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**A Project Report On**

# "POINT OF CARE QUALITY IMPROVEMENT IN KANGAROO MOTHER CARE FOR HYPOTHERMIC CHILDREN: A SYSTEMATIC REVIEW"

## IIHMR Delhi


**By**

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**PG/21/121**

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**PGDM (Hospital and Health Management)**

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## International Institute of Health Management Research New Delhi

Annexure F

# FEEDBACK FORM

**Name of the Student:** Tarang Gupta

**Name of the Organisation in Which Dissertation Has Been Completed:** IIHMR Delhi

**Area of Dissertation:** POCQI (Point of Care Quality Improvement)

**Attendance:** 100%

**Objectives achieved:** Yes

**Deliverables:** Study on Kangaroo mother care, A systematic Review

**Strengths:** Team Player

**Suggestions for Improvement:** Improve on technical aspects of healthcare services

**Suggestions for Institute (course curriculum, industry interaction, placement, alumni):**

**Signature of the Officer-in-Charge/ Organisation Mentor (Dissertation)**

**Date:** 21 June 2023
**Place:** Delhi

## CERTIFICATE FROM DISSERTATION ADVISORY COMMITTEE

This is to certify that **Mr. TARNG GUPTA,** a graduate student of the **Post-Graduate Diploma in Health & Hospital Management** has worked under our guidance & supervision. He has submitting this dissertation titled **"Point of care quality improvement in Kangaroo Mother Care for Hypothermic Children"** in partial fulfillment of the requirements for the award of the **Post-Graduate Diploma in Health & Hospital Management.**

This dissertation has the requisite standard & to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.

**Dr. Preetha G.S**

**Professor, Mentor**

**IIHMR, New Delhi**

## Certificate of Approval

The following dissertation titled **"Point of Care Quality Improvement in Kangaroo Mother Care for Hypothermic Children- A Systematic Review"** is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **PGDM (Hospital & Health Management)** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation.

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| NAVEEN VASISHT | NAVEEN 17/06/23 |
| Dr Rohini Rahil | Rohini 17/06/23 |
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# CERTIFICATE

Tarang Gupta, affiliated with IHMR, Delhi, conducted a research project titled **"Point of care quality improvement in Kangaroo Mother Care for Hypothermic Children: A Systematic Review"** between March 10, 2023, and May 31, 2023. The study involved the collection of secondary data from reputable databases such as PubMed, Google Scholar, and ProQuest. Following a thorough screening of titles, abstracts, and full texts, a total of 8 articles were deemed suitable for inclusion in the study. The extracted results focused on protocols, procedures, and drills, with a specific emphasis on resources that adhered to the recommended standards as highlighted in various studies.

**Mentor**

**Dr Preetha G.S**

**Professor and Dean Research,** IIHMR, New Delhi

## TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. TARANG GUPTA** student of Post Graduate Diploma in Hospital & Health Management (PGDHM) from International Institute of Health Management Research, New Delhi has undergone **Dissertation** at **IIHMR Delhi** from **10 Mar 2023** to **31 May 2023**. Tarang Gupta has successfully carried out the study designated to her during the dissertation period & her approach to the study has been sincere, scientific & analytical.

The Dissertation is in fulfilment of the course requirements, and I wish her all success in all her future endeavors.

**Dr. Sumesh Kumar**

Associate Dean, Academic & Student Affairs

IIHMR, New Delhi

**Dr. Preetha G.S**

Mentor

## CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **"Point of care quality improvement in Kangaroo Mother Care for Hypothermic Children**, submitted by Tarang Gupta Enrollment No. **PG/21-23/121** under the supervision of **Dr. Preetha G.S** for award of the Postgraduate Diploma in Hospital & Health Management of the Institute carried out during the period from **10 Mar 2023 to 31 May 2023.** Embodies of my original work & has not formed the basis for the award of any degree, diploma associateship, fellowship, or titles in this or any other Institute or other similar institution of higher learning.

**Tarang Gupta**

## ACKNOWLEDGEMENT

1. I write this to place on record my deep sense of gratitude & appreciation for the valuable guidance, constructive comments & constant encouragement & guidance provided by my **Mentor Dr. Preetha G.S**, Professor, IIHMR, Dwarka. The successful completion of the project study would never have been possible but for his whole-hearted support.
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Date: 19 Jun 2023

Tarang Gupta

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## ABBREVIATIONS

I would like to express my heartfelt gratitude to the various individuals and organizations who have played a significant role in supporting me throughout my study journey. Their guidance, encouragement, and assistance have been instrumental in my growth and success. I would like to extend my sincere thanks to my mentor, IIHMR (Indian Institute of Health Management Research), my parents.

First and foremost, I am deeply grateful to my mentor at IIHMR for their unwavering support and guidance. Their expertise, knowledge, and dedication have been instrumental in shaping my academic and professional development. They have not only imparted valuable insights and industry perspectives but also provided me with the encouragement and motivation to push my boundaries and strive for excellence.

Next, I would like to extend my heartfelt appreciation to my parents, whose unwavering support and sacrifices have made my educational journey possible. Their constant encouragement, love, and belief in my abilities have been a constant source of strength for me. Their unwavering faith in my potential has been a driving force behind my achievements, and I am forever grateful for their unwavering support.

In conclusion, I am deeply indebted to my mentor, IIHMR, my parents for their unwavering support, guidance, and encouragement throughout my study journey. Their contributions have been instrumental in shaping my personal and professional growth, and I am grateful beyond words for their presence in my life. I am truly fortunate to have had the opportunity to learn from them and to be supported by their wisdom and guidance.

# LIST OF ABBREVIATIONS

SDG- Sustainable Development Goals

KMC- Kangaroo Mother Care

LBW- Low Birth Weight

MDG- Millennium Development Goal

# ABSTRACT

Kangaroo Mother Care (KMC) is an effective intervention for the care of preterm and low birth weight infants, particularly in addressing hypothermia. However, the quality of KMC implementation and its impact on hypothermic children have not been extensively investigated. This systematic review aims to assess the effectiveness of point-of-care quality improvement programs in KMC for hypothermic children. The review examines the impact on KMC implementation, neonatal outcomes, challenges, and facilitators to program implementation. The findings indicate a gender distribution of respondents, satisfaction levels with KMC implementation, frequency of KMC practice, and challenges faced by parents. Recommendations include enhancing healthcare provider training, addressing barriers to implementation, initiating quality improvement initiatives, improving patient satisfaction, promoting awareness, and fostering collaborative efforts. The study highlights the importance of tailored interventions and regular evaluation to optimize the implementation of point-of-care quality improvement in KMC. By addressing challenges and incorporating recommendations, healthcare facilities can enhance the quality of care and outcomes for hypothermic children through KMC. Further research is needed to evaluate long-term impacts and explore additional factors influencing successful program implementation.

# CHAPTER 1:
# INTRODUCTION

POCQI, short for Point of Care Quality Improvement, is a critical aspect of the Continuous Quality Improvement movement, which strives to minimize mother, neonatal, and child avoidable mortality. Its overarching goal is to support the achievement of the Global Strategy for Women's, Children's, and Adolescent Health as well as the SDG-3. The primary study is to assess whether the implementation of KMC immediately after birth or with a one-hour delay can effectively reduce the occurrence of moderate or severe hypothermia in full-term newborns when compared to standard thermoregulation care practices. Furthermore, the research seeks to investigate the impact of KMC and conventional care methods on crucial factors such as weight gain, the prevalence of hypothermia and apnea, and the duration of hospital stay among low birth weight (LBW) infants.

In 2013, an astonishing 2.8 million infants tragically lost their lives worldwide, shedding light on the urgent necessity for improved healthcare practices to prevent such devastating fatalities. Despite a decline in infant mortality, the rate of reduction lags behind that of child mortality in children under the age of five. Currently, infant deaths account for 44% of all child deaths. Regrettably, due to slow progress in reducing neonatal fatalities, certain countries are unlikely to achieve the Millennium Development Goal 4 (MDG-4) target of reducing child mortality by two-thirds between 1990 and 2015. To address this concerning trend, the Every Newborn: An Action Plan to End Preventable Deaths initiative was established in June 2014. This comprehensive plan outlines strategies for implementing effective, cause-specific interventions to accelerate the reduction of newborn mortality.

