of equipment, supplies, or medications has resulted in an increased workload, contributing to discouraging midwives from accepting positions in rural or remote healthcare facilities (Munabi-Babigumira, Glenton, Lewin, Fretheim, & Nabudere, 2017). In this regard, a study conducted in Mozambique, in 2016, revealed that midwives faced challenging circumstances due to limited resources, including inadequate referral systems and lack of portable water. These obstacles resulted in frustration, feelings of insufficiency, and decreased job satisfaction among midwives (Adolphson et al., 2016).

According to 2017 article, which focused on healthcare challenges in Gilgit Baltistan it was observed that some hospitals in the region faced major water supply shortages, which made patient care, hospital cleanliness, and maintaining basic hygiene extremely difficult. Furthermore, the harsh winter season resulted in a continuous influx of patients into hospitals and other facilities, yet there was no well-regulated, round-the-clock heating system available for pediatric and adult patients in the wards, as well as for attendants in the waiting areas (Asif, 2017).

Qualitative interviews were conducted in Kitonyoni, and Mwanja, sub-locations of Makueni County in Eastern Kenya. This revealed a noteworthy challenge, highlighted by all participants, was the absence of electricity during winter. This situation created difficulties in providing quality maternal and newborn services, especially round-the-clock care. The health personnel reported that lack of electricity posed a major challenge during deliveries, particularly at night, and they had to rely on torch lights, lamps, or weak lights from mobile phones (Essendi et al., 2015). Moreover, the absence of electricity in remote areas can hinder a health worker's ability to perform vacuum extraction, even if they have received training in vitro diagnostics (Tshering, Dorji, & Wangden, 2021).

***Inadequate Thermal Facilities.*** An essential factor when attempting to warm a cold baby is monitoring temperatures carefully to prevent hyperthermia. Failure to recognize fever in infants can also result in delayed treatment of neonatal sepsis, leading to increased morbidity. While high-resource settings

use expensive incubators with continuous temperature monitoring or intermittent monitoring for infants in open cribs, affordable temperature monitoring devices, but lower-resource settings often lack the necessary features for accurate detection of hypothermia or may not be designed for clinical use (UNICEF, 2020). In developing countries, the issue of inadequate thermal facilities to keep newborns warm is a significant challenge that is still underappreciated (Sitaula et al., 2021).

Furthermore, lack of proper heating at healthcare facilities negatively impacts the health of patients, employees, and newborns (Shahnaz, Jan, Lakhani, & Sikandar, 2015). The impact of environmental temperature in the delivery room on heat loss in infants is widely recognized. Ensuring appropriate maintenance of the delivery room temperature is a direct intervention that needs to be implemented (Mance, 2008). According to the practical guide by the World Health Organization (WHO), it is recommended that the delivery room should be kept warm, within the temperature range of 25-28°C (77-82°F). This temperature helps in reducing heat loss in the newborn baby and can also be comfortable for the mother. In situations where the delivery room is cold, a small area can be blocked off using blankets or sheets and warmed with an electric heater or fire. However, caution is necessary when using fires or heaters as they can be dangerous if placed near materials that can catch fire (Organization, 1993).

The physical surroundings for small and sick newborns should meet high standards, ensuring quality, safety, security, and proper maintenance. They should be well-organized, with reliable energy supply, and must be designed to accommodate the required level of care. Additionally, they should incorporate a dedicated unit or space for kangaroo mother care, equipped with necessary resources, and provide facilities for rooming-in. The overall design should prioritize a family-centered approach, enabling mothers and caregivers to learn and develop the necessary skills for caring for their newborns (WHO, 2020).

## **Newborn Hypothermia due to Harsh Winter Weather**

The Sustainable Development Goals (SDGs), set by the United Nations, aim to reduce neonatal mortality to a target rate of 12 per 1000 live births. However, a substantial number of newborn deaths, approximately 39%, occur in the South Asian region. Among the countries with the highest burden, India, Pakistan, Nigeria, the Democratic Republic of Congo, and Ethiopia account for half of all neonatal deaths. However, Pakistan specifically has the highest neonatal mortality rate among these countries (Naz, Lakhani, Mubeen, & Amarsi, 2022).

Hypothermia is considered one of the major contributors to neonatal mortality and morbidity worldwide, particularly in low-resource settings (Nebiyu, Berhanu, & Liyew, 2021). According to WHO, Neonatal hypothermia occurs when the core body temperature falls below 36°C, and severe hypothermia is characterized by a temperature dropping below 32°C. (Nyandiko, Kiptoon, & Lubuya, 2021). It is a frequently occurring medical condition among neonates delivered at hospitals, with a range of prevalence rates, between 32% to 85% (Karsten Lunze, Bloom, Jamison, & Hamer, 2013).

A research finding, reveals that over 98% of the annual 4 million neonatal deaths occur in developing countries; however, there is still a dearth of available specific data and research on hypothermia (Mullany et al., 2010a). Further, infant age has a strong correlation with both mortality and hypothermia, and season can significantly affect the total risk of hypothermia (Mullany et al., 2010b). The primary cause of higher neonatal mortality is related to lower outdoor temperatures. In addition, colder weather conditions have a direct impact on neonatal deaths, with hypothermia being the main contributor to the increased mortality rate in winter (Dalla-Zuanna & Rosina, 2011); (Derosas, 2009). Therefore, it is likely that infants born during the winter season face a higher risk of neonatal mortality, as compared to those born during summer (Scalone & Samoggia, 2018).

The risk of hypothermia in preterm infants is influenced by both their physical characteristics and environmental factors. Environmental factors that contribute to this risk include decrease ambient air temperature in delivery rooms and (NICU) rooms, as well as the low surface temperature of beds used during admission and resuscitation (Manani et al., 2013). Low temperatures during the early days of birth have a significant harmful effect on the survival of newborns. Extreme cold conditions may cause infants to use up their stored fat reserves in order to regulate their body temperature and combat the cold, leading to weight loss during the first few days after birth. In some cases, this weight loss may lead to death within the initial week of life, either due to hypothermia or atrophy. Additionally, this weight loss can also make newborns more susceptible to infections, such as sepsis and pneumonia, which is also a common cause of neonatal mortality (Scalone & Samoggia, 2018).

Newborns are also at risk of heat loss during the first few hours of life due to certain care practices; these practices are more prevalent in home births within developing nations but regrettably also occur in maternity settings. Such practices include delivering the baby in a room that is not adequately warmed, immediate bathing with cold water, and delayed drying. (Mullany, 2010). Statistically, approximately 25% of newborns experience hypothermia, often resulting from the loss of body heat during the transfer of the baby from the labor room to the neonatal ward (Chanvorachote, Jirachotdech, & Suksumek, 2022).

### **Midwives' Strategies to Prevent Newborn and Maternal Health Issues in Maternity Settings**

Midwives have been observed implementing strategies to adapt and navigate the challenges and consequences they face in their work. Among the strategies employed by midwives, one notable example is the use of bleach for sterilizing equipment, instead of autoclaving. This adaptation is particularly relevant when birthing equipment needs to be promptly reused to attend to more women, with time being a critical factor. Some midwives have reported the absence of autoclaves in their healthcare facilities,

leading them to rely on sterilizing equipment with bleach as a regular practice (Ismaila, Bayes, & Geraghty, 2021).

Thermal facilities are essential for maintaining a newborn's body temperature during cold weather, to prevent a newborn from hypothermia. A study conducted in Bhutan focused on identifying the obstacles in institutional delivery services in districts with low coverage. One significant barrier reported by participants was the reluctance of people residing in cold areas to go to health centers for delivery, because they are afraid about babies getting hypothermia, as no thermal facilities are available for newborns. The researchers also observed that the health centers lacked appropriate heating systems, and Bukhari (traditional space heaters) were ineffective at warming up the rooms (Gurung et al., 2021).

Another study describes various methods that are employed in maternity settings to prevent newborn hypothermia; and these include the use of lamps, water-filled mattresses, heaters, radiant warmers, and incubators. Currently, the Embrace thermo pod is utilized as an effective solution for preventing hypothermia in newborns. The Embrace thermo pod is a portable infant warmer that is user-friendly and does not require a constant power supply. It is an innovative device designed to be used in various settings, such as NICUs, maternity wards, and during neonate transportation. The primary purpose of the Embrace thermo pod is to provide warmth to stabilize newborns and to prevent hypothermia (Benjamin & Jarone, 2017).

### **Gap analysis**

The literature review highlights several gaps regarding challenges midwives face during harsh winter weather while providing maternity care in Northern Pakistan. One significant gap is that most research on this subject is from regions with different climates, so it may not directly apply to the unique winter conditions in Northern Pakistan.



Furthermore, we lack detailed information about the specific issues that midwives encounter during the harsh winters. While some studies briefly mention problems like transportation difficulties and resource shortages. However, we need a deeper understanding of these challenges to develop effective solutions. Additionally, there is a lack of data on how frequently newborns in Northern Pakistan experience hypothermia during the winter season, which is crucial information for addressing this issue effectively.

Another gap in the literature is the absence of discussions about incorporating local knowledge and practices into midwifery care. Utilizing indigenous knowledge can help make maternity care more culturally appropriate, and also help to assess both benefits and potential harms for effective implementation.

To the best of the researcher's knowledge, there hasn't been any study in the Pakistani context that has explored the challenges faced by midwives and the strategies they employ to provide maternity care during harsh winter weather. Additionally, there is a scarcity of recent data and direct studies conducted in other countries on similar topic as well. Therefore, the current study aims to shed light on the experiences of these dedicated midwives who work diligently despite challenging weather conditions and to understand the assistance and support they need to deliver high-quality care during the harsh winter season. To support midwives and their strategies to provide effective care during harsh weather, it is important to explore and understand their challenges first and to get the directions for future interventions to combat weather challenges.

## **Summary**

In summary, the literature investigated the impact of harsh winter weather on maternal and newborn health and the delivery of essential supplies. It discussed the general challenges midwives encounter in their

practice, also emphasizing the significance of essential resources and a conducive working environment. The exploration extended to challenges related to transportation and inadequate resources, particularly in harsh weather. Lastly, gaps within the current body of knowledge were identified, and the justification for conducting the present study was established.

### **Chapter Three: Methodology**

This Chapter presents an overview of the research methodology used in the current study. The chapter starts with a brief explanation of the study design, followed by detailed information on, b) Study participants, c) Study setting and d) Population, e) Recruitment of the study participants, and f) Duration. It also describes the inclusion and exclusion criteria, data collection tools, and pilot testing. In addition the Chapter also discusses the data collection process, analysis, and study rigor. Lastly, it presents the ethical considerations of the study and a summary of the chapter.

#### **Study Design**

The qualitative descriptive-exploratory research design was employed in this study to explore and collect in-depth data regarding the challenges and strategies faced by midwives in maternity settings during the harsh winter weather. Qualitative research generally seeks an in-depth understanding of other people's experiences (Boswell & Cannon, 2018). Furthermore, it provides an opportunity to explore the depth, richness, and complexity inherent in human lives (Gray, Grove, & Sutherland, 2016).

The exploratory-descriptive qualitative research aims to address a particular knowledge gap by seeking the perspectives of the individuals who are most impacted (Gray et al., 2016). Additionally, this research design enables the researcher to investigate a topic with limited coverage in the literature, and allows the study participants to contribute to the development of new information in that field (Hunter, McCallum, & Howes, 2019). Given that the phenomenon being studied is new and has limited coverage in existing literature, the qualitative exploratory research design was considered appropriate for conducting

this study.

### **Study Setting and Population**

This study was conducted in the Sehhat Foundation (maternity setting) in Danyore, Gilgit-Baltistan (Northern Areas of Pakistan). It is a registered non-governmental organization (NGO) working in Gilgit-Baltistan since 2005. It focuses on general health, maternal and child health, nursing training, and health education. The study population comprised midwives working in the Maternal Department of Sehhat Foundation (maternity setting).

### **Study Participants**

Participants were recruited, using the purposive sampling technique. It is a method often utilized in qualitative study, in which researchers look for individuals who have witnessed the phenomenon of interest and can give "information-rich accounts of their experiences." (Gray et al., 2016). In qualitative studies, the researchers often use smaller sample sizes, since their main objective is to explore and analyze the meanings and experiences of specific individuals. However, the sample size should be sufficient to obtain ample information that addresses the research question, by adhering to the concept of data saturation (Boswell & Cannon, 2018).

In the current study, a total of 9 midwives from the Sehhat Foundation (maternity setting) were interviewed. The data collection stopped after meaningful information had been achieved. In qualitative studies, when no new themes or concepts emerge, the researcher understands that data saturation has occurred (Boswell & Cannon, 2018).