The WHO defines KMC as early, ongoing, and sustained skin-to-skin contact between the mother (or other caregivers) and the newborn. Kangaroo Mother Care (KMC) is a low-resource, evidence-based, and highly impactful intervention for low birth weight (LBW) infants. It is recognized as a global indicator for the quality care of newborn children(2).

Ensuring high-quality services that uphold the dignity and rights of women, newborns, and children is a fundamental aspect of achieving universal health coverage and the objectives outlined in SDG-3. The POCQI model has been developed collaboratively by WHO-SEARO, WHO Collaborating Center for Newborns (AIIMS), ASSIST, and is supported by UNICEF, UNFPA, USAID, and WHO in the South East Region.

The WHO issued a policy in 2014 that is  the directive emphasizing the importance of promoting respectful maternity care (RMC). This directive recognized the fundamental right of every woman to receive healthcare that is dignified and respectful, providing the highest standard of health achievable. WHO's commitment to RMC is further evident in its vision for improving the Respect and dignity, good communication, and emotional support are the three primary themes that are essential to ensure a positive experience for women, according to the quality of maternity and infant care. WHO recently released guidelines based on research targeted at improving the overall user experience of intrapartum treatment. According to these recommendations, RMC is a holistic strategy that includes supportive and respectful care. RMC makes sure that care is delivered in a way that respects women's dignity, privacy, and confidentiality, shields them from violence and mistreatment, gives them the power to make wise decisions, and offers ongoing support throughout the labor and delivery process.

Despite the growing recognition that poor care given to women during childbirth restricts their human rights (Khosla et al., 2016), multiple studies have shown instances of disrespectful treatment in medical institutions all over the world, particularly in low- and middle-income countries (LMICs). (Bohren et al., 2015; Hameed and Avan, 2018; Ukke et al., 2019). The mistreatment experienced during childbirth can have detrimental effects that are both immediate and long-lasting, including bodily and emotional pain, traumatic delivery experiences, fear of future births, and dehumanising feelings.(Hameed and Avan, 2018; Schroll et al., 2013). Unpleasant childbirth experiences can also discourage women from choosing facility-based births (Bowser and Hill, 2010). While much research has focused on women's perspectives on care, there is a relative scarcity of studies exploring the viewpoints of healthcare providers on this issue (Asefa et al., 2018). Some investigations have centered on service providers' perceptions of mistreatment (Moridi et al., 2020) and its potential effect on pregnant women's health (Orpin et al., 2019), while others have examined the individual and systemic factors that contribute to mistreatment and the impact that broader sociocultural norms have on it (Bohren et al., 2016).

Following are some broad categories that qualitative research involving service providers has found as contributing to mistreatment: individual-level variables (such as provider attitudes, the belief that giving respectful maternity care is not beneficial, the pursuit of favourable results, the belief that women are difficult, stress, and burnout); Both socio-cultural and systemic factors, such as power dynamics between patients and providers, normalized punitive conduct towards "disobedient" women, and gender norms, can contribute to resource and supply shortages. Systemic causes include severe workloads, a lack of accountability, facility culture, and

shortages of crucial resources and supplies.(Orpin et al., 2019). These studies add significantly to our understanding of the problem, but the majority of them have looked at service providers' views utilising frameworks from Bowser et al. (2010) and Bohren et al. (2015). with limited exploration from a behavioural science standpoint (Smith and Banay, 2020). Furthermore, there is a lack of systematic examination of the underlying health systems challenges related to mistreatment, and the specific issues surrounding the implementation of respectful maternity care have yet to be adequately addressed.

In general, there is little data about health system constraints that impede the maternal care that is respectfully provided by LMIC public health systems. Furthermore, research that gathered service providers' opinions on RMC were primarily conducted in African countries, leaving a void in the information from South Asian nations. We set out to fill in this knowledge gap by describing how a typical maternity ward and labour room function within a public health facility's Obstetrics and Gynaecology section, as well as the structural bottlenecks that prevent the delivery of respectful maternity care in secondary-level healthcare facilities in Pakistan.

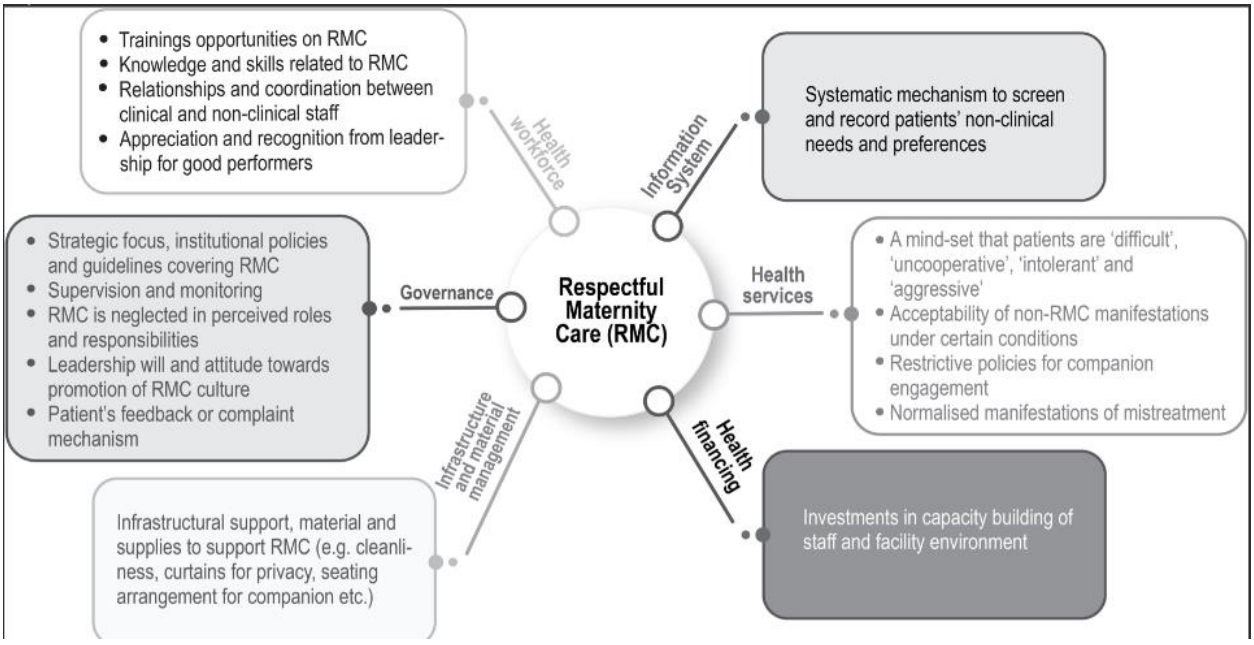

**Figure 1 RMC**

**Interaction with patients and their companion.**

The greatest obstacle for the personnel is thought to be dealing with uncooperative and demanding patients and their companions. The majority of clinical staff claim that it is extremely difficult to deal with patients and their companions who make unreasonable demands, such as those for drips, medications, immediate normal delivery upon arrival, and the provision of services to which the patient is not legally entitled or which fall outside the purview of the health facility (e.g., blood transfusion, delivery of anaemic patients, etc.). On the other hand, non-clinical employees expressed worries about patients' disregard for keeping medical facilities clean. Clinical and non-clinical personnel recognize the issue of low literacy levels among patients and their companions. However, despite providing repeated counselling and ongoing encouragement to address this health literacy gap, it remained a persistent challenge. When patients' expectations were not promptly fulfilled or when staff members struggled to effectively communicate the reasons for such delays, patients or their companions often reacted with impatience and aggression, resorting to disrespectful and offensive language or making unfounded accusations against the staff. These situations posed significant difficulties for the staff to handle.

**Provision of Respectful Maternity Care**

The provision of respectful maternity care is an essential aspect of healthcare. However, Clinical staff members believe that being stern with patients is vital, even if it leads to verbal or physical abuse, to ensure that instructions are followed during childbirth. Some clinical and non-clinical staff members also link this behavior to specific personality qualities, arguing that people with short fuses tend to mistreat of clinical and non-clinical staff also link this behavior to specific

personality qualities, arguing that people with short fuse tend to mistreat both patients and their coworkers without justification.