### **Participant Recruitment Process**

The recruitment of participants began after receiving approval from the Ethical Review Committee (ERC) of the Aga Khan University Pakistan (refer to Appendix B) to conduct the study. In addition, the permission letter was also obtained from the Director of the Sehhat Foundation(maternity setting); (Appendix A). Initially, the researcher had planned to conduct interviews in Gilgit Baltistan independently. However,

due to flood warnings in the region, the researcher opted for telephonic data collection instead.

Initially, the researcher was connected to the department head of the Sehhat Foundation with the help of supervisor. The department head provided the researcher with a list of eligible participants and their contact numbers. The researcher approached participants via phone call and obtained information related to the eligibility criteria (inclusion and exclusion); those participants who fulfilled the inclusion criteria were invited to join the study. Then, a detailed explanation about the purpose of the study was provided to the participants. Also, the researcher aimed to gain the participants' trust by explaining the interview process, assuring them of confidentiality. The interviews were arranged according to the participants' preferred date and time, ensured they were conducted in a private, quiet, and comfortable environment with a reliable phone signal. Following this, informed consent was taken from each participant before proceeding with data collection, and consent for audio recording was also taken for accuracy purposes (refer to Appendix 'C'). Since the study population was qualified midwives, who comprehended Urdu and English. Therefore, the informed consent and study guide were provided in both the languages, (English and Urdu) to ensure understanding and facilitate communication.

### **Study Duration**

The study was carried out after approval from the Ethical Review Committee (refer to Appendix 'B'), and the duration was from June 6, 2023, to August 30, 2023.

### **Eligibility Criteria**

The following eligibility criteria were developed to include and exclude the study participants.

**Inclusion criteria.** The study included:

- Midwives of all age groups, currently working in the Sehhat Foundation (maternity setting).
- Midwives having at least one year of experience, in providing care during the winter weather in Gilgit-Baltistan, (Northern Areas of Pakistan).

**Exclusion Criteria.** The study excluded:

- Healthcare workers other than midwives.

## **Data Collection Tool**

The researcher developed a Demographic tool and a study guide for interviewing the participants. The demographic tool comprised the details related to the participants' age, gender, and years of professional experience, designation, and socio-economic status. Additionally, the study guides were developed through a comprehensive process involving a thorough literature review. The Interview guides' questions and probes were developed that comprehensively address the research questions. The guide was reviewed for its content validity by supervisor and committee member. A few initial general questions that guided the interview were:

- A) Could you please share your personal experiences as an individual providing care in a maternity setting at Sehhat Foundation during winter weather?
- B) Do you face any challenges during winter weather?
- C) What strategies have you found to be effective in addressing the challenges you face during cold weather in the maternity setting?

With each question, consistent probing was used to explore the in-depth perception.

## **Pilot- Testing**

Before collecting actual data, pilot testing was carried out on two participants, to check for the validity and appropriateness of the interview guide, in order to ensure comprehension of the language used during the interview questions, evaluate how well the participants understood the questions in the interview guide. In addition, to assess for unexpected problems, that may arise during data collection. Furthermore, pilot interviews also assist a researcher in calculating a reasonable time estimate for the interviews (Gray et al., 2016). During the Pilot study it was observed that the interview was being disrupted due to network issues. The findings from the pilot testing were shared with the supervisor and committee members. Hence, in response to the identified challenge, the researcher approached a data collector as a mitigation strategy, or as a contingency plan. The recruitment of the data collector was facilitated with the support of the department head of the Sehhat Foundation. The researcher provided the data collector with comprehensive

training and guidance on the research's purpose, the interview guide, informed consent, and ethical considerations by the researcher. The appointed data collector was a school teacher holding a Bachelor's degree in education.

### **Data Collection Process**

After approval from the Ethical Review Committee (ERC), data collection was initiated from June 6, 2023 to August 30, 2023. Data collection means gathering information to understand and explain a phenomenon (Nayar & Stanley, 2014). In-depth interviews were conducted, through a semi-structured interview guide with open-ended questions, to collect data (refer to Appendix 'G'). The semi-structured interview approach is flexible and can accommodate the addition of new questions during the interview session (Ruslin, Mashuri, Rasak, Alhabsyi, & Syam, 2022); while open-ended questions give informants the freedom to answer in their own words. This form of questioning is more commonly used to evaluate qualitative issues and in exploratory research (Gray et al., 2016). Consent was taken from each of the research participants before data collection.

As per interviewee preferences, the interviews were conducted bilingually, using both Urdu and English language. The researcher initially built rapport with the participants, so that the interviewees got the confidence to speak, and then proceeded to collect the data. The researcher ensured that the interviews were conducted separately to maintain privacy and confidentiality. Each interview lasted approximately 25 to 30 minutes. Also, the researcher facilitated the participants to share information by using verbal cues such as making sounds to show active listening and interest. Moreover, in this study, probing techniques, such as open-ended questions, clarifications, and reflections were used to encourage participants to provide more detailed and in-depth information about the topic being studied.

A total of nine interviews were conducted, with eight interviews being solely carried out by the primary researcher, and one interview were conducted by the data collector, due to the participants' location in a remote area where no network access was available.

All the interviews were audio-recorded on a recorder and then transcribed and translated from Urdu to the English language without altering the meaning. The audio recording was done with the consent of the participants. The recording of interviews is considered an ideal choice for capturing interview data more effectively (Jamshed, 2014). After each interview, field notes were taken by the researcher to document verbal and nonverbal cues, such as laughing, and pausing, these field notes were compared with the transcripts during analysis, to enhance the validity and accuracy of the data collected.

### **Data Management**

Upon completion of interviews, the reported data were transferred from the recorder, to the personal computer of the researcher; the data was stored in a separate file with an assigned code and date of collection. Furthermore the data were preserved in the device with password protected in order to maintain confidentiality.

### **Data Analysis**

The analysis of qualitative data involves an ongoing and interactive process. Qualitative researchers often scrutinize their data with care and deliberation, frequently rereading the material to uncover meaning and a deeper understanding (Polit & Beck, 2010). The analysis of data was carried out simultaneously with data collection. The data analysis was conducted manually, using the six steps content analysis approach, proposed by Creswell (2014). Qualitative content analysis condenses raw data into categories or themes through valid inference and interpretation. It employs inductive reasoning, enabling themes to emerge from the data through careful examination and continuous comparison by the researcher (Patton, 2002).

**Data organization.** Upon completion of the data collection process, the audio-recorded interviews were transcribed verbatim in English by the researcher to a Microsoft Word document, using pseudonyms for the participants to maintain anonymity.

**Reading and reflection of data.** After organizing the data, the researcher listened to the audio recordings two to three times, and re-read the translations to comprehend the actual sense of the

information. The researcher also compared the written notes with the transcriptions, to ensure accuracy and to obtain a complete understanding.

**Data coding.** It is the process of organizing data by bracketing chunks, and writing a word in the margins to signify a category (Creswell & Creswell, 2017). In this step, the researcher organized the responses from all participants, for each question into separate files. Each file had five columns, which included the transcription, codes, subcategories, categories and themes.

**Categories and themes.** Multiple codes were developed from the participants' response, and all the similar identified codes, which had the same meaning, were clustered, to create the categories. Following this, all the categories were critically analyzed to generate common themes, which made the data more comprehensible.

**Data interpretation.** Data was interpreted by the researcher, from the emerging themes. Regular communication with the thesis supervisor and committee members was maintained to validate the accurate interpretation of the findings in alignment with the literature. Ongoing meetings, both online and face-to-face, were conducted to ensure the coherence of the study findings.

**Data representation.** Lastly, the data was presented in tables and charts, in a hierarchical form, with a subsequent sequence; categories, major themes, and their extracted interpretation. The demographic data have been presented in the form of tables. This representation is helpful for the readers to clearly understand the phenomenon and the results of the study.

## **Study Rigor**

The purpose of rigor in qualitative research is to accurately describe study participants' experiences. (Speziale, Streubert, & Carpenter, 2011). For qualitative studies, trustworthiness is regarded as a more relevant criterion. Guba and Lincoln (1989) suggest a set of criteria for the research to be considered trustworthy, which includes four components: credibility, conformability, dependability, and transferability (Maher, Hadfield, Hutchings, & De Eyto, 2018).



**Credibility.** Credibility is established when the participants acknowledge the reported research results as a reflection of their own experiences (Speziale et al., 2011). The researcher listened to the participants' interviews carefully and, also, provided an opportunity to the participants to share their feelings and perspectives openly and honestly. Simultaneously, field notes were maintained to document important findings and verbal observations during data collection, to cross-check and verify findings from the transcription, which significantly strengthened the credibility. In addition, the data were reviewed individually and verified by the supervisor and committee members. Member checking was done by discussing and reconfirming the findings with the participants, to verify interpretation and meaning.

**Confirmability.** confirmability stands for impartiality or lack of bias (Boswell & Cannon, 2018). It involves making sure that the research process and the results are impartial and not influenced by any biases. Confirmability was achieved by keeping field notes during fieldwork. Additionally, the process of data analysis was reviewed and discussed with the supervisor and committee members to ensure the accuracy and integrity of the findings.

**Dependability.** This is the stability of the research findings at different points in time (Lincoln & Guba, 1985). In the research, dependability was ensured by repeatedly listening to the audio-recordings and by double-checking the transcripts. The data of transcripts was read several times to ensure complete analysis of the research findings, and was constantly compared with the audio recordings and field notes. Moreover, the researcher discussed the analysis and interpretation with the supervisor and committee members, throughout out the research process.

**Transferability.** It refers to the generalizability and applicability of the data findings in other similar studies in different contexts and at different times (Lincoln & Guba, 1985). This was ensured by providing a thick description of the research methodology, detailed contextual information, such as the location of fieldwork, and characteristics of the informants. The comprehensive information and findings have made the study accessible and replicable for future research (Stahl & King, 2020).

## **Ethical Considerations**

Ethical compliance was ensured by obtaining permission from the Director of the Sehhat Foundation (refer to Appendix 'A'), and final approval from the ethical review committee ERC of the Aga Khan University Hospital, Karachi, Pakistan, to ensure that it adheres to the ethical principles. Participants were well informed about the audio recording and note-taking during the data collection process. The nature and purpose of the study was communicated to the participants and volunteer consents were taken before collecting data.

The participants' personal information and identity was protected and kept confidential throughout the study, by using pseudonyms; (pseudonyms are fictitious names used for participants in studies to protect their privacy and keep things confidential) for the participants, to ensure that their privacy rights were upheld. All the computerized data was secured with passwords. Moreover, audio recordings and notes were kept under lock and key to maintain participants' confidentiality. Only authorized personnel had access to the data, which included the researcher, supervisor, and committee members. Furthermore, the participants were informed that they had the right to withdraw from the study at any time, and that the researcher would destroy the related participants' data if they withdrew, without any penalty.

## **Summary of the Chapter**

In conclusion, the chapter discussed the research methodology utilized during the study. The qualitative exploratory design was used to explore midwives' challenges and strategies during the harsh weather in the Northern Areas of Pakistan. The study was conducted in the Sehhat Foundation (maternity setting), Danyore. Semi-structured interviews were conducted, with 9 midwives, selected through purposive sampling. It also explained the eligibility criteria, and the data management, collection, and analysis process, followed by the steps taken to maintain the study rigor to ensure the trustworthiness of the study. Lastly, the chapter ends with an ethical consideration.

## **Chapter Four: Study Findings**

This chapter presents the findings of the study. Firstly, it provides an overview of the demographic characteristics of the study participants. These characteristics comprise the participants' years of experience, gender, age, monthly income, city/district, marital status, and type of house. Secondly, the chapter highlights the main themes identified through an analysis of in-depth interviews with participants. Finally, this section incorporates pertinent narrative texts extracted from the interviews to support each theme. Lastly, the chapter concludes with a summary.

### **Demographic Characteristics of the Study Participants**

A total of nine midwives participated in the study. The midwives in this study had varying levels of experience: three had less than 5 years of experience, four had 5 to 10 years of experience, and the remaining two had 10 to 15 years of experience. All participants were females, accounting for 100% of the sample. The age distribution of the midwives indicated that six midwives were in the 20 to 30 age range, while the remaining three were in the 30 to 40 age range. All participants reported monthly earnings between 20,000 to 30,000 PKR, with none earning more than 30,000 PKR. The midwives in the study were from various cities or districts: three were from Ghizer, three were from Danyore, two were from Nagar, and one was from Ghanche.

Regarding marital status, out of the nine midwives, six were married, two were unmarried, and one midwife was a widow. Regarding housing, none of the midwives lived in "Kaccha" houses. The majority, seven midwives, lived in "Pacca" houses, while two midwives resided in "Semi-Pacca" houses. The demographic details of the study participants are shown in Table 1

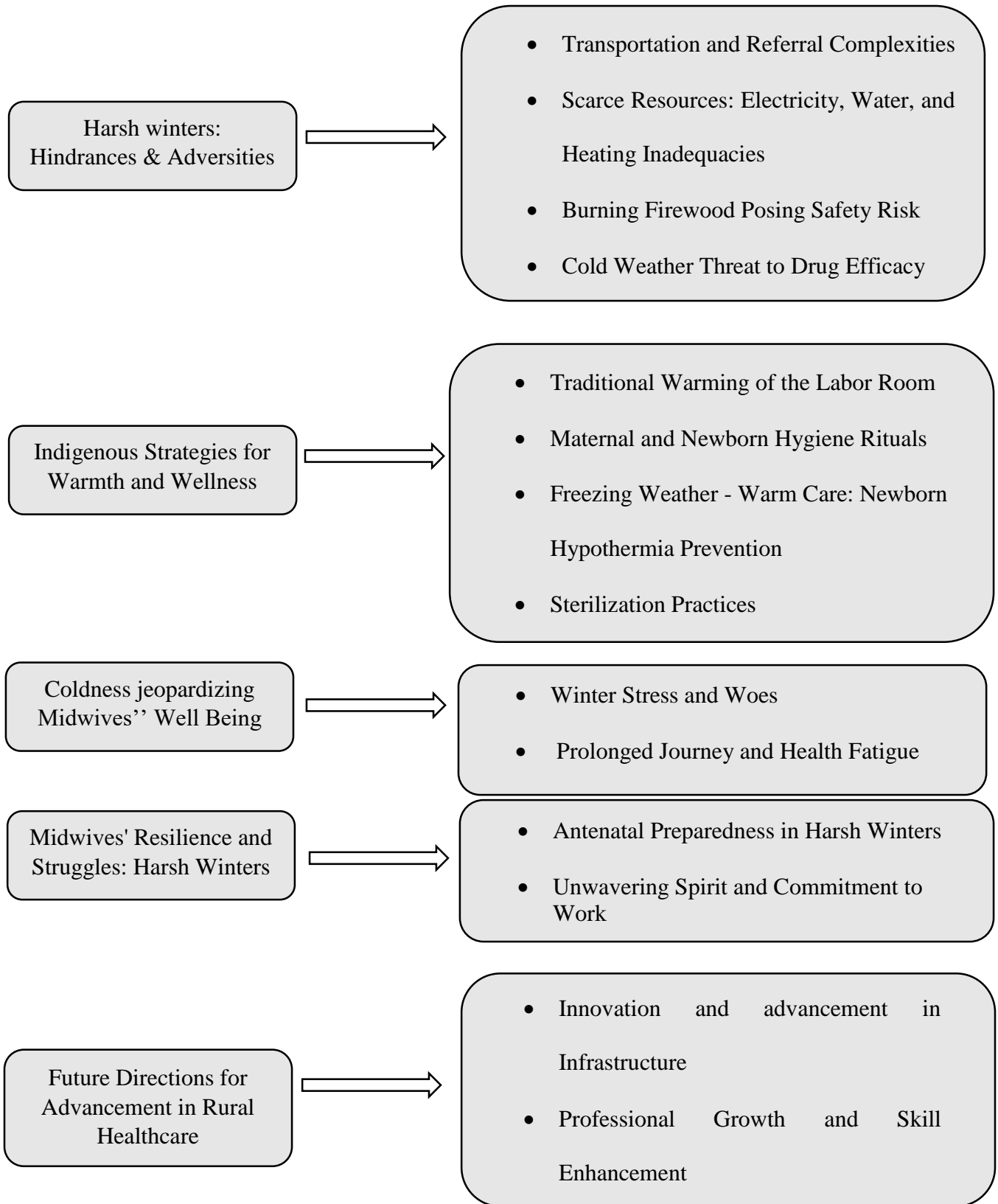
**Table 1***Demographic characteristics of the study participants (n=9)*

<b>Characteristics</b>	<b>Frequency</b>	<b>Percentages</b>
<b>Study Participants</b>		
Midwives	9	100%
<b>Years of Experience</b>		
<5 years	3	33.3%
5 $\leq$ 10 years	4	44.4%
10 $\leq$ 15 years	2	22.2%
<b>Gender</b>		
Female	9	100%
<b>Age</b>		
20-30Years	6	66.6%
30-40Years	3	33.3%
<b>Monthly Income</b>		
20,000 to 30,000	9	100%
<b>City/District</b>		
Ghanche	1	11.1%
Ghizer	3	33.3%
Danyore	3	33.3%
Nagar	2	22.2%
<b>Marital Status</b>		
Unmarried	2	22.2%
Married	6	66.6%
Widow	1	11.1%
<b>Type of House</b>		
Pacca	7	77.7%
Semi – Pacca	2	22.2%

**Content Analysis of the Participants' Interviews**

The content analysis of the data resulted in the development of multiple codes from the participants' narratives. Similar codes were clustered and formed sub-categories. These sub-categories were assembled and developed into fourteen main categories. A total of five major themes emerged from these categories. The researcher has provided participants' narrations to support each theme and category. Moreover, the researcher has given pseudonyms to the study participants to ensure their anonymity. These themes and categories are illustrated in Table 2.

Table 2. Themes and categories from the findings



**Theme 1: Harsh Winters: Hindrances & Adversities.** This theme emerged by asking the participants' about their firsthand experiences and challenges they encountered during the harsh winter weather. It revealed the issues that hinder midwives in providing care to maternal and newborn patients during the harsh winter. Four major categories emerged from the participants' responses. The categories include (1) Transportation and Referral Complexities. (2) Scarce Resources: Electricity, Water, and Heating Inadequacies. (3) Burning Firewood Posing Safety Risk. (4) Cold Weather Threat to Drug Efficacy. These categories shed light on the multifaceted nature of the challenges that the participants face during harsh winters.

*Category 1: Transportation and Referral complexities.* Most participants experienced challenges and difficulties due to transportation inaccessibility and road blockages caused by heavy snowfall, impacting the mobility and safety of both themselves and the maternal women. One of the participants expressed that the winter months, particularly from December to March, are considered to be an arduous and formidable period for them, as these months have heavy snowfall; due to this, the roads get blocked, which disrupts the deliveries of essential supplies:

As a midwife, we encounter many difficulties during winter. Notably, in December, January, February, and March, the roads get blocked because there is heavy snowfall here, resulting in a shortage of essential supplies in the delivery rooms, including heating systems and medicines.

(Fid 001)

The same participant added that referring patients to other healthcare facilities becomes a daunting task because of the unavailability of ambulance services due to road blockage, making it impossible to send patients to well-equipped facilities. Consequently, they had no choice but to manage complicated cases on their own. As narrated by the participant:

We have to deal with many challenges. Antenatal and postnatal mothers cannot reach us due to the harsh winters, and ambulances and other local transport can also not reach us because of

road blockages. Sometimes, due to road closures, emergency cases cannot be referred, so we have to manage them ourselves. (Fid 001)

Likewise, some participants also mentioned that when ambulances are unavailable for referral, they depend on local emergency services for assistance. The ambulance tires are equipped with chains to ensure safe patient transportation to medical facilities, and this allows them to navigate icy roads effectively. One of the participants revealed:

When we do not have an ambulance available due to heavy snowfall during critical emergencies, we call 1122 emergency services. They provide us with the necessary assistance, and in such cases, we often have to attach chains under the ambulance tires to transport them to other facilities in these icy conditions. (Rashi 008)

Some participants also revealed that referring patient become more complicated when vehicle drivers show reluctance to take risks due to snow-covered roads, “Finding vehicles during winter becomes problematic. Some vehicle operators are also reluctant to take the risk. So, for us, it becomes a significant issue” (Rash 005).

Some participants revealed that antenatal and postnatal visits become challenging during harsh weather, especially when these visits involve remote areas, where narrow roads with few vehicles are cut off by snow, “When we need to go for ANC or PNC visits, it becomes quite challenging as transportation is unavailable during winter” (Mari 002).

Another participant mentioned similar challenges faced during polio vaccination campaigns, mainly when heavy snowfall occurs. As narrated by the participant, “Due to heavy snowfall, those routes become inaccessible for us. Especially, during polio vaccination campaigns, we have to visit remote areas in this harsh weather” (Ani 003).

Some participants expressed concern regarding the consequences of road blockages during inclement weather, leading to delays in reaching expectant mothers who require emergency care.

These delays can have severe repercussions for the health of mothers during childbirth:

During the winter, heavy snowfall frequently leads to road closures, making it difficult for expectant mothers to reach our healthcare facility for delivery. In such circumstances, we have to travel to their location. However, if we experience delays due to road closures, a mother gives birth unassisted or encounters complications, like a retained placenta, because of our late arrival. These delays can result in significant challenges for us. (Ani 003)

***Category 2: Scarce Resources: Electricity, Water, and Heating inadequacies.*** Most participants reported severe resource scarcity during harsh winters, including electricity disruptions, water shortages, and heating inadequacies. This scarcity leads to problems, with increased risk of infections, poor monitoring, delays in treatment, and unnecessary complications for the patients. One of the participants revealed that when there is a shortage of electricity, heating systems, and gas supply, they need to resort to firewood as an alternative heat source to ensure consistent temperature in healthcare facilities. One of the participants commented:

When new babies are born in our region, we confront many challenges for their well-being. I face difficulties with the heating system and gas supply during severe colds, so we need to gather firewood. The electricity is often unavailable for hours. (Fid 001)

In regard to resource scarcity, one of the significant challenges that exacerbate midwives' difficulties in providing care is chronic electricity disruption during harsh winter weather, resulting in darkness in the labor room, making it difficult for midwives to work effectively.

Some participants reported that due to extended power outages and seasonal solar panel ineffectiveness, they use torches to navigate in the darkness; they purchase high-quality torches from



the local market, which they use for the care of mothers and newborns. This situation makes it difficult for them to attend to births, especially at night. As narrated by one of the participants:

We have a limited number of solar panels installed here, which sometimes fail to function during extreme winter conditions, and we often experience shortages of electricity for durations of 10 days, five days, or even up to a month. That is why we buy good-quality torches, which we use during mother and baby care. (Ani 003)

Another participant stated that they use torches for regular patients and reserve generators for critical cases due to prolonged hours of electricity disruptions. However, these partial arrangements of electricity lead to patient dissatisfaction:

Sometimes, we do not have electricity for hours, and during that time, we face difficulties. Patients frequently complain to us to make arrangements for electricity. For emergencies, we have generators that we use for the most critical patients. For regular patients, we rely on torches and similar alternatives. (Rashi 008)

Some participants highlighted the repercussions of power outages during winter, leading to phone battery depletion and hindering communication. As one of them said:

Sometimes, the situation arises where there is no electricity, and our cell phones run out of charge, so we cannot receive calls. Patients who are in pain cannot inform us through a call. In such cases, they send someone from the household to inform us. (Mari 002)

Besides this, water scarcity was also highlighted as one of the major challenges that the midwives encountered during the harsh winter weather. Most participants reported that one of the significant issues that they encountered in harsh weather was lack of portable tap water, including warm, water because everything tended to freeze. One of the participants shared, “During winter, we usually have a scarcity of water here because it is a cold area. As you

probably know, water tends to freeze due to the low temperature, and then it takes on an icy form” (Shak 004).

Some participants also reported that freezing water creates difficulties in maintaining basic hygiene and cleanliness. A participant verbalized, “In winter, water turns into ice, leading to various difficulties that we have to overcome. The major difficulties we face are washing hands and giving baths to patients” (Ayes 009).

Some participants expressed concerns about frozen water in the taps, resulting in a lack of water for drinking and restroom use. They also acknowledged and appreciated the assistance provided by the helpers in the maternity settings, who fetched water from the river to alleviate the water scarcity issue. One participant stated:

Here, the winters are extremely cold, and we don't even have water to drink. All the pipes in our washrooms freeze, so there's no water available in the washroom either. We have a watchman and *Aaya* who, out of compassion, fetch 3/4 drums of water from the river for us. (Rashi 008)

In addition, some participants also shared that along with the frozen faucets, the river water also freezes, and they have to break the river ice to obtain water from underneath. One participant said, “The water supply in the pipes also gets blocked, and because of that, restrooms also remain closed. Sometimes, we have to break the ice on the river to get water” (Razi 007).