The existence of repeated and excessive requests from patients that exceed the capabilities of the healthcare facility is another element that contributes to the provision of disrespectful care. Patients and healthcare professionals become tense as a result of this. Unmet requests from patients may lead them to make slanderous accusations against service providers, leading to retaliatory disrespectful behavior from the staff. This cycle of confusion and tension arises from the patients' impression that staff members intentionally withhold certain services, while in reality, the health facility may not be equipped to provide those services.

Neglect and discrimination are also identified as common reasons for non-respectful care. Overworked staff members at district headquarters hospitals, for example, may struggle to provide optimal attention to patients due to their heavy workload. Additionally, socio-political influences play a role, as patients with strong affiliations may exert pressure on staff members to receive preferential treatment through influential contacts, leading to discrimination against other patients.

**Identifying the diverse needs and preferences**

To identify the diverse needs and preferences of patients both clinical and non-clinical staff rely mostly on clinical indicators such the stage of labour, blood pressure, blood deficiency, labour pain, foetal movement, and probable complications. Both groups of staff members acknowledge poverty as an important non-clinical feature. Stress, physical impairments, and language problems are additional concerns that were mentioned. No one clearly linked stress to recognised

mental health illnesses like anxiety or depression, despite the fact that stress is frequently described as feeling "upset" for a variety of reasons.

In certain cases staff members personally help struggling patients with their finances. Additionally, companions are occasionally hired to help ladies who are physically challenged or to overcome linguistic challenges. The staff members noted the dearth of standardized screening techniques for determining these patients' unique needs, as well as the absence of an organized structure for providing supportive care to address those needs.

**Governance and accountability**

Governance and accountability are crucial in healthcare institutions. Existing institutional guidelines are combined with effective oversight, regulation, incentives/appraisal, and accountability mechanisms.

Supervision and monitoring play a role in ensuring compliance with these guidelines. In the Obs&Gyne section, visits by the health facility in-charge and external monitors are conducted to monitor the presence of staff, cleanliness, and accessibility to supplies and medications. However, both clinical and non-clinical workers claim that the monitors give little thought to how staff members treat patients. These monitoring visits usually take place during the day shift, with little coverage during the evening and night shifts, and feedback from patients or their companions is infrequently requested. Nevertheless, the monitors take fast action if any flaws are found during the visits.

Particularly in a health system with limited resources, the administrative leadership of the medical facility seems to place less of an emphasis on improving how maternity staff interacts with patients. They contend that the hospital is already experiencing a lack of basic supplies for both patients (such as medications) and personnel (such as a staffing shortage). Therefore, it

becomes difficult to guarantee that every employee always acts appropriately among patients. Although they occasionally make an effort to emphasise the value of excellent behaviour with patients, they feel that meeting the requirements of their staff comes first, and it is a significant

demand that they consistently treat all patients with respect and dignity.

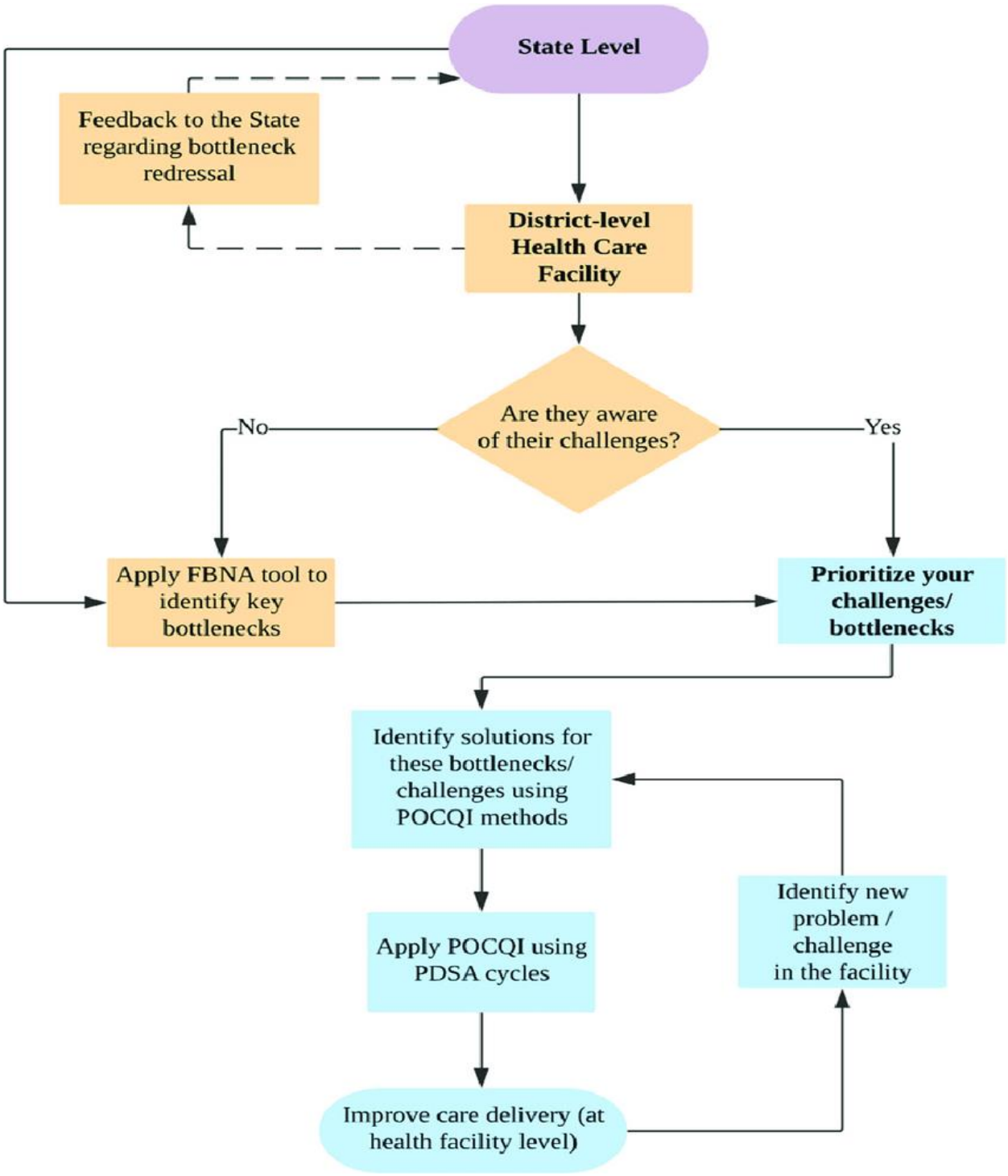


**Figure 2 Flow Chart**

**Roles and responsibilities**

Clinical and non-clinical staff employees have distinct roles and responsibilities in the healthcare setting. Clinical staff members with specific designated tasks in the labour room include doctors and nurses. The doctor or nurse in charge creates the staff roster and plans the patient's treatment, and nurses and midwives carry out the plan. Sterilisation, availability, and upkeep of equipment are the responsibilities of non-clinical employees, especially Aayas. On the other hand, it was noticed during visits to medical facilities that there is a sizable amount of unofficial work shifting to non-clinical staff, who assist clinical staff during childbirth and may even carry out routine births in the absence of clinical staff. In addition to their monthly wage, the informal payments they can directly get from clients and their guests fuel this practise.

**Accountability**

Regarding accountability, there is no established system in place in healthcare facilities for receiving patient input. In certain cases, informed and empowered patients or their companions report problems directly to senior maternity staff or the facility manager, who responds right away without keeping a formal record. Typically, complaints are made when there have been major mistakes or instances of negligence that have harmed the patient. The lack of a system to gather women's input on their maternity care experiences, which is something they believe is more typical at larger private hospitals in urban areas, was also mentioned by clinical and non-clinical staff members.

**Patient Involvement**

In terms of patient involvement, mothers are primarily responsible for providing Kangaroo Mother Care (KMC) to eligible babies, with another female family member taking over if the

mother is unavailable or exhausted. The consent for providing KMC is obtained verbally at the time of admission.

**Quality improvement**

Quality improvement in healthcare is hindered by several common reasons These include a lack of physical infrastructure, fundamental facilities, qualified personnel, and necessary tools and supplies. Health professionals could also lack the necessary clinical expertise, know-how, or comprehension of how to deliver high-quality care. Another obstacle is the poor organization of services at medical institutions, which makes it challenging for personnel to easily deliver the treatment they are aware is crucial.

Quality Improvement (QI) is a powerful management strategy that gives healthcare professionals the power to improve patient care while working with the resources they have. It focuses on reorganizing care delivery and addressing related challenges, such as resource constraints. QI identifies gaps in clinical knowledge, skills, and care organization, allowing healthcare workers to prioritize training and improve the quality of care provided. Importantly, QI is not intended to assign blame but rather to find practical solutions within the specific context of healthcare facilities.

To ensure quality of care, it is essential to integrate QI into a broader healthcare system strategy. This strategy should establish performance targets, implement changes in care practices to meet those targets, and establish mechanisms for accountability. Defining clear "Standards of care" sets benchmarks that all healthcare facilities should follow. External assessors can evaluate the quality of care provided through quality assurance or accreditation mechanisms, ensuring accountability.

In line with the WHO-SEARO Regional Framework for improving quality of care for RMNCAH (Reproductive, Maternal, Newborn, Child, and Adolescent Health), member states are strengthening institutional mechanisms at the national and subnational levels to promote and monitor quality of care. They are also adopting global standards for maternal and newborn health, as well as child care. Step 4 of the Regional Framework emphasizes the improvement of quality of care at health facility levels. WHO-SEARO supports member states in building the capacity of healthcare workers to enhance the quality of services incrementally and progressively. Collaborative efforts between WHO-SEARO, AIIMS New Delhi (WHO Collaborating Centre for Training and Research in Newborn Care), and the USAID ASSIST project have resulted in a model that healthcare teams can utilize to improve care for mothers, newborns, and children at the point of care within health facilities.

The successful implementation of quality improvement initiatives at health facilities requires support and encouragement from district and state health systems. These efforts should be guided by national policies and strategies for quality of care, led by the Ministry of Health. WHO SEARO has also developed implementation guidance to assist in establishing and managing district-level quality improvement programs.

The National Academy of Medicine defines quality as the extent to which healthcare services contribute to desired health outcomes for individuals and populations, while aligning with current professional knowledge. Quality improvement serves as the framework for systematically enhancing healthcare by standardizing processes and structures to minimize

variation, attain consistent and predictable outcomes, and improve overall results for patients, healthcare systems, and organizations. The term "structure" encompasses elements such as technology, culture, leadership, and physical resources, while "process" refers to knowledge capital (e.g., standardized operating procedures) and human capital (e.g., education and training).

**Together, quality improvement and measurement are used**

Through quality measure benchmarking, healthcare professionals gain knowledge and enhance outcomes. The best practises in healthcare can be found by benchmarking. In order to find research possibilities that increase professional knowledge and guide the development of future best practises, we must first analyse variation in quality metrics. Comparably, quality measure standards can be used to precisely track the advancement of quality improvement.

**CMS utilise quality assessment and enhancement**

The Meaningful Measures Framework's priorities and goals are carried out by CMS through quality measurement and improvement. The Framework aims to lessen the load on doctors and providers while also enhancing results for patients, their families, and providers. The focus areas of CMS are:

- Addressing priority issues for protecting public health
- Choosing actions that are beneficial to patients and centred on them
- Whenever possible, adopting outcome-based methods;
- Complying with legal obligations
- Reducing the burden on the providers
- Finding substantial areas for improvement

- Using different payment models to address the population-based payment measure demands
- Coordinating efforts across various payers and programmes (such as Medicare, Medicaid, and private payers);

**Standardisation is the mechanism for quality improvement.**

1. The behaviour is first made systematic so that, within the limits of uncertainty (randomness), the same inputs produce the same outcomes.
2. Second, behaviour is in keeping with the data supporting good practises (such as recommendations and systematic reviews). A methodical technique called the PDSA (Plan-Do-Study-Act) Cycle is used to pinpoint the patient, procedure, or system features linked to "non-standardized behaviour." The PDSA Cycle is used to improve behaviour by repeating it until it is more organised and consistent. By using both structure and procedure, behaviour is standardised. Technology (such as electronic medical records), management, or culture may all be considered to be parts of structure. Standard operating procedures, instruction, and training are examples of processes. The probability of desired health outcomes rises with the standardisation of structure and procedure.

**Selection and choosing are the methods of gauging the quality of something.**

A measure of quality is a tool of "good decisions"—decisions that increase the likelihood of a positive outcome and decrease the likelihood of an unanticipated or unintended negative outcome. High-performing clinicians are chosen by patients and their families using quality metrics. Quality metrics are used by healthcare professionals to evaluate their own performance.

The probability of desired medical results is increased by selection and choice judgements based on reliable quality measurements.

**Model for Point-of-Care Quality Improvement (POCQI)**

The POCQI paradigm increases the ability of healthcare professionals to enhance the standard of care in medical institutions. The administration or leadership of the healthcare facility or the district must support these frontline healthcare worker improvement initiatives. The availability of crucial patient care infrastructure is a requirement for quality improvement. For this model, a training programme has been created to increase the knowledge and abilities of front-line healthcare professionals so they may employ quality improvement techniques to address issues in their medical facilities and consistently provide improved treatment. The POCQI package comes with a facilitator's guidebook, a learner's manual, a series of slides, and other educational materials.

The POCQI model's distinctive attribute and strength is that it provides a condensed common sense strategy that has been utilised effectively in various situations to increase the quality of treatment while utilising the resources at hand. The POCQI methodology provides a fresh perspective that goes beyond the conventional method of giving clinical training and coaching to healthcare professionals with the presumption that a knowledge gap is the main contributor to subpar performance and poor service quality. The emphasis of this approach is on establishing a team among the healthcare professionals at the healthcare facilities and building the ability to collectively decide, using local information, a target that includes as well as improving accessibility and efficient use of available resources, including time, necessary medicines, and

equipment, with the goal to achieve standardization of care for improving the standard of care as well as patient satisfaction. This strategy is predicated on the idea that healthcare professionals aim to guarantee the best possible medical results for all of their patients. Healthcare employees' job satisfaction will increase right away because to POCQI's simplified methodology, which focuses on quick wins and keeps staff members motivated to collaborate as a team in the medical centre. The training programme builds on the work of a number of quality improvement projects and groups, including Canadian Evidence-Based Practice for Improving Quality (EPIQ), Helping Babies Survive or Thrive, and USAID ASSIST. The POCQI package is being implemented in a number of WHO-SEARO Member States & has proven to be acceptable and practicable for use in healthcare institutions to enhance maternal, neonatal, and child care.

Prematurity-related complications including hypothermia increase morbidity and mortality. Unwanted consequences include hypoglycemia, acidosis, neurological impairments, intraventricular haemorrhage, and lengthier hospital admissions could result. One study showed that for every 1°C drop in core body temperature, mortality increases by 28%.

For a variety of reasons, newborns who are premature are vulnerable to hypothermia. Birth weight and gestational age have an opposite relationship with its growth. Increased sensitivity is brought on by evaporative heat loss, a lack of subcutaneous fat, or immature neurological function. Shivering is not possible in premature babies, which prevents efficient thermogenesis.[6] Convective, radiative, conductive, and evaporative heat loss all happen at once.[5] Premature babies must therefore take additional precautions to keep their body temperatures stable. Neonatal hypothermia is less common and neonatal survival is increased when interventions like radiating warmers, plastic bags/wraps, and heated transport incubators

are used. However, hypothermia continues to be a major issue worldwide, particularly in areas with few resources.

The aviation industry has long employed checklists as a means of ensuring safety. In the healthcare industry, checklists are helpful tools for avoiding medical errors that increase morbidity and mortality. Checklists have been shown to improve patient care and communication while reducing the incidence of central line-associated infections, according to a study by Berenholtz et al. in an intensive care unit at John Hopkins Hospital. This idea was included in the World Health Organization's Surgical Safety Checklist & Guidelines for Safe Surgery in 2006. In a multicenter study, the Safety Checklist considerably decreased morbidity and mortality. Checklists make guarantee that current clinical practice recommendations are followed in addition to lowering medical errors and near-misses.

In order to reduce the hypothermic admission temperatures for newborns who were premature treated the neonatal intensive care unit (NICU), this quality improvement (QI) effort developed a delivery room checklist. Our SMART goal was to "decrease the incidence of hyperthermia in babies born at 32 weeks estimated gestational age (EGA) by 25% from a baseline of 50% to 40% by December 2012 and sustain for 6 months."