In addition to the above-mentioned issues, heating inadequacies have also been identified as a major challenge encountered by midwives. These inadequacies involve the unavailability of heaters or warmers and the lack of temperature monitoring devices, particularly in maternity settings and, more specifically, in labor rooms. Most participants expressed that one of the significant challenges that midwives experience is the lack of a heating system in the labor room, which is considered compulsory to keep newborns warm. As narrated by a participant, "Yes, for us, keeping newborn

babies warm in the cold winters is a significant challenge, especially in the labor room because we do not have a heating system or any kind of heating facility” (Fid 001).

One of the participants highlighted that the leading causes of death in the area were exposure to cold and pneumonia, primarily due to the lack of a heating device, “Here, most of the deaths, especially in Gilgit Baltistan, occur due to exposure to cold or pneumonia. Because there is no proper heating system here, this becomes the major challenge” (Shak 005).

Some participants expressed concerns about the limited facilities in their setting. Midwives use heaters and stoves intermittently and carefully manage their use of firewood. This challenge becomes especially critical during winter when the demand for firewood rises, but the supply remains limited. The participant emotionally expressed:

During the winter, we face various challenges. We have only one heater, which we use when examining patients. Therefore, when patients leave, we turn off the heater. We use traditional stove *angithi* in our rooms but do not keep it burning continuously because our region experiences extreme cold, and we need to use firewood carefully. (Ayes 009)

One of the prominent issues identified by most of the participants was the absence of a temperature monitoring device in the labor room. This becomes increasingly challenging for midwives as they need to balance the inside room temperature. Particularly when the outside temperature drops. One of the participants said, "No, we do not have any equipment to maintain and monitor room temperature. Therefore, maintaining a moderate room temperature becomes problematic for me” (Fid 001).

Many participants mentioned that they rely on traditional heating methods, but the dampness of the wood hampers their ability to burn the stove. One of the participants stated:

We use a traditional stove *Angethi* to heat the rooms. In case, God forbid, the wood is damp, then we cannot even light a fire because the wood often remains wet due to the

cold weather. We do not have any other suitable system in place. So, we have to deal with several challenges due to the cold weather. (Ayes 009)

Burning the traditional stove takes time to warm the room. Some participants reported delays in achieving a comfortable labor room temperature during active labor. However, there is enough time for adequate heating during the early stages of labor with substantial dilation. As narrated a participant:

We have never experienced a situation where the labor room became extremely cold. However, in some cases, when a mother arrives in active labor, it may take longer for the room to reach a comfortable temperature. Moreover, if the mother is in early labor, with dilation at around 5cm or 6-7cm, we have ample time to ensure that the labor room is adequately heated. (Shak 005)

**Category 3: Burning Firewood Posing Safety Risks.** Most participants revealed

health and safety concerns regarding use of wood in traditional stoves for heating.

This practice is not only costly but also causes health issues. Igniting the wood can be challenging, sometimes requiring harmful combustible materials, resulting in discomfort and eye irritation in caregivers and mothers. As narrated by a

participant:

Winters begin in November and last until April. For heating, we burn wood, which is costly and generates a lot of smoke. Heating is a significant issue here. Igniting the firewood is quite challenging; sometimes, we have to use paper or plastic. Burning firewood causes tears in our and mothers eyes. (Shib 006)

Similar concerns were shared by other participants, “Lighting the fire *Angethi* creates smoke inside the room, causing discomfort in our eyes. Breathing also becomes very difficult for the patient due to the smoke, which becomes a major issue for the patient” (Fid 001).

However, a few participants expressed disagreement regarding the harm caused by burning

firewood. However, they emphasized the need for caution due to the risk of burning accidents. One of the participants expressed, “During the winter, we rely on using fire to keep the rooms warm by using *Bukhari*. Using the traditional stove *Bukhari* does not cause smoke issues, but there is a risk of burning accidents, such as clothes catching fire” (Raz 007).

**Category 4: Cold Weather Threat to Drug Efficacy.** Some participants expressed the effect of winter weather on medications, as the medications become severely cold during harsh winter, which can cause shivering and discomfort in patients. As a solution, they warm them by immersing them in hot water before administering them to patients. One participant verbalized:

The drip does not freeze completely. However, it gets extremely cold and does not match the body temperature, so we can't attach the drip directly to our patients because they might shiver during delivery due to the cold drip. So, we have to warm them in hot water, melt the ice, and then administer them to the patients". (Rashi 008)

Some participants revealed that certain medications, such as drips, syrups, and ampules, become extremely cold and even freeze during the winter, "In the centers, the medicines, including drips, syrups, and ampules, all become extremely cold and sometimes even freeze” (Ayes 009).

A few participants also reported that, during winter, the labor room gets extremely cold, causing spilled water to freeze instantly. The liquid medication turns cold. The pre-warming process of medication is necessary but time-consuming, potentially delaying treatment and risking damage to their molecules. As reported by a participant:

The labor room completely freezes over; even if water spills on the tiles, it freezes instantly. Even the medicine drips get cold in winter; we must warm them in hot water. This process takes time, and if a mother's blood pressure drops during the delay, we cannot administer the drip at that time because the drips become extremely cold. If we put them in warm water too quickly, the molecules can get damaged, so we face these issues. (Raz 008)

The freezing of medicines, due to inclement weather, also creates difficulties during medical treatments and surgical procedures. One of the participants expressed:

Items like Pyodine and Dettol freeze in the extreme cold, causing difficulties for us.

Sometimes, when there is a sudden road traffic accident, patients come to us, and when we need to clean their wounds with normal saline, it often turns extremely cold, making it challenging for us and the patients. Additionally, during a C-section surgery, when we need to clean the stitches with Pyodine, it also freezes in the cold weather, creating difficulties for us.

(Fid 001)

**Theme 2: Indigenous Strategies for Warmth and Wellness.** This theme emerged when the participants shared the strategies that they used to provide care in maternity settings during the harsh winter weather. It revealed that midwives employ indigenous methods to combat the harsh winter and ensure the well-being of both mothers and newborns. This theme is divided into four categories:

Traditional Warming of the Labor Room, Maternal and newborn Hygiene Rituals, Freezing weather-warm care: Newborn Hypothermia Prevention, and Sterilization practices.

**Category 1: Traditional Warming of the Labor Room.** In response to these challenges, midwives employ traditional warming techniques such as *Angethi* and *fujika*. These are the traditional stoves that midwives employ for heating and room warming purpose, to create a warm and comfortable environment for maternal women and newborns during the harsh winters. Majority participants reported that they follow these traditional warming approach to warm the room and maintain its temperature. Additionally, midwives insulate the room to enhance its efficiency and also assess its warmth based on personal comfort. When they feel sufficiently warm, it indicates that the room is suitable for the delivery. One participant stated:

To keep the temperature at a certain level, we burn pieces of wood in a stove *Angethi* to warm up the room. After lighting the stove, we cover the windows with curtains, close doors, and air

wells *Roshan Dan* to maintain the room's temperature. Once we realize that our bodies have become warm, we proceed with the delivery. (Fid 001)

Some participants reported that closing windows to manage labor room temperature leads to inadequate lighting, requiring midwives to rely on torches or lanterns. As one of them said,

We do not have any advanced facilities to regulate the room temperature. Just before the delivery, we shut all the windows and ignite the fire on the stove (*Angethi*) to manage the room temperature. However, due to the closed windows, the room becomes dimly lit, and it gets difficult to see correctly, which becomes challenging for us during deliveries. As a solution, we rely on torches or lanterns to assist us during the delivery process. (Ani 003)

Another participant shared the importance of burning firewood. She said, "We use local firewood. We burn it to warm up the room, maintaining its temperature. This is done to prevent both the mother and the baby from getting hypothermia later" (Shak 004).

Another traditional method that midwives use alongside the stove during the winter is the (*fujika*) which operates on kerosene oil. This is another traditional tool employed for the same purpose of regulating room temperature during childbirth. As narrated by midwives:

There is no central heating system here. To warm up the room, we use a stove and burn a significant amount of wood to bring the room to a comfortable temperature. We also use (*fujika*) which runs on kerosene oil. We turn it on to maintain warmth. (Rash 005)

**Category 2: Maternal and Newborn Hygiene Rituals.** Most participants shared the hygiene practices that they used for the mother and newborn, mainly when portable water is unavailable or frozen. One of the participants described a method in which they heated icy water on a stove and warmed a bottle of baby oil on the same stove. They used this warmed oil for cleaning purposes. Additionally, they utilized a warm, damp cloth or gauze to clean the mother. In a participant's words:

To maintain the hygiene of both the mother and the baby, we use a wood-burning stove *Bukhari*. When the fire is lit, we place a container with water on it so the water gets heated. Then, we put a bottle of baby oil in the warm water. Right after delivery, we use the warm oil to clean the baby, and we advise the mother to bathe the baby after a week. If the mother has any blood or other substances on her, we clean her with warm water, using gauze or cotton. (Mari 002)

Another participants expressed:

The water supply becomes limited during winter. So, we try to store water in advance and later use it by boiling it when necessary. We use this stored water not only for hand washing but also for drinking purposes. We use the same method for mothers and their children. As a healthcare provider, we keep hand sanitizers readily available. If water is unavailable, we use sanitizers for hand hygiene. (Shak 004)

Some participants expressed their commitment to the practice of comprehensive cleaning in the labor room, “For other things like cleaning, we send the security guard to fetch water from the river, and then we clean everything, from the labor room to the delivery bed, including the Macintosh. We keep everything clean” (Rash 005).

***Category 3: Freezing Weather - Warm Care: Newborn Hypothermia Prevention.*** Almost all participants shared their practices to prevent newborns from experiencing hypothermia during harsh winters. These practices include drying the baby's head, using a warm cloth, placing a cap on the baby's head, putting the baby on a warm surface, and ensuring immediate skin-to-skin contact with the mother. One of the participants expressed:

After the delivery, we ensure that the newborns are kept warm. When a newborn baby is born, we gently dry their head and then cap them. After drying their head and body with a warm cloth, we lay them on a warm and clean surface. Then, we wrap them in a warm blanket, place



them in the mother's lap, with skin-to-skin contact, and ask the mother to feed the baby. (Fid 001)

Most participants highlighted proactive efforts to prevent hypothermia, including pre-room heating and immediate encouragement of Kangaroo Mother Care after delivery. As expressed by one of the participants:

Our primary target is to prevent the baby from hypothermia, so we first warm up the room. When the mother starts experiencing true labor pains, we prepare the room by lighting up the firewood in the stove *Bukhari* to maintain the room temperature. Then, right after the delivery, we quickly clean the baby with baby oil and immediately ensure skin-to-skin contact with the mother. At the same time, we try to wrap them in blankets to keep them warm and facilitate immediate mother-to-baby breastfeeding. This ensures that the baby stays warm and is protected from hypothermia. (Mari 002)

Another participant reported their strategies that they used during unexpected deliveries, particularly in emergencies. They used an *Angethi* to adjust room temperature, however, the sudden arrival of delivery made it challenging to prepare the room thoroughly. They highlighted that the extreme cold even affected their ability to function, and they mentioned using their body heat to protect the baby from hypothermia:

In our situation, when patients are fully dilated and arrive in a maternity setting suddenly, without any advance notice, they come from distant areas, so we are unprepared, because we need to make preparations in advance. We adjust the room temperature by using *Angethi*. When they arrive in an emergency, we need to expose the patient entirely, and they become extremely cold. It is so cold here that even our hands do not function properly. After delivery, we try to provide skin-to-skin contact for the

baby, and sometimes, it's so frigid that we have to use our body heat to protect the baby from hypothermia. (Shib 006)

**Category 4: Sterilization Practices.** Most midwives shared that they collected and melted icy river water on a stove to sterilize surgical or reusable equipment. If boiling was insufficient, they used antiseptic solutions for sterilization. One of the participants revealed:

We collect water from rivers and then boil the iced water on a stove and sterilize our delivery kit. However, even if this does not work, we use alcohol, Dettol, or iodine to sanitize these delivery kits to keep them free from germs. (Fid 001)

Another participant expressed a similar strategy for sterilizing equipment:

We do not have any facilities or resources here, so we use firewood. We keep water preheated. To reuse the delivery kits, we place them in a clean container, boil them, and then clean them with an antiseptic lotion. (Shak 004)

**Theme 3: Coldness Jeopardizing Midwives' Well-Being.** Extreme cold conditions present significant challenges that affect the physical and emotional well-being of participants. Two main categories were identified: one that emphasizes the psychological impact, and the other that focuses on the physiological effects.