UNICEF figures show that Pakistan has a horrendous child mortality rate. 1 According to the most recent data, there are 42 newborn deaths for every 1000 live births, which represents 7% of the total deaths of newborns globally. 2  Neonatal hypothermia is a severe issue that causes substantial morbidity and mortality. 3,4 Due to their greater surface area per unit body weight, restricted heat generating capabilities, and susceptibility to exposure due to healthcare personnel'

lack of professional vigilance, newborns are more likely to suffer hypothermia. 5 A cold atmosphere, a wet or nude baby, cold linen, while being transported, and during treatments like washing and infusions are some of the things that cause significant heat loss. Maintain a neutral thermal environment between 36.5 to 37.3 0C, which is the temperature at which a baby can maintain an adequate body temperature with using the fewest amounts of BMR and oxygen. 6,7 Warm rooms for delivery (>25 0C), quick drying of infants, skin-to-skin contact, suitable attire, and breastfeeding can all help prevent hypothermia. 8,9 The development of "Point of Care Quality Improvement (POCQI) method" was made possible in 2015 when the World Health Organisation established a legal framework. One of the Pakistani POCQI implementation centres was NMU. 10-12 The main goal was to provide all newborns with four early important newborn care components in order to lower the rate of neonatal death and enhance care for both mother and baby. Prior to UNICEF's initiative, there was no established process for providing newborns in labour room NMU with rapid care, and information on neonatal morbidity and mortality due to neonatal hypothermia, hypoglycemia, and infection was not gathered. The purpose of this study was to determine the current state of early breast feeding and quick drying of all neonates delivered via spontaneous vaginal birth in order to prevent neonatal hypothermia.

**HYPOTHERMIA**

Lower than 35°C (95°F) core body temperature is considered hypothermia. The core temperature-based hypothermia stage has a significant impact on both diagnosis and care. These are the meanings that are most frequently used:

- **Mild:** Core temperature between 32 and 35 °C (90 and 95 °F).
- **Moderate -** Core temperature between 82 and 90 °F (28 and 32 °C)

- **'Severe'** refers to a core temp below 28 °C (82 °F).

Deep hypothermia, according to some experts, is defined as basic temperature below 25°C (77°F).

Published temp cutoffs vary slightly, but due to inaccurate measurement and patient variation, all cutoffs are approximate.

The 3 stages of hypothermia in a human body are compensation, decompensation, and failure in which each reflect a different aspect of the body's response to cold. When making crucial healthcare decisions, symptoms and signals might be deceiving. It is important to take your core body temperature as soon as possible. Clinical staging methods stress the importance of accurately measuring core body temperature before determining a patient is dead, barring the presence of visible fatal injuries.

## CONSEQUENCES FOR TREATMENT DECISIONS

Hypothermia is human body’s basic temperature below 32°C (90°F), modifies the usual choices of whether to continue or stop treatment. Suspended metabolism may prevent hypoxia at these temperatures. Unless there are injuries that are obviously fatal, we would revive and rewarm any youngsters who were suffering from mild to severe hypothermia. Clinicians must refrain from pronouncing patients who are pulseless and have serious hypothermia (core temperature 28°C [82°F]) dead before they are actually dead.

## CLASSIFICATION AND DEFINITIONS REWARMING

The treatment of a hypothermic patient must include rewarming. The physician must be aware of the many rewarming method classes, how to select the best class based on a patient's core

temperature and whether or not circulation is present, as well as any potential downsides of various techniques (algorithm 1).

**Passive rewarming** — Taking off damp or cold garments and covering up with blankets or other dry insulation in a warm setting is known as passive rewarming. The patient is not supported by passive rewarming, which forces the youngster to produce heat. When managing children with moderate, severe, or mild hypothermia, passive approaches may stop additional chilling, but they should be combined with the proper aggressive rewarming strategies.

**Active external rewarming** — Heat is applied outside of the patient using active external rewarming methods. These include the use of radiant heat, Along with forced air rewarming, other options include heating pads made of chemicals and plumbed-water (see image 1). Forced air rewarming, which is our preferred technique, may reduce the risk of burns to under-perfused skin that can occur when warming packs or pads are applied directly to the skin [7,8], and small research on adults suggest it may help reduce after drop [9–11]. If possible, it is frequently warmed up the trunk first in order to avoid mobilising blood from freezing extremities.

There are many simple and accessible active external rewarming techniques. Although these techniques can cause after drop (further dropping) of the body's core temperature, hypotension (rewarming shocks), ventricular fibrillation (VF), and asystole in patients having severe or moderate hypothermia, they can also move chilly and passage of acidic blood from one extremity into the heart.

Active external rewarming should be avoided by people with severe hypothermia and absent circulation until no other options are available since it may be inefficient and occasionally hazardous [12].

**Active internal rewarming:** These methods all actively warm the patient from the inside out, but they do it in different ways.

●**Noninvasive** – The use of warmed intravenous, or IV, normal saline and heated, humidified oxygen at temperatures between 40 and 44°C [104 and 111°F] and 37°C [98.6°F] are examples of noninvasive procedures. These techniques alone do not effectively rewarm the body, although being straightforward and crucial to preventing additional chilling.

●**Invasive** – Lavage with heated normal saline (40 to 44°C) is one invasive internal rewarming procedure that can be used on the pleura, the bladder, the stomach, and the peritoneum. Patients having extreme hypothermia (temperature 28°C [82°F]), especially those who have maintained circulation or who have moderate hypothermia and a poor response to early rewarming (algorithm 1), are suggested to employ these techniques, particularly pleural lavage [4].

●**Extracorporeal** – These therapies include cardiopulmonary bypass & extracorporeal membrane oxygenation (ECMO). If available, ECMO is preferred since it could help with anticoagulation, pulmonary disease control, and possibly longer duration. Extracorporeal rewarming should be considered for patients who have failed other treatments or for children with severe hypothermia and no circulation.

## PREHOSPITAL CONSIDERATIONS

Doctors who supervise, Emerging prehospital staging techniques must be understood while performing rescue and evacuation of hypothermic patients. To give a brief overview, the recommendations listed below are advised:

**1 Identifying hypothermia:** Identifying hypothermia is critical, albeit identifying severe instances can be difficult. Rescuers and medical professionals should check for hypothermia in youngsters who have been visibly exposed to cold environments, as well as in those who have altered mental status or need urgent care. It can be difficult to gauge the core temperature in the field. As a result, Decisions regarding the patient's care should not be made until then in a hospital that is capable of accurately measuring core temperatures. Investing in procedures such as the esophagus or bladder irrigation in distant places or advanced care rescue and transport systems.

2. **Prehospital pronouncement of death:** When hypothermia cannot be ruled out, prehospital declaration of death in children is extremely unusual. Even after a lengthy cardiac arrest, severe hypothermia can result in amazing survival despite obvious signals of death. Exceptions include cases in which rescue is difficult, there are plainly lethal injuries (e.g., decapitation), or genuine "do not resuscitate" orders are documented.
3. **Rescuers**: It is important to remind rescuers that the typical clinical signs used to determine death can often be misleading in cases of severe hypothermia, and some signs may actually mask the presence of hypothermia.

Rescuers must additionally be advised that successful hypothermia survival has occurred following delayed saving, lengthy convey, as well as prolonged and delayed cardiac resuscitation.

Impersonal results used to determine the stage of hypothermia should not be used as the primary basis for making life-or-death decisions in the field. Whenever unsure and unable to establish an exact temperature, assume hypothermia, continue resuscitative attempts, and transport the patient to a healthcare facility (see the "Decision to Resuscitate and Rewarm" section below).

Prehospital carers should prevent patient exertion and physical handling during patient treatment and transfer since these acts might trigger bringing cold, acidic blood to the heart, which could result in cardiac arrhythmias or cardiac arrest.

In situations where uncertainty exists regarding the core temperature or the presence of a perfusing rhythm, it is recommended to initiate standard chest compressions promptly. Cardiopulmonary resuscitation (CPR) that is delayed, interrupted, or protracted may also be used in difficult rescue situations. Given that extreme hypothermia can cause even modest circulation to be sufficient, it is important to recognize the difficulty of performing CPR in the field. Additionally, CPR has the potential to cause ventricular fibrillation (VF). Rescuers are encouraged to carefully watch for any signs of life for up to a minute because it can be challenging to gauge both temperature and circulation in the field.