**Category 1: Winter Stress and Woes.** Most midwives emphasized the burden of physical exhaustion and mental stress induced by the harsh winter conditions. Moreover, the scarcity of resources exacerbated the situation. Winter substantially increased their workload, leading to disheartening. Long hours of travel exhausted them, reducing family interactions and disrupting sleep patterns. One of the participants expressed:

We often experience mental stress during the winter because of the intense cold and its challenges. We do not have many resources available, and the winter season increases our workload substantially, while making us feel disheartened. The long hours of travel exhaust

us, and due to the increased workload, our interactions with our families decrease, and our sleep is also affected. (Ayes 009)

One of the major concerns that most midwives shared was ensuring the safety of both the mother and newborn, in view of adverse weather conditions, which disrupted access to essential supplies, and fear of newborn getting hypothermia, this causing tension in their caregiving efforts. One of the midwives reported, “During the winter months, there is constant stress about the safety of mother and child. Due to heavy snowfall, roads and essential supplies, like food and medicine, are not available on time, which causes tension" (Raz 007).

Another participant revealed, “During severe cold, there is much stress. The biggest worry is to prevent the baby and the mother from getting cold. We are particularly concerned about ensuring that the baby does not experience hypothermia” (Ani 003).

***Category 2: Prolonged Journey and Health Fatigue.*** Some participants also revealed that navigating the mountainous terrain, with limited transportation, in snowy conditions, can turn a simple journey into a lengthy ordeal, requiring up to two hours of walking. This physical exertion exhausts midwives and has adverse effects on their health:

As it is a mountainous area, sometimes it takes an hour to reach our destination, and other times it can take up to two hours. We have to travel on foot because transportation is limited due to the heavy snowfall. This physical exertion leaves us quite exhausted, impacting our health. (Ayes 009)

Another participant shared:

Yes, ma'am, the most significant challenge and source of tension for us during severe winter conditions arises when we have to travel to remote areas for postnatal visits. If there is a 1 km road to reach the destination, due to heavy snowfall, it often gets extended to at least three km or more. (Shak 004)

A few participants also expressed the harsh realities of dealing with snow-related challenges, requiring early departures, on-foot travel, and the fear of being stuck in centers:

We need to leave our homes early because the roads get blocked due to snow, and we have to cover the distance on foot. We also have to return home before it gets dark; otherwise, we are left with no choice but to stay there. This issue causes us a great deal of concern.

(Ani 003)

**Theme 4: Midwives' Resilience and Struggles: Harsh Winters.** The theme emphasized the midwives' resilience and dedication despite working in harsh weather conditions. From the data provided by the participants, two major categories were identified: Antenatal Preparedness in Harsh Winters, Unwavering Spirit, and Commitment to Work. Each category is discussed below.

*Category 1: Antenatal Preparedness in Harsh Winters.* Most participants revealed that they took proactive measures during antenatal to prepare mothers for winter deliveries. They informed and guided mothers to bring warm clothing, blankets, and other necessities for their newborns. As stated by one participant:

When it comes to newborns, the mothers who come for antenatal care are pre-booked. The expected due date is determined, and if they are expected to deliver in winter, we inform them during early antenatal care to bring warm clothes, blankets, socks, hats, and all necessary things for the baby. We inform the mother to wash and iron these items to protect them from germs before bringing them along. (Rash 005)

Most participants shared that they prepared antenatal mothers for winter challenges by conducting sessions on hypothermia, educating them about post-delivery care practices, and providing instructions on precautionary measures to protect their babies from cold-related conditions. One participant expressed:

For mothers, the session on hypothermia is usually conducted during our antenatal period. During these sessions, we provide information on what steps mothers should take after delivery to protect their newborns from hypothermia, especially when giving birth in cold weather. We discuss various precautions that they can take to ensure their baby stays warm and is safeguard against severe cold-related conditions, like pneumonia. Mothers can better understand and prepare for these situations through provision of this education during the antenatal period, making it easier for them to handle such challenges. (Shib 006)

Another participant reported, “When the roads gets blocked, we start early referrals. For patients who come to us for antenatal care and are identified as high risk or have previous surgical scars, we refer them early” (Raz 007).

***Category 2: Unwavering Spirit and Commitment to Care.*** The majority of midwives expressed remarkable zeal and determination, even in challenging conditions. They were deeply committed to ensuring the safety and well-being of mothers and infants. Their compassionate approach, especially for those in need, exemplified their unwavering dedication. Despite adversity, they remained strong and resilient. One of the participants proudly shared:

We care for the mother and the child, ensuring that they are kept warm. We make sure they do not face any issues or discomfort. We know how to keep the mother and child warm. Besides, many needy patients cannot go elsewhere for treatment, so even in these challenging circumstances, we try our best to facilitate and assist the patients as much as possible from our side. (Rashi 008)

Similarly, another participant expressed a strong connection to their place of work and a steadfast commitment to their duties. The participant verbalized:

This is our birthplace, so we have become accustomed to it. It means we do not feel bad about it, and we are not overly excited either. There is no thing that can demotivate us

because we are connected to our work. We consistently do our work, and it does not matter whether it is cold or anything. Because we are ready to do our job even in difficult times.

(Ayesha 009)

**Theme 5: Future Directions for Advancement in Rural Healthcare.** The participants suggested two strategies to mitigate challenges and improve the quality of mother and newborn care. The categories under this theme include (1) Innovation and advancement in infrastructure. (2) Professional Growth and Skill Enhancement.

**Category 1: Innovation and Advancement in Infrastructure:** Almost all participants suggested the need for advanced facilities to work effectively during harsh the winter weather. They recommended transitioning from traditional firewood heating to gas or electric heaters due to smoke-related health concerns. They emphasized the importance of improving transportation services during winter, particularly for timely maternal referrals. One of them said:

Instead of using the traditional firewood system, I suggest we arrange for gas heaters or electric heating in our area. The firewood system Bukhari is quite challenging, mainly due to the smoke, because it causes breathing difficulties. During the winter, there should be transportation arrangements so that we can save time and refer mothers promptly when needed. (Shib 006)

Another participant suggested:

I wish that we had a complete setup or a device here through which we could determine the room temperature. Additionally, I desire that we have a solution for our electricity issue. Due to the lack of electricity, our cell phones often run out of charge, which prevents us from receiving calls for ANC (Antenatal Care) and PNC (Postnatal Care). This creates much trouble for us. If we have electricity, we would use heaters and other appliances, and we would also use electric geyser to heat water. (Mari 002)

Another participant suggested the idea of upgrading the sterilization facilities. She expressed: As a healthcare provider, I suggest that we should have the same facilities available in primary healthcare centers, to work more effectively. For example, essential equipment that is required to keep babies warm should be provided. Resources, such as autoclaving machines for infection prevention, should also be available. If all these resources are provided, it would significantly enhance our ability to provide better care. (Rash 005)

**Category 2: Professional Growth and Skill Enhancement.** Some participants suggested further training for midwives' professional development, “Further training in Kangaroo Mother Care (KMC) and Helping Babies Breathe (HBB) should be provided, as this would greatly enhance the care provided to patients during this weather” (Raz 008).

Another participant recommended:

I suggest conduction of regular training sessions to refresh our knowledge and skills in safe delivery practices, especially in challenging weather conditions. Additionally, organizing community workshops on newborn and maternal care can empower local families and contribute to improved health outcomes. (Ayes 009)

## **Summary**

This chapter presented the study findings and participants' demographic data. The analysis of interviews revealed five key themes. These included: (1) Adversities and hindrances faced by Midwives amid Harsh Winter Conditions, (2) Indigenous Practices for Warmth and Wellness, (3) Physical and psychological impact on midwives, (4) Midwives' Resilience and Dedication Amidst Challenges, (5) Recommendation for future advancement.

## **Chapter Five: Discussion**

This chapter discusses the study's findings based on midwives' challenges and the strategies used to provide care in maternity settings during the harsh winter weather in the northern areas of Pakistan. The chapter is classified into three sections. In the first section, the key findings of each theme are discussed. The second section explains the strengths and limitations of this study and offers recommendations for the future based on the findings of the study. The last section includes the conclusion section and a summary of the chapter.

### **Transportation Delays: Risk to Maternal Health**

Maternal and newborn health in remote areas like Gilgit-Baltistan faces significant challenges due to the geographical barriers and limited healthcare access, leading to a higher incidence of maternal deaths as compared to the rest of the country (Jan et al., 2023). One of the factors identified during the analysis of the findings is unavailability of transportation due to road closures, particularly in the harsh winter weather. This poses a major obstacle for expectant mothers to reach healthcare facilities for delivery. In such situations, midwives often have to travel to the mother's location. However, delays caused by road closures and transportation, can result in mothers giving birth unassisted or experiencing complications such as a retained placenta due to the late arrival of midwives. Similar findings were identified in a study conducted in Pakistan, in the same region, which highlighted that harsh weather is a major contributor preventing pregnant women from seeking healthcare from maternity settings (Shahnaz et al., 2015). This problem can exacerbate, particularly when women go into labor at night when public transportation is not available (Iftikhar ul Husnain, Rashid, & Shakoor, 2018).

In numerous studies, the absence of transportation has been highlighted as a major hindrance in accessing maternal health services, including antenatal care (ANC), emergency obstetric care



(EmOC), and postpartum care (Geleto, Chojenta, Musa, & Loxton, 2018; Kironji et al., 2018).

Thaddeus and Maine (1990) proposed a three-delay model that identifies delays in seeking, reaching, and receiving care as the key factors contributing to maternal mortality. This model underscores that one of the significant factors causing delays in reaching healthcare facilities, both from home and from the first service point to the referral Center, is transportation (Atuoye et al., 2015). Within the Three Delays Model, lack of vehicles, road infrastructure, and a scarcity of ambulances affect the second delay (Geleto et al., 2018). Similarly, it was also indicated that delays in reaching a healthcare facility significantly contribute to maternal mortality (Ajegbile, 2023).

Therefore, to enhance healthcare access and ensure timely maternal and newborn care, several strategies should be considered. For instance, investing in road infrastructure, and establishing maternity homes in close proximity to maternal facilities, or encouraging antenatal mothers to relocate closer to the facilities, especially as the delivery time approaches, and to remain there until the baby is delivered. The maternity homes should have access to all necessary facilities, including areas for patients to prepare food, and provide a minimum level of comfort and dignity. Similar recommendations were also found in one other study (Iftikhar ul Husnain et al., 2018). Moreover, close geographical and social proximity of midwives to the communities they serve is a valuable asset (Nove et al., 2021).

### **Winter Maternity Care: Battling Resource Shortages**

Another key findings in this study, is the prolonged **electricity disruption** during harsh winters in maternity settings, necessitating midwives to rely on torches during deliveries. This finding is consistent with the studies conducted in Ghana and Malawi, where midwives similarly relied on unconventional methods, such as torches, Kerosene lamps, and mobile phone flashlights to supplement lighting during the childbirth process (Ismaila et al., 2021; Reuland et al., 2020). Other studies have also reported that electrical power supply can have a profound impact on the provision of healthcare services, and persistent shortages of resources not only hindered their ability to work safely but also compromised the

quality of the care that they could deliver (Bogren, Grahn, Kaboru, & Berg, 2020). For example, life-saving care may be delayed when the site of vaginal tears cannot be identified due to insufficient lighting, or when there is only one light source available for both the mother and the infant (Rokicki, Mwesigwa, Schmucker, & Cohen, 2019).

Moreover, the absence of electricity and reliable lighting sources not only exposes health workers, mothers, and infants to the risk of infection through cross-contamination, but also increase the risk of injuries from the sharp objects used during childbirth (John, Mkoka, Frumence, & Goicolea, 2018). It also poses challenges in using equipment, such as fetal monitors and warmers (Okeke et al., 2017). The United Nations acknowledges that providing fundamental necessities, such as consistent electricity, can encourage midwives to work in rural areas, thus improving access to critical maternal and child health services (Essendi et al., 2015).

Another challenge identified in the current findings, is the **lack of portable water**, particularly during harsh winters when water freezes and becomes inaccessible, due to which washing hands, sanitation, hospital cleanliness, and giving baths to patients become difficult. The unavailability of water hampers their ability to provide basic and standard hygiene care for both mothers and babies (Dalinjong, Wang, & Homer, 2018). The findings of the current study are in line with the results of previous studies (Asif, 2017; Reuland et al., 2020). Furthermore, a research conducted in 78 countries indicated that approximately half of the healthcare facilities, including maternity settings, do not have access to piped water (Hirai et al., 2021), This situation jeopardizes the quality of care and presents a challenge for midwives in achieving universal health coverage and meeting the Sustainable Development Goals (SDGs).

Moreover, the World Health Organization (WHO) has reported that healthcare facilities lacking access to water and essential hygiene services represent a deadly threat to pregnant mothers, newborns, and children. Shockingly, each year, approximately 670,000 newborns lose their lives to sepsis (WHO,

2022). Proper water, sanitation, and hygiene (WASH) in healthcare facilities are essential for delivering safe and high-quality healthcare services. Hence, establishing an effective environment for enhancing WASH services in maternity settings requires supportive policies, ongoing investments, national standards, specified objectives, and clearly outlined responsibilities for stakeholders (WHO, 2015). However, enhancing WASH facilities alone is not sufficient; additional initiatives, such as training and compliance assessment, are needed to enhance and attain the desired objectives (Arowosegbe et al., 2021).

Among the multitude of resource challenges that midwives face in maternity settings, lack of heating systems and **lack of room temperature monitoring devices** is one of the most detrimental barriers identified in the current study. In this study, midwives employed the practice of burning "fujika" or "Angethi" (traditional stove) for heating and room warming, as they do not have any central and advanced heating system. Moreover, due to the unavailability of temperature monitoring devices in the labor room, the midwives self-determine the temperature according to their own comfort.

Maintaining an optimal temperature is a key aspect of managing neonatal intensive care units and delivery rooms (Ahmad et al., 2016). The literature suggests that the recommended appropriate delivery room temperature must remain at a minimum of 25°C for full-term babies and between 26–28°C for preterm babies (Oygür, Önal, & Zenciroğlu, 2018). However, the absence of such devices makes it challenging for midwives to accurately determine the room's temperature, especially when the external temperature drops to extremely cold levels. The unavailability and inadequacy of such equipment remain a concern for high-risk neonates, particularly in resource-constrained environments (K Lunze & Hamer, 2012). According to WHO, maintaining a suitable indoor temperature is essential within healthcare facilities (Organization, 2023). This aligns with the study conducted in Zambia, which revealed that warming and maintaining the appropriate room temperature has been found to be protective against neonatal hypothermia (Nguyen, Mitsakakis, Sucha, Lemyre, & Lawrence, 2022).

Another finding of the current study showed that the utilization of traditional heating stoves, such as the Angethi, requires considerable time to create a warm and comfortable environment in the delivery room. This situation becomes challenging during emergencies when full-term mothers arrive unexpectedly for delivery; this presents challenges in swiftly preparing the room appropriately for delivery. However, no comparable findings have been identified in other studies. But, the findings of the current study might align with the concept of the 'third delay' within the Three Delays Framework proposed by Thaddeus and Maine, in 1990, that refers to a delay in receiving timely and adequate care during childbirth at the healthcare facility (Actis Danna, Bedwell, Wakasiaka, & Lavender, 2020).

### **Newborn Survival: Preventing Hypothermia in Severe Weather**

Midwives are often the initial and most proactive healthcare professionals in identifying potential risks and critical conditions in infants, and they undertake actions to mitigate these risks. Regulating the body temperature of infants is a significant duty of nurses (Verklan & Walden, 2015). Considering the challenges that midwives face due to inadequate heating resources, they use several strategies to mitigate those challenges and try to deliver high-quality care to both mothers and newborns in the maternity settings during the harsh winter weather. One of the key strategies identified in this study, is the implementation of hypothermia prevention techniques during harsh winter conditions. The midwives ensure sufficient warming of the room prior to delivery. After delivery, they take the following steps to protect newborns from hypothermia: drying the baby's head with a warm cloth, placing a cap on the baby's head, positioning the baby on a warm surface, and ensuring immediate skin-to-skin contact with the mother. These practices are also recommended in the WHO thermal protection guidelines, described as a “Warm Chain” (Organization, 1997). Similar practices can also be seen in other studies (McCall, Alderdice, Halliday, Vohra, & Johnston, 2018 ; Vilinsky & Sheridan, 2014). These techniques are considered to be major contributors to keep newborns warm.

Moreover, the literature suggests that Kangaroo Mother Care (KMC) is the most preferred approach for preventing and addressing hypothermia in low birth weight newborns. However, the literature suggests that Kangaroo Mother Care (KMC) may not always be feasible. As a result, they emphasize the significance of developing technologies such as radiant warmers that can be used alongside Kangaroo Mother Care (KMC) to enhance the health outcomes of premature and unwell neonates. Moreover, in cases where such equipment is not accessible, the guidelines recommend implementing skin-to-skin care for clinically stable neonates. However, when no such equipment is available, maintaining a normal body temperature in clinically unstable neonates becomes a significant challenge (Kyokan, Rosa-Mangeret, Gani, & Pfister, 2023).

### **Physical Exhaustion and Mental Fatigue**

Gilgit-Baltistan is a mountainous region, characterized by harsh terrain. In this challenging landscape, midwives face formidable obstacles, especially during periods of heavy snowfall. The inaccessibility of transportation compels them to travel on foot, making the journey long and contributing to physical exhaustion. The difficult roads sometimes take up to two hours for midwives to reach women's homes (Jaffer et al., 2017). Moreover, the harsh weather amplifies their workload as they engage in additional preparations for the winter season.

Several Studies have reported the impact of these challenges that they ultimately lead to reduced quality of care and emotional disengagement from their work. Additionally, these barriers also contribute to psychological distress, and burnout, negatively affecting midwife retention (Bremnes et al., 2018; Ismaila et al., 2021).

In this study, the participants also reported fear of hypothermia in the newborn. This finding is congruent with the study conducted in Tanzania, in which the finding underscores that, the fear and anxiety of midwives that arose from their sense of responsibility to ensure the baby's survival (Moshiro, Ersdal, Mdoe, Kidanto, & Mbekenga, 2018).

## **Antenatal Education and Training**

The results of the study found that midwives prepared expectant mothers for winter challenges by conducting antenatal sessions on kangaroo mother care, to teach them preventive measures for the prevention of hypothermia during the harsh winter weather. This proactive education equips mothers with the knowledge and readiness to effectively handle such challenges. This is in line with a study carried out in Ethiopia. It was noted that women in Ethiopian health centers and hospitals at all levels were provided with information about specific pregnancy complications during their ANC care visits (Limenih, Belay, & Tassew, 2019). This strategy is founded on the principle that adequate preparation for childbirth reduces any potential delays in accessing the necessary care (Acharya, Kaur, Prasuna, & Rasheed, 2015). Moreover, antenatal education has the potential to alleviate maternal stress and enhance maternal self-confidence (Hong et al., 2021). Literature suggests that, informing and educating mothers about skin-to-skin care should begin during antenatal care visits, continue through labor and birth, and be reinforced during postnatal care visits (Osman, Egal, Abdi, Mohamud, & Erlandsson, 2021).

In this study, it was highlighted that the midwives prioritize the well-being of mothers and children, showing remarkable dedication and compassion. Notably, even in challenging circumstances, these providers consistently go beyond their call of duty to aid vulnerable patients who lack alternative treatment options. This finding aligns with other studies, highlighting midwives' unwavering determination to provide essential care, driven by their deep affection for the communities they serve and their respect for the women they assist. Despite challenging work environments, midwives exhibit a strong commitment to women and newborns, rooted in their high professional ethics and patient loyalty (Daellenbach et al., 2020). However, substantial barriers limit the full realization of their life-saving potential in such contexts. To support midwives, investments should be made not only in increasing their numbers but also in enhancing their education, training, regulation, and working conditions (Nove et al., 2021).

## **Strengths of the study**

- This study stands out as the first of its kind in Pakistan, delving into the challenges and strategies faced by midwives in northern areas during harsh winter conditions.
- The qualitative approach is well suited for exploring the in-depth phenomenon.
- Knowing the challenges that midwives face during harsh weather, this study can help healthcare agencies and policymakers in developing targeted interventions to support midwives in delivering high-quality maternal and neonatal care under adverse weather conditions.

## **Limitations**

- The study solely reflects the viewpoints of midwives, potentially limiting the depth and diversity of insights. Including input from maternal women, Lady Health Visitors (LHV'S), Community Midwife (CMW) or hospital administrators could have offered a more holistic understanding of the phenomena studied.
- Conducted solely in one district of Gilgit due to time constraints, the study's findings may be applicable to other northern areas, such as Chitral and Hunza. However, may not be applicable to hot climate regions.
- The present study was only limited to one setting. Therefore, the researcher was unable to explore the challenges of those midwives working in government and private settings across Gilgit Baltistan.
- The sample size was small, which may limit the generalizability of the findings. A larger and more diverse sample could have provided a broader range of perspectives, contributing to a more comprehensive understanding of the challenges faced by midwives.

- As the interviews were conducted over the phone, hindered the ability to observe participants' facial expressions and body language. This limitation also diminished the capacity to provide necessary therapeutic support when needed.

## **Recommendations**

**Midwives' Education.** Regular workshops and ongoing refresher courses should be conducted in nursing institutes and maternity settings, to update midwives' knowledge, especially in preventing newborn hypothermia. Moreover, each institution should have a program of continuing education in the area of Kangaroo Mother Care (KMC) and breastfeeding. All midwifery schools should include KMC in their curricula.

**Nursing Practices.** Government and healthcare officials should provide Comprehensive Emergency Obstetric and Newborn Care (EMONC) training to nursing students and midwives to manage childbirth emergencies, addressing maternal and neonatal crises, especially crucial in challenging weather conditions.

**Future Research.** Incorporating diverse perspectives, including expectant mother's challenges that they face during harsh winter weather and understanding the impact on their maternal journey will contribute significantly to the overall richness of the research findings.

**Policy Maker.** Policymakers and health agencies should collaborate to formulate contingency plans for emergency healthcare transportation. The regional government should be actively involved in addressing and developing strategies to overcome electricity and water issues. Stakeholders from the healthcare sector, including hospital administrators, leaders, and midwives, should actively participate in the planning and implementation of infrastructure strategies.



## **Conclusion**

The study concluded that harsh weather conditions present multifaceted challenges, hindering midwives' ability to provide quality care to mothers and newborns. The presence of snow-covered mountains makes transportation and ambulance services profoundly difficult, resulting in delays in providing emergency maternal care, leading to complications. Moreover, the shortages of resources in maternity settings not only impede safe maternal deliveries but also give rise to hygiene issues. Additionally, the lack of an appropriate heating system in these facilities can jeopardize the well-being of both mothers and newborns, especially in the harsh winter conditions.

The study also discussed the strategies that midwives employ during harsh winter weather, such as use of traditional stove for heating, warming of freezing water for hygiene and sterilization purpose. The midwives also employ the strategy of thermal protection to prevent newborn hypothermia, highlighting the "warm chain" approach. Moreover, the challenges that midwives face, have a significant impact on their wellbeing, causing stress and physical exhaustion due to long travels during harsh winter weather lastly, the antenatal training and education for expectant mothers are considered vital to prepare them for these challenges.

## **Summary**

The chapter illuminated the study findings with reference to available relevant literature. The findings are consisted with the literature. Contextual evidence supported the study findings. The chapter also presented the strength, limitations, impact of the study and study conclusion.

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## Appendix B. ERC Permission Letter



# SEHHAT FOUNDATION

Main KKH, China Graveyard, Sharote, Danyore,  
Gilgit-Baltistan.  
Ph: 05811-459997 - 456977

### Approval for research study

Title of the research study: "Exploring Midwives' challenges and techniques in maternity settings during Cold weather in Northern areas of Pakistan".

Primary investigator: Sana Sultan  
MSN Student  
Aga Khan University,  
School of Nursing & Midwifery,  
Karachi, Pakistan.

Thesis Supervisor: Dr. Rafat Jan  
Professor & Associate Dean  
Out Reach & Policy Unit  
Aga Khan University,  
School of Nursing & Midwifery,  
Karachi, Pakistan.

I, Farzana Zulfiqar, Director/Principal of Sehhat Foundation Hospital/ School of Nursing & Midwifery Danyore, Gilgit, accept to access participants' data and collect the required information after seeking their informed consent in the above study.

  
Signature



SEHHAT FOUNDATION  
School of Nursing & Midwifery  
Main KKH, Danyore,  
Gilgit-Baltistan  
05811-459997 456977

6.3.2023  
Date



آغا خان یونیورسٹی  
THE AGA KHAN UNIVERSITY

06-Jun-2023

Dr. RAFAT JAN  
Department of School of Nursing and Midwifery  
Aga Khan  
University  
Karachi

Dear Dr. RAFAT JAN,

2023-8585-25285. RAFAT JAN: “Exploring Midwives' Challenges and Strategies to Provide Care in Maternity Settings during Winter Weather in Northern Areas, Pakistan.”