Upon arrival at the hospital, it is common for hypothermic patients to be colder than when they were initially rescued. The process of rescue, transportation, and therapy carries further cooling hazards in addition. Rescuers should therefore take all necessary precautions to stop patients from losing heat while being transported. Important measures in this regard include:

•Taking off wet clothing

•Vapor barriers and insulating layers provide effective protection.

•Warming the transportation vehicle

•If possible, provide warm intravenous (IV) fluids.

If moderate hypothermia is thought to exist, Prehospital external warming may be helpful, as in the case of a conscious or shivering child; however, doctors who oversee rescue and prehospital treatment for children must stay current on numerous new techniques and safety measures.

External rewarming, on the other hand, may aggravate fatal collapse because it raises the risk of an after a drop (an additional decline in body temperature) in moderate to severe hypothermia. Children's lower body mass and more peripheral vasoconstriction may make them more vulnerable to the subsequent decrease. As a result, we avoid forceful external rewarming during quick transfers in children with suspected moderate or severe hypothermia. One possible exception is that patients with severe hypothermia should ideally be transported with advance notification en route to stabilization at has pediatric cardiac bypass or extracorporeal membrane oxygenation (ECMO) capabilities, which are frequently available at Level I designated pediatric trauma centers. Children with moderate hypothermia warrant transport to a hospital with pediatric intensive care capability, if possible.

**Examine the internal temperature and stop additional cooling** — In order to properly treat children with hypothermia during initial stabilisation, reliable core body temperature assessment is crucial. This should take place in tandem with support for breathing, airway function, and circulation. Ideally, a low-reading flexible thermometers probe should be used to take a child's core temperature if hypothermia is suspected. Although they should be taken deeply in the rectum, rectal temperatures may sometimes exhibit delays. The bladder, esophagus,

nasopharynx, and central vein are preferred central locations. We advise measurement at least two distinct central sites in urgent situations.

Children with hypothermia need to be gently handled while being kept in a flat supine position. Clinicians should take off any wet clothing & cover the victim with dry blankets to protect them from additional exposure. Before determining the level of hypothermia and the best method of rewarming, the following actions should be taken in all patients:

● Even though it happens nearly automatically in many hospitals, applying external heat should be discouraged when circulation is compromised.

● When it is feasible, give patients warm, humidified oxygen at a temperature of 37 °C (98.6 °F). There will be warmed humidifiers available for respiratory therapy departments.

● A quick intravenous (IV) administration of room temperature (e.g., 21°C [70°F]) solutions may result in further cooling and could produce VF (ventricular fibrillation) or asystole. All intravenous (IV) fluid that is given should be warmed to 40 - 44°C (104 to 111°F). For the delivery of warmed IV fluids, a specific trauma-style IV fluid warmer and short, large-bore, insulated, or countercurrent tubing are needed. Fluid cannot be kept warm while being supplied to the patient using standard IV tubing or coil blood warmers.

While necessary to stop additional chilling, these techniques might not be sufficient on their own to achieve rewarming.

**Breathing and airway —** Safe and recommended is careful, mild respiratory support. The following is how we proceed:

● Through a nonrebreather mask, all patients will get warmed, humidified 100% oxygen.

● In children who are hypoventilating and are getting ready for endotracheal intubation, use bag-valve-mask ventilation.

● Patients with compromised airways, respiratory problems, hypotensive shock, or a cardiac arrest may need endotracheal intubation.

Endotracheal intubation shouldn't be postponed in cases where it's necessary for the hypothermic child. The patient should be moved very little during the procedure and with gentleness. Throughout the surgery, cardiac rhythm ought to be carefully monitored.

In cases of extreme hypothermia where the muscles are rigid and the jaw cannot move, performing a direct laryngoscopy might prove challenging. Potential solutions include oral intubation with a video laryngoscope, a doctor skilled in managing challenging airways, as well as a flexible intubating dimension.

Although VF has been considered a potential concern in patients with moderate to severe hypothermia who underwent endotracheal intubation, a case series of 428 people with hypothermia revealed that none of the 97 patients who were endotracheally intubated or had core temperatures below 32.2°C (90°F) had it.

**Circulation** — The cardiovascular system can be significantly impacted by hypothermia, hence these patients frequently require vigorous warmed IV fluid infusion. In order to properly treat a patient, Paediatric Advanced Care Support algorithms may need to be modified in accordance with the patient's core temperature, heart rhythm, and circulatory condition.

**Therapy with intravenous fluids and vascular access**— Vasoconstriction brought on by hypothermia can be challenging for vascular access, especially in young patients. The treatment of severe and moderate hypothermia, however, depends on aggressive, warmed volume

expansion, therefore vascular access is essential. If necessary, the doctor should place an intraosseous needle and a central line via the femoral vein. peripheral access to an IV (two 22-gauge or bigger periphery IVs) is not available quickly. A catheter is kept outside of the possibly irritated myocardium when using a femoral placement as opposed to different central access locations that need intracardiac implantation.

**Taking care of hypovolemia** — Due to diuresis or fluid changes, patients with severe or moderate hypothermia frequently experience disproportionate hypovolemia. Hypothermia is made worse by fluids at room temperature, such as 21°C (70°F). Therefore, an initial bolus of 20 millilitres per kilogramme of warmed (40 or 44 degrees Celsius [104 - 111°F]) IV saline solution should be administered to these patients over the course of 5 to 10 minutes, and then as needed

Given that vigorous and continuing growth in volume is frequently necessary in hypothermia, frequent reassessments of the volume status and prompt administration of extra warm IV boluses are necessary.

In patients who are moderately or severely hypothermic, it might be challenging to determine whether the volume support is enough. The direction of resuscitation may be aided by measures of the oxygen saturation or central venous pressure. To prevent arrhythmias from being brought on by touch with the heart, a catheter should be inserted below the diaphragm.

In order to monitor urine production and identify and replenish the excessive renal loss of fluid or "cold diuresis" that is typical in mild to severe hypothermia, a bladder catheter ought to be implanted. Another important tool for determining core temperature is bladder catheters having built-in temperature probes.

In order to effectively treat hypotension and bradycardia, which are prevalent in cases of severe hypothermia, warmed isotonic fluid should be aggressively administered. After rewarming, persistent hypotension and bradycardia may be treated using conventional methods, such as vasopressors or inotropes.

**Perfusing bradycardic rhythms** — In children with hypothermia, rewarming is the main therapy for bradycardic perfusion rhythms. Hypothermia-related perfusing rhythms include sinus bradycardia, first-degree atrioventricular block, and AF with a slow ventricular response [28]. These rhythms are thought to be sufficient for sustaining adequate oxygen supply in cases of severe hypothermia. Thus, in cases of extreme hypothermia, bradycardia may be physiological. As a result, cardiac pacing is typically not necessary until After warming up to 32 to 35°C (90 to 95°F), the bradycardia still exists. Similarly, while warming up might make the heart's rate return to normal, bradycardia medications (such atropine and epinephrine) may not be used in cases of extreme hypothermia.

**Nonperfusing cardiac rhythms** — Patients with moderate to severe hypothermia frequently experience VF, a syndrome characterised by asystole, pulseless electric activity (PEA), and ventricular tachycardia (VT) without pulse. Since arrhythmias therapy without rewarming is frequently futile, either active internally rewarming or, preferably, extracorporeal warming up may be the main course of treatment in these individuals. Reports of cases with intact neurological survival have occasionally shown that rewarming alone can cause asystole to spontaneously transition to VF and VF to sinus rhythm.

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**Choosing to revive and rewarm** — Decisions about whether to withhold or stop therapy must be changed if hypothermia is present, an explanation of a core temperature of 32°C (90°F) or lower. Reduced metabolism may offer protection against hypoxia at low temperatures. Although doctors are aware that extreme hypothermia may have neuroprotective effects, they frequently wonder how to determine when resuscitation & rewarming should be avoided. With only obviously fatal injuries—such as "decapitation, major injury to the head with brain damage issue, Experts mostly uphold the simple rule that no one is actually dead until they are warm and dead, with the exceptions of truncal transection and combustion.

Many intact survivors of extreme hypothermia are documented in an ever-expanding body of studies and case series, Despite clinical signs that, at normal temperatures, would suggest death. In actuality, severe hypothermia is characterised by symptoms of death such fixed and dilated pupils, apnea, apparent stiffness, dependent lividity, cyanosis, colour, or palpable cold; all of these markers have been observed in several hypothermia patients who have successfully recovered.

And nearly no period of arrest is to long; neither is the core body temperature required for resuscitation nor the length of the arrest. Despite having no circulation, hypothermic patients have successfully recovered from temperatures in the core as low as 14°C, 66 and 83-minute submersions, hours of cardiac arrests with no CPR, up to six and a half hours of CPR, and up to nine hours of total resuscitation.

The possibility of creating hypothermia survivors with severe neurological damage may worry medical professionals. In fact, the data point to a possible rarity for substantially compromised survival. 32 individuals were chosen for extracorporeal rewarming with severe hypothermia

(core temperature of 28 °C [82 °F]) and cardiac arrest in a cohort of 46 persons. Only one of these patients—one of fifteen—had any significant long-term neurologic problems.

According to our experience and numerous case reports, hypothermia is still ignored and the proper resuscitation is still not given. A variety of variables, It could lead to the mistaken declaration of death, especially in people with severe hypothermia (core temperature of 28 °C [82 °F]).

For instance, prolonged immersion in extremely Long-term exposure to cold water (10 °C [50 °F]) may offer anoxic protection. immersion in water that is warmer is linked to anoxic harm. However, at the time of patient presentation, details like the temperature of the water, the length of exposure, and the point at which submersion begins are frequently ambiguous or even incorrect. What is the temperature of an empty swimming pool or springtime pond? When did submersion change from first immersion? In a startling instance, seven teenagers whose boat overturned under two degrees Celsius (36°F) water were discovered by rescuers 108 - 169 minutes later with their heads immersed in the water, seemingly dead, unconscious, and without a pulse. Six of the seven made a fair neurological recovery; all seven survived hrs of rescue, cardiac resuscitation, and extracorporeal warming.

So-called bathtub deaths due to drowning which initially may imply warm water immersion, are an even sneakier scenario. In actuality, nevertheless, Hypothermia in bathtub drownings is highly suspicious; cases of child abuse in cold water are commonly labelled as bathtub drownings by mistake. In this case, true submersion is frequently missing, and anoxia is almost always preceded by substantial cooling,thus there may be a decent possibility of intact life. Clinicians

must always be on the lookout for bathtub drownings, assess the victim's core body temperature, and, if hypothermia is present, start the proper resuscitation and warming procedures.

**Chest compressions** — If there is any doubt about the perfusing rhythm and core temperature, standard compressions to the chest should be administered very away.

Due to myocardial insufficiency, the risk of myocardial infarction, and highly hypothermic people's core temperatures of 28 degrees Celsius (82 degrees Fahrenheit), chest compressions should be avoided so that circulation will return with rewarming, according to some medical professionals. This is true until a nonperfusion rhythm of the heart (such as asystole, VF, or PEA) is present. On a heart monitor, asystole or VF will be seen, although it might be challenging to detect PEA in cases of extreme hypothermia. For up to a minute, carefully palpate the area for any pulses. Quick bedside cardiac ultrasonography may help distinguish between PEA and mild cardiac contractions.

Chest compressions should be given to patients with nonperfusion beats at regular depths and speeds. Although open cardiac massage was once used to help with chest compressions, As the myocardium will also become rigid and all closed-chest mechanical effects of CPR would be lost, it is currently discouraged. Compression of the chest will be challenging due to muscle rigidity. **Hypothermic ventricular arrhythmias** — Conventional therapy may not work for patients with hypothermia, VF, or VT if there is no pulse until the patient has warmed up. According to Paediatric Advanced Life Support recommendations (algorithm 2), these patients may initially undergo defibrillation and medication therapy; However, if the initial attempts fail, CPR and forceful rewarming must be initiated immediately. Many episodes of severe

hypothermia have been recorded to result in refractory VF, and rewarming by itself has been shown to cause spontaneous VF conversion.

**Pulseless electrical activity, or asystole** — In accordance with paediatric advanced life support recommendations for cardiac arrest as well as active internal rewarming, patients with asystole or PEA as well as serious When a patient has hypothermia (core temperature of 28 Celsius [82°F]), they should be given epinephrine, compressions to the chest, endotracheal intubation, and preferably ECMO when one is available.

Despite the fact that epinephrine's effectiveness decreases among people with severe hypothermia, there is some animal research that suggests that using epinephrine in accordance with paediatric advanced lifesaving rules for sudden cardiac death in conjunction in aggressive rewarming may help patients' bodies warm up more quickly. Regardless of core body temperature, avoid using high doses when treating people with asystole and PEA for known or suspected hypoglycemia. (e.g., 0.5 g/kg).

According to recognized Paediatric Advanced Life Support procedures, children with asystole or PEA & moderate hypothermia (core temp 28 - 32°C [82 to 90°F]) ought to get medicine. When a patient's core temperature is more than 32°C (90°F), Some doctors may choose to extend the time between doses. Clinicians should weigh the risks and advantages of each medicine while keeping in mind that, as brain protection falls within this range, quick restoration of circulation becomes more crucial.

**Duration of resuscitation** — The youngster should get resuscitation until their core temperature reaches 34 - 35°C (93 - 95°F). Due to the neuroprotective properties of hypothermia, complete recovery of patients with severe hypothermia or cardiac failure has been extensively documented, even after incredibly time-consuming resuscitation. Despite the fact that neuroprotection is minimal beyond 32 degrees Celsius (90°F), Warming up and resuscitation should continue until the core body temperature reaches around 34-35°C (93-95°F) or until spontaneous circulation has restarted, according to legal and moral considerations.

Severe hypothermia alters conventional prognosis guidelines. For instance, in very cold water, suggestions regarding the amount of submersion necessary for survival do not apply. Children have survived in such water for up to 66 to 83 minutes. Similar to this, avalanche victims have endured lengthy burial while being extricated in asystole.

The water temp was often between 5 and 10 degrees Celsius (41 and 50 degrees Fahrenheit), according to an analysis of cases where people survived near-drowning or hypothermic arrest [49]. However, the exact water temperature is rarely established, therefore if there is any uncertainty, resuscitation & rewarming should be offered. We have found that the ideal strategy is to reheat and encourage the patient before letting the course take itself.

Any attempt to utilise chemical indicators of death must be done with caution. Completely safe threshold values have not yet been established, despite the fact that patients who do not recover from hypothermia display severe acidosis, hyperkalemia, hyperammonemia, or symptoms of intravascular thrombosis (fibrinogen 50 mg/dL). Case studies demonstrate that individuals with blood pH levels as low as 6.51 percent or 6.29 have survived unharmed despite the severity of an acidosis.

Although experts caution against basing treatment judgements solely on one biological metric, they also point out that no patient with a potassium level in their blood greater than 12 mmol/L has been shown to survive. As a result, a lot of adult guidelines state that stopping CPR may be "considered" if the serum potassium level is higher. Because case studies in children show intact survivors with potassium levels in the blood as high as 11.3 to 11.8 mmol/L, we do not think a threshold of 12 mmol per is always safe in paediatric care, and we avoid regulations which halt resuscitation for a certain level. A sample taken from a single central venous source has the lowest chance of exhibiting an unnatural rise when the serum potassium level is assessed while the patient is hypothermic.

Most scientists agree that core temperatures beyond 32°C (90°F) negate the neuroprotective benefits of hypothermia. Rewarming is certainly necessary for patients whose core temperatures are between 32 - 34°C (90 or 93°F), although the length of the resuscitation depends on the clinician's clinical judgement. When the patient's core temperature reaches 34 - 35°C (93 - 95°F), resuscitation may be halted in accordance with paediatric advanced life support standards if spontaneous circulation has not been restored despite the use of suitable treatments.

**Glucose homeostasis** — In hypothermia, hypoglycemia is fairly typical and needs to be treated. Patients who are unable to assess their blood sugar levels and have documented hypoglycemia or Dextrose IV (e.g., 0.5 g/kg) should be administered to patients with a chronically altered mental status.