Thank you for submitting your application for ethical approval regarding the above mentioned study.

Your study was reviewed and discussed in ERC meeting. There were no major ethical issues. The study was given an approval for a period of one year with effect from 06-Jun-2023. For further extension a request must be submitted along with the annual report.

List of document(s) approved with this submission.

Submission Document Name	Submission Document Date	Submission Document Version
citiCompletionCertificate_11215714_49304086	15-Mar-2023	version
ICH-GCP certificate -RAFAT JAN		
citiCompletionCertificate-Marina Baig-pdf	20-Mar-2023	1
affidavit for translation	20-Mar-2023	1
informed consent English Appendix B	20-Mar-2023	1
inform consent urdu version	20-Mar-2023	1
STUDY PROTOCOL FINAL (1) (5)	19-Apr-2023	2
study guide English Version (Appendix C)	24-May-2023	2
Study Guide URDU VERSION D	24-May-2023	2
Demographic Profile of Participants (Appendix E)	31-May-2023	3
Demographic urdu version appendix F (1) (1)	31-May-2023	3
Permission Letter (Sehhat Foundation) Appendix A	05-Jun-2023	2
Sample form for - ERC Response (4)	05-Jun-2023	2

Any changes in the protocol or extension in the period of study should be notified to the Committee for prior approval. All informed consents should be retained for future reference.

Please ensure that all the national and institutional requirements are met.

Thank you.

Sincerely,

A handwritten signature in blue ink, appearing to read 'S. Sabzwari', enclosed in a light blue rectangular box.

Page 1 of 2

Dr. Saniya Sabzwari

Chairperson

Ethics Review Committee

## Appendix C. Consent Form

**Title of Study: “Exploring Midwives' Challenges and Strategies to Provide Care in Maternity Settings during Harsh Winter Weather in the Northern Areas of Pakistan.”**

<b>ERC application No: 8585</b>	<b>Dr. Rafat Jan</b> Professor & Associate Dean -Outreach and Policy Uniy AKUSONAM <b>Thesis Supervisor</b> <a href="mailto:Rafat.jan@aku.edu">Rafat.jan@aku.edu</a> <b>+92 21 3486-5420</b>
<b>Ms. Sana Sultan MScN</b> Student, AKU-SONAM <b>Co-Investigator</b> <a href="mailto:sana.sultan2@scholar.aku.edu">sana.sultan2@scholar.aku.edu</a> Contact number: 03353786994	<b>Ms. Marina Baig</b> Senior Instructor AKU-SONAM <b>Co-Supervisor</b> <a href="mailto:Marina.baig@aku.edu">Marina.baig@aku.edu</a> <b>+92 21 34865432</b>

### Introduction

I am Sana Sultan student of Master of Science in Nursing (MScN) at Aga Khan University School of Nursing and Midwifery Karachi. I am conducting my research study on midwives' Challenges, and Strategies to Provide Care in Maternity Settings during Winter Weather in Northern Areas, of Pakistan. This study is supervised by Dr. Rafat Jan, Associate Dean, Outreach and Policy Unit at Aga Khan University School of Nursing and Midwifery (AKU-SONAM), Karachi Pakistan. I would like to invite you to participate in this research study.

### Purpose of the study

The purpose of the study is to explore the challenges that midwives in maternity settings and the strategies they use to overcome those challenges during winter weather.

### Procedure

In this study, your challenges and strategies in a maternity setting during winter weather would be assessed through an interview guide. If you agree to participate in this study, you will be asked to answer questions about your demographic data and the challenges face during winter weather. Which will take 30 to 40 minutes. The interview guide and your response will be in the Urdu language. After data collection in Urdu, interviews will be translated into English. Further, to ensure privacy interviews will be conducted in a silent space. The interview would be audio recorded.

### Possible Risk

There are no potential harms, risk, or threats to any participants associated with this study. You might feel a sense of distress for being interviewed. To relieve your discomfort and to enhance your comfort you will be allowed to ventilate about it. Also, you have the right to refuse to answer any question that you are not comfortable to answer. You can also refuse to continue with the interview.

### Benefits

This study is for academic purposes only. There are no direct benefits to you for participating in this study, but the information you provide may help improve the quality of care provided to women during winter weather in the northern areas of Pakistan. There will be no monetary compensation provided to you for your participation.

### **Financial Considerations**

There is no payment to participate in this study and will not receive any payment for participation.

### **Right of refusal to participate and withdrawal**

You are free to choose to participate in the study. You may also withdraw at any time from the study. You also have the option not to answer any question with which you are not comfortable.

### **Confidentiality**

Your privacy will be ensured throughout the duration of the study. Moreover, all the collected data will be kept in locked cabinets, and data in soft copies will be secured by a password. The data will only be accessible to the principal investigator and committee members. However, the monitoring and evaluation team of an ethics committee, AKU may review the data for quality assurance.

### **Right to ask Question**

If you have any queries or questions related to the study or consent form, kindly contact Ms. Sana Sultan at Aga Khan University School of Nursing and Midwifery on cellphone number: 03353786994 or email address: [sana.sultan2@scholar.aku.edu](mailto:sana.sultan2@scholar.aku.edu)

### **Authorization**

I have read and understand this consent form, and I volunteer to participate in this research study. I understand that I will receive a copy of this form. I voluntarily choose to participate, but I understand that my consent does not take away any legal rights in the case of negligence or another legal fault of anyone who is involved in this study.

Name of participant (Printed or Typed): \_\_\_\_\_ Date: \_\_\_\_\_

Signature of participant: \_\_\_\_\_ Date: \_\_\_\_\_

Signature of Principal Investigator: \_\_\_\_\_

Date: \_\_\_\_\_

Name and Signature of the person obtaining consent: \_\_\_\_\_

Date: \_\_\_\_\_

## Appendix D. Inform Concern (Urdu)

باخبر رضامندی۔

مطالعہ کا عنوان: "شمالی علاقوں، پاکستان میں سردیوں کے موسم کے دوران زچگی کی ترتیبات میں دیکھ بھال فراہم کرنے کے لیے دانیوں کے چیلنجز اور حکمت عملیوں کی تالش۔"

<p>ERC درخواست نمبر: 8585</p>	<p>DR رفعت جان پروفیسر اور ایسوسی ایٹ ڈین - آؤٹ ریچ اور پالیسی <b>Unit AKUSONAM</b> ٹھیس سپروائزر <a href="mailto:Rafat.jan@aku.edu">Rafat.jan@aku.edu</a> <b>+92 21 3486-5420</b></p>
<p>محترمہ مرینہ بیگ سینئر انسٹرکٹر AKU-SONAM شریک سپروائزر رابطہ نمبر: 03353786994 <a href="mailto:Marina.baig@aku.edu">Marina.baig@aku.edu</a> <b>+92 21 34865432</b></p>	<p>محترمہ ثناء سلطان MScN طالبہ، AKU-SONAM شریک تفتیش کار <a href="mailto:sana.sultan2@scholar.aku.edu">sana.sultan2@scholar.aku.edu</a> <a href="mailto:sana.sultan2@scholar.aku.edu">sana.sultan2@scholar.aku.edu</a> <b>Contact number: 03353786994</b></p>

## تعارف:

میں آغا خان یونیورسٹی اسکول آف نرسنگ اینڈ مڈوائفری کراچی میں ماسٹر آف سائنس ان نرسنگ (MScN) کی طالبہ ثنا سلطان ہوں۔ میں پاکستان کے شمالی علاقہ جات میں سردی کے موسم کے دوران زچگی کی ترتیبات میں دیکھ بھال فراہم کرنے کے لیے دائیوں کے چیلنجز، اور حکمت عملیوں پر اپنا تحقیقی مطالعہ کر رہا ہوں۔ یہ مطالعہ آغا خان یونیورسٹی اسکول آف نرسنگ اینڈ مڈوائفری (AKU-SONAM) کراچی پاکستان میں ایسوسی ایٹ ڈین، آؤٹ ریچ اور پالیسی یونٹ ڈاکٹر رفعت جان کی زیر نگرانی ہے۔ میں آپ کو اس تحقیقی مطالعہ میں شرکت کی دعوت دینا چاہوں گا۔

## مطالعہ کا مقصد:

مطالعہ کا مقصد زچگی کی ترتیب میں دائیوں کو درپیش چیلنجز اور سردیوں کے موسم میں ان چیلنجز پر قابو پانے کے لیے استعمال کی جانے والی حکمت عملیوں کو تلاش کرنا ہے۔

## طریقہ کار:

اس مطالعہ میں، سردیوں کے موسم میں زچگی کے ماحول میں آپ کے چیلنجز اور حکمت عملیوں کا اندازہ انٹرویو گائیڈ کے ذریعے کیا جائے گا۔ اگر آپ اس مطالعہ میں حصہ لینے پر اتفاق کرتے ہیں، تو آپ سے آپ کے آبادیاتی ڈیٹا اور سردیوں کے موسم میں درپیش چیلنجز کے بارے میں سوال کا جواب دینے کو کہا جائے گا۔ جس میں 30 سے 40 منٹ لگیں گے۔ انٹرویو گائیڈ اور آپ کا جواب اردو زبان میں ہوگا۔ اردو میں ڈیٹا اکٹھا کرنے کے بعد انٹرویو کا انگریزی میں ترجمہ کیا جائے گا۔ مزید، رازداری کو یقینی بنانے کے لیے انٹرویو خاموش جگہ پر کیے جائیں گے۔ انٹرویو آڈیو ریکارڈ

## ممکنہ خطرہ:

اس مطالعے سے وابستہ کسی بھی شرکاء کے لیے کوئی ممکنہ نقصان، خطرہ یا خطرہ نہیں ہے۔ انٹرویو کے لیے آپ کو تکلیف کا احساس ہو سکتا ہے۔ آپ کی تکلیف کو دور کرنے اور آرام کو بڑھانے کے لیے آپ کو اس کے بارے میں ہوا دینے کی اجازت ہوگی۔ اس کے علاوہ، آپ کو کسی ایسے سوال کا جواب دینے سے انکار کرنے کا حق ہے جس کا جواب دینے میں آپ آرام سے نہ ہوں۔ پ انٹرویو جاری رکھنے سے بھی انکار کر سکتے ہ

## فوائد:

یہ مطالعہ صرف تعلیمی مقاصد کے لیے ہے۔ اس مطالعہ میں حصہ لینے کے لیے آپ کو براہ راست کوئی فائدہ نہیں ہے، لیکن آپ جو معلومات فراہم کرتے ہیں اس سے پاکستان کے شمالی علاقوں میں سردیوں کے موسم میں خواتین کو فراہم کی جانے والی دیکھ بھال کے معیار کو بہتر بنانے میں مدد مل سکتی ہے۔ آپ کی شرکت کے لیے آپ کو کوئی مالی معاوضہ فراہم نہیں کیا ج

## مالیاتی تحفظات

اس مطالعہ میں حصہ لینے کے لیے کوئی ادائیگی نہیں ہے اور شرکت کے لیے کوئی ادائیگی نہیں ملے گی۔

## شرکت سے انکار اور دستبرداری کا حق

آپ مطالعہ میں حصہ لینے کا انتخاب کرنے کے لیے آزاد ہیں۔ آپ کسی بھی وقت مطالعہ سے دستبردار ہو سکتے ہیں۔ آپ کے پاس یہ اختیار بھی ہے کہ

آپ کسی ایسے سوال کا جواب نہ دیں جس سے آپ راضی نہ ہوں۔

## رازداری:

مطالعہ کی پوری مدت میں آپ کی رازداری کو یقینی بنایا جائے گا۔ مزید برآں، تمام جمع کیے گئے ڈیٹا کو بند کینٹ میں رکھا جائے گا، اور سافٹ کاپیز میں موجود ڈیٹا کو پاس ورڈ کے ذریعے محفوظ کیا ئے گا۔ ڈیٹا صرف پرنسپل تفتیش کار اور کمیٹی ممبران تک ہی قابل رسائی ہو گا۔ تاہم، ہیومن اینتھکس کمیٹی، اے کے یو کی مانیٹرنگ اور جا ایویلیوایشن ٹیم کو الٹی اشورینس کے لیے ڈیٹا

## سوال پوچھنے کا حق:

اگر آپ کے مطالعہ یا رضامندی کے فارم سے متعلق کوئی سوالات یا سوالات ہیں، تو برائے مہربانی آغا خان یونیورسٹی اسکول آف نرسنگ اینڈ مڈوائفری میں محترمہ ثنا سلطان سے سیل فون نمبر: 03353786994 یا ای میل ایڈریس: sana.sultan2@scholar.aku.edu پر رابطہ کریں

## اجازت

میں نے رضامندی کے اس فارم کو پڑھ اور سمجھ لیا ہے، اور میں اس تحقیقی مطالعہ میں حصہ لینے کے لیے رضاکارانہ طور پر تیار ہوں۔ میں سمجھتا ہوں کہ مجھے اس فارم کی ایک کاپی مل جائے گی۔ میں رضاکارانہ طور پر حصہ لینے کا انتخاب کرتا ہوں، لیکن میں سمجھتا ہوں کہ میری رضامندی اس مطالعے میں شامل کسی بھی شخص کی غفلت یا کسی اور قانونی غلطی کی صورت میں کوئی قانونی حق نہیں چھینتی ہے۔

حصہ لینے والے کا نام (مطبوعہ یا ٹائپ شدہ): (تاریخ: \_\_\_\_\_)

شرکت کنندہ کے دستخط: تاریخ: / \_\_\_\_\_

پرنسپل تفتیش کار کے دستخط: تاریخ \_\_\_\_\_

رضامندی حاصل کرنے والے شخص کا نام اور دستخط \_\_\_\_\_



**Appendix E. Demographic Profile of Participants' (English)**

**Study Title: "Exploring Midwives' Challenges and Strategies to Provide Care in Maternity Settings during Winter Weather in Northern Areas, Pakistan."**

Study Participants ID: \_\_\_\_\_

Interview Date: \_\_\_\_\_

Interview start time: \_\_\_\_\_

Interview end time: \_\_\_\_\_

**Contact:** Sana Sultan, Master Scholar in Nursing

The Aga Khan University, School of Nursing and Midwifery (AKU-SONAM)

Mobile: **03353786994**

**Age:**

**Marital Status:**

**Professional Qualification:**

**Total Years of experience:**

**Designation:**

**City/District:**

**Name of Institution/Hospital:**

**What is your monthly income?**

Less than 30000  31000 to 50000  51000 to 70000  71000  
to 9000  90000 or mor

**Which type of house you are currently living?**

**Kaccha**  **Pucca**  **Semi - Pacca**

## Appendix F. Demographic Profile of Participants' (Urdu)

شرکاء کی آبادیاتی پروفائل

مطالعہ کا عنوان: "شمالی علاقوں، پاکستان میں سردیوں کے موسم کے دوران زچگی کی ترتیبات میں دیکھ بھال فراہم کرنے کے لیے دائیوں کے چیلنجز اور حکمت عملیوں کی تلاش۔"

مطالعہ کے شرکاء کی شناخت \_\_\_\_\_

انٹرویو کی تاریخ \_\_\_\_\_

انٹرویو شروع ہونے کا وقت \_\_\_\_\_

انٹرویو کا اختتامی وقت \_\_\_\_\_

رابطہ: ثناء سلطان، نرسنگ میں ماسٹر سکالر

آغا خان یونیورسٹی، سکول آف نرسنگ اینڈ مڈوائفری AKU-SONAM

موبائل: 03353786994

عم

ازدواجی حی

پیشہ ورانہ ای

شہر/ض

ادارے کا

ع

تجربے کے کل

آپ کی ماہانہ آمدنی کیا ہے؟

30000 سے کم  31000 سے 50000  51000 سے 70000  71000 سے 90000

91000 یا اس سے زیادہ

آپ اس وقت کس قسم کے گھر میں رہ رہے ہیں؟

کچا  پکا  نیم -

## Appendix G. Study Guide (English)

Title: “Exploring Midwives' Challenges and Strategies to Provide Care in Maternity Settings during Winter Weather in Northern Areas, Pakistan”.

City	Level of Education	Years of Experience
Danyore	Diploma	1 year or more

Study Participants ID \_\_\_\_\_

Interview Date \_\_\_\_\_

Interview start time \_\_\_\_\_

Interview end time \_\_\_\_\_ :

### General Guidelines for In-depth Interviews

The researcher will formally greet and address the participant and will introduce her and her role in the study. After introducing myself, the participant will be invited to provide informed consent before starting the formal interview. The participant's contribution to the discussion will be voluntary; if they do not want to participate in this discussion, they will not be forced to participate. The discussion will be audio-recorded with the participant's permission. The interviewer will explain the purpose of the study to the participants in detail. Moreover, the interviewer will not give a comment on whether the participant is right or wrong. The interviewer will also refrain from blaming things and engaging in conflicts.

### Participants

In-depth interviews (IDI) will be conducted with the midwives working in Sehhat foundation (maternity setting) located in Danyore, Gilgit Baltistan, (northern areas of Pakistan). Upon achieving saturation, further IDI will be stopped.

### Venue for IDI

The venue will be a private room of the maternity department of the Sehhat Foundation

Danyore, Gilgit Baltistan.

### Data Collection

The researcher will collect data through IDI using a study guide by asking open-ended questions to the participants. The pilot testing of the study will be done before conducting the formal IDI in a similar setting.

### **Pre-requisites for the IDI**

All the prerequisites will be arranged before initiating the IDI. This will include, the interview guide, consent forms, tape recorder, batteries, additional tape recorder, additional batteries, adequate stationery, and ensuring that all the equipment is working.

### **Introductory Scripts**

#### **Assalam-o-Alaikum**

I am thankful to you for your time; I am a graduate student at Aga Khan University, School of Nursing and Midwifery. I am conducting a research study on exploring midwives' challenges and strategies to provide care in maternity care during winter weather in northern areas of Pakistan.

I will take your time for asking some questions regarding the experiences and challenges of midwives working in the maternity setting, while taking the interview I will also take some notes.

I will discuss my list of questions about the challenges they face and strategies they use to provide care in maternity setting during winter weather. I would like to spend around 30 minutes to 40 minutes with you today. I might not be able to write down all you said, therefore with your permission, I would like to record the conversation on audio so that I can write down everything you said and not forget anything. After the study is finished, all the recorded data will be deleted and destroyed, and I'll make sure you're satisfied with the process.

#### **Research Question**

- What challenges do midwives face in maternity settings during winter weather in Northern Areas, of Pakistan?
  - What strategies do midwives employ to overcome challenges in maternity settings during winter weather in Northern Areas, of Pakistan?
1. Could you please share your personal experiences as an individual providing care in a maternity setting at Sehat Foundation during winter weather?
  2. Do you face any challenges during winter weather?  
**Probing question:**  
If yes, then what are the main challenges you face when providing care in a maternity setting during winter weather?
  3. What challenges do you face in the maternity setting to keep newborns warm (to protect newborns from getting hypothermia) during extreme winter conditions?
  4. Do you have any measures to keep the temperature of the labor room warm during

winter weather? If not, then what measures do you take to maintain the temperature?

5. Do you encounter water shortage in your maternity setting during winter?

**Probing Question:**

If yes then what problems occur in providing hygiene care, mainly during labor and delivery with the shortage of warm water? How do you sterilize equipment?

6. How do you maintain hygiene standards when water sources are limited or frozen during extreme winter conditions, both for yourself and for maternal and newborn hygiene?
7. Do your settings have basic facilities such as gas and electricity during the winter months? If not, what do you do when there are no such facilities available?
8. What are the conditions of the road during winter weather? What challenges do you face due to this?
9. During winter weather, some patients may be unable to visit maternity settings due to snowfall and road closure. How do you ensure that they receive the necessary care?
10. Does working in extremely cold weather increase your stress level?

**Probing Question:**

If yes then what factors associated with extreme cold weather contribute to increased stress levels while working?

11. What strategies have you found to be effective in addressing the challenges you face during cold weather in the maternity setting?
12. What strategies do you use to prevent newborns from hypothermia and other cold-related health problems during winter conditions?
13. Would you like to suggest any changes?

**Probing Question:**

If yes then what are the changes and what would you like to see in the healthcare system to support midwives, providing care during winter weather in Gilgit Baltistan?

## Appendix H. Study Guide (Urdu)

Study Participants ID \_\_\_\_\_

Interview Date \_\_\_\_\_

Interview start time \_\_\_\_\_

Interview end time \_\_\_\_\_:

حقیق کا عنوان:

"شمالی علاقہ جات، پاکستان میں سردیوں کے موسم کے دوران زچگی کی ترتیب میں دیکھ بھال فراہم کرنے کے لیے دائیوں کے چیلنجز اور حکمت عملیوں کی تلاش"۔

1. کیا آپ سردیوں کے موسم میں gnittes ytinretam کے ماحول میں دیکھ بھال فراہم کرنے والے فرد کے طور پر اپنے ذاتی تجربات کا اشتراک کر سکتے ہیں؟

2. کیا آپ کو سردیوں کے موسم میں کسی چیلنج کا سامنا ہے؟

اگر ہاں، تو سردیوں کے موسم میں gnittes ytinretam کے ماحول میں دیکھ بھال کرتے وقت آپ کو کن اہم چیلنجز کا سامنا کرنا پڑتا ہے؟

3. شدید سردیوں کے حالات میں آپ کو نوزائیدہ بچوں کو گرم رکھنے کے لیے (نوزائیدہ بچوں کو (aimtrhtopyh) ہونے سے بچانے کے لیے) زچگی کی ترتیب میں کن چیلنجز کا سامنا کرنا پڑتا ہے؟

4. کیا آپ کے پاس سردیوں کے موسم میں moor robal کے درجہ حرارت کو گرم رکھنے کے لیے کوئی اقدامات ہیں؟ اگر نہیں، تو درجہ حرارت کو برقرار رکھنے کے لیے آپ کیا اقدامات کرتے ہیں؟

5. کیا آپ کو سردیوں کے دوران اپنی gnittes ytinretam کے ماحول میں پانی کی کمی کا سامنا کرنا پڑتا ہے؟

اگر ہاں تو حفظان صحت کی دیکھ بھال فراہم کرنے میں کیا مسائل پیش آتے ہیں، خاص طور پر لیبر اور ڈیلیوری کے دوران گرم پانی کی کمی کے ساتھ؟ ن حالات میں آپ آلات کو جراثیم سے پاک کیسے کرتے ہیں؟

6. آپ hygiene کے معیارات کو کیسے برقرار رکھتے ہیں جب پانی کے ذرائع انتہائی سردیوں کے حالات میں محدود یا منجمد ہوتے ہیں، اپنے لیے اور زچگی اور نوزائیدہ بچوں کی حفظان صحت کے لیے؟

7. آپ کی سیٹنگز میں سردیوں کے مہینوں میں sag اور yticirtcele کی بنیادی سہولت موجود ہیں؟ اگر نہیں، تو آپ کیا کریں گے جب ایک ہی طرح کے ماحول میسر نہیں ہیں؟

8. سردیوں کے موسم میں سڑکوں کے حالات کیا ہوتے ہیں؟ اور اس کی وجہ سے آپ کو کن چیلنجوں کا سامنا ہے؟

9. سردیوں کے موسم کے دوران، کچھ مریض برف باری اور سڑک کی بندش کی وجہ سے زچگی کی ترتیبات پر جانے سے قاصر ہو سکتے ہیں۔ آپ اس بات کو کیسے یقینی بناتے ہیں کہ وہ ضروری دیکھ بھال حاصل کرتے ہیں؟

10. کیا انتہائی سرد موسم میں کام کرنے سے آپ کے تناؤ (sserts) کی سطح میں اضافہ ہوتا ہے

اگر ہاں تو پھر شدید سرد موسم سے منسلک کون سے عوامل کام کے دوران تناؤ کی سطح میں اضافہ کرتے ہیں؟

11. زچگی کے ماحول میں سرد موسم کے دوران درپیش چیلنجوں سے نمٹنے کے لیے آپ کو کون سی حکمت عملی کارآمد ثابت ہوئی ہے؟

12. سردیوں کے موسم میں نوزائیدہ بچوں کو ہائپوتھرمیا اور سردی سے متعلق دیگر صحت کے مسائل سے بچنے کے لیے آپ کون سی حکمت عملی استعمال کرتے ہیں؟

13. کیا آپ کوئی تبدیلی تجویز کرنا چاہیں گے؟

اگر ہاں تو کیا تبدیلیاں ہیں اور آپ گلگت بلتستان میں سردیوں کے موسم میں نگہداشت فراہم کرنے والی دائیوں کی مدد کے لیے صحت کے نظام میں کیا دیکھنا چاہیں گے؟