Contrarily, it is not advisable to provide insulin to a child who is both hyperglycemic and hypothermic since doing so may render the child ineffective in the cold patient and may result in hypoglycemia in the child who has been re-warmed.

**Statement of the problem**

The purpose of the project, "Point of Care Quality Improvement in Kangaroo mother care for hypothermic children: A Systematic review" is to analyse the effectiveness of implementing a point-of-care quality improvement program for Kangaroo Mother Care (KMC) in improving neonatal outcomes. KMC is a low-cost, evidence-based intervention that involves continuous skin-to-skin contact between the mother and the premature or low-birth-weight new born, along with exclusive breastfeeding and early discharge.

The project report aims to provide insights and recommendations for healthcare facilities looking to implement effective point-of-care quality improvement programs for KMC to improve neonatal outcomes.Top of Form

This study will provide a brief introduction to KMC, its benefits, and its potential impact on neonatal mortality and morbidity rates. This study will analyse the current state of KMC implementation in healthcare facilities, including barriers to implementation, and identify areas for improvement.

**Objectives/Key Research Questions**

1. To assess the impact of a point-of-care quality improvement program on the implementation of Kangaroo Mother Care (KMC) in a healthcare facility.
2. To measure the improvement in neonatal outcomes resulting from the implementation of a point-of-care quality improvement program for KMC.
3. To identify the key challenges and facilitators to the successful implementation of a point-of-care quality improvement program for KMC in healthcare facilities.
4. To provide evidence-based recommendations for healthcare facilities seeking to implement a point-of-care quality improvement program for KMC, including strategies for overcoming barriers to implementation and sustaining successful programs

**Scope:**

The scope of the project report will include a literature review on KMC and its benefits, an analysis of the current state of KMC implementation in healthcare facilities, and an evaluation of the effectiveness of point-of-care quality improvement programs in improving KMC outcomes. This study will also include a case study of a healthcare facility that has successfully implemented a point-of-care quality improvement program for KMC, along with recommendations for other facilities looking to implement similar programs.

# CHAPTER 2:

# LITERATURE REVIEW

**Bowser D, Hill K, (2010**) there hasn't been much research done on the larger health system elements that affect Respectful Maternity Care (RMC). In order to understand how shortcomings in the larger factors may affect many aspects of care delivery at the individual level, we analyzed both factors at the level of the broader health system and factors at the level of health workers in our study. Mistreatment has been linked in the past to ineffective leadership and governance.

**Sfantou DF, Laliotis A, (2017)**our research showed that neither institutional standards nor the focus of health authorities' monitoring visits appropriately addressed RMC. These inspections largely disregarded RMC and were primarily concerned with things like supply availability, employee presence and cleanliness. As a result, maternity workers did not consider RMC to be a part of their duties. Expecting workers to prioritize RMC without a clear strategic direction and capable leadership is impractical. As a result, developing a culture of caring with respect necessitates incorporating it into effective governance regulations and executives must actively involve their workforce to create a common vision.

**Nutley T, Reynolds H, (2017**)the quality of care can be improved by making decisions based on the best available evidence, which requires a reliable health information system. We were unable to locate any systematic procedures at RMC that would have allowed medical professionals to check patients for potential psychological vulnerabilities. Without accurate examination and recognition of the psychosocial desires and requirements of pregnant women, providing individualizedcustomized support is not possible. Additionally, formalized methods for enabling

people to express their opinions about their experiences with care were lacking in healthcare facilities. Initiatives aimed at improving the quality of care heavily rely on patient feedback.

**Afulani PA, (2020)** this study highlights the need for addressing broader health system factors to promote RMC. This includes incorporating RMC into institutional guidelines, ensuring it receives attention during monitoring visits, fostering strong leadership commitment, implementing effective health information systems and establishing mechanisms for screening psychosocial vulnerabilities and collecting patient feedback. These improvements are crucial for fostering a culture of respectful care and enhancing the quality of maternity services. Due to a shortage of funding, healthcare professionals' capacity to provide Respectful Maternity Care (RMC) has not been adequately built. Improving the clinical understanding and abilities of healthcare professionals has been the main focus. Our findings also revealed supply and infrastructure problems that function as roadblocks to the provision of RMC which is consistent with other studies. These discrepancies highlight the necessity of making strategic investments in personnel capacity building for RMC and enhancing the facility environment for RMC promotion.

**Pant L, Khalid N, (2021),** We found that neither clinical nor non-clinical health staff were familiar with RMC. Importantly, the lack of training as well as the absence of higher authority control and oversight of RMCs may be the cause of the association between patient rights or aid with merely material things. It's important to note that despite the belief that respect should be a two-way process such as both the patient and the practitioner; the concept of "respect" was commonly simplified to simply "speaking nicely" to the patient. As some care workers pointed out, clients' violent behaviours or disobedience might occasionally result in mistreatment. This

idea of respect could contribute to mistreatment. The coordination and working relationships between clinical and non-clinical personnel also clearly showed a divergence, which was a manifestation of power dynamics. Non-clinical staff felt frequently inferior or powerless, which could lead to unhappiness and a desire to rule over patients, which could result in mistreatment.

**Asefa et al (2020).** Most workers claimed to be intrinsically motivated, and additional studies support the idea that women's or their companions' appreciation was a significant motivator. It is hoped that implementing new RMC-related practices will increase carers' professional self-esteem and inspire them to deliver better care, in large part as to the compliments received from women or their companions. However, the lack of praise or demeaning attitude from seniors or administration was a problem mentioned by maternity workers, suggesting the staff's need for acknowledgment from their superiors. This offers a chance to encourage RMC in medical facilities by teaching staff members and praising those who give supportive and respectful care. The comprehension of RMC by service providers has improved as a result of targeted training. For RMC to be implemented successfully, it is essential to address the issues connected to infrastructure, capacity building, and personal elements. The promotion of RMC can enhance the newborn healthcare experience for women by strategically investing in staff training, enhancing facility surroundings, encouraging a culture of gratitude and respect, with bridging the gap among clinical or non-clinical workers.

**Aronson L, (2012)** Healthcare workers face enormous difficulties as a result of difficult and demanding patients as well as their companions. The use of the terms "difficult" or "uncooperative" patients in medicine is extensively discussed in the literature. This way of

thinking results from a paternalistic healthcare system where doctors and nurses like to use their authority and view obedient patients favorably.

**Khalil DD, (2016)** Tension develops between the provider of services and the patient as a result of non-compliance by patients or their companions. In these circumstances, providers could feel helpless and frustrated, which might cause them to use force to guarantee compliance, which can lead to mistreatment.

**Freedman LP, (2018)** The most severe types of abuse, verbal as well and physical, frequently take place during childbirth. Service providers justify their activities by claiming that doing so will save the lives of expectant mothers and newborns. The fact that such behaviours are accepted and discussed suggests that they have become commonplace and that there are no mechanisms in place to address them.

**McMahon S, George A, Chebet J, (2014)** The necessity for frequent explanations and persistent unreasonable demands of patients were also mentioned as root causes of abuse. While this poses a difficulty for providers of services, especially in areas that have decreased female literacy rates (17 percent in our study), it also highlights the relevance of developing the capacity of individuals to effectively communicate in challenging circumstances, which is particularly important in the healthcare industry.

**Bohren MA, Hofmeyr GJ, (2017)** The offering of psychological assistance is advised as a critical element of intrapartum care due to the psychological anguish pregnant women suffer during labour and delivering. Our study showed a glaring gap in clinicians' knowledge of spotting pregnant women who may be at risk, including those with language problems, obvious

disabilities, anxiety or depression, or people who are under stress. We propose a formal education for maternal service providers in light of the rising prevalence of mental disorders in order to ensure the consistent delivery of psychosocial assistance following appropriate screening. According to WHO recommendations, it should also be a priority to engage women's companions effectively because they are crucial in providing psychological assistance. To provide such compassionate and honourable maternity care, a comprehensive package of service delivery interventions would be needed, utilizing all six elements of the healthcare system to their fullest potential. This would include everything from investments in maternity teams' capacity building to the establishment of a welcoming environment in the facility through effective leadership and accountability.

# CHAPTER 3:
# METHODOLOGY

## ELIGIBILITY CRITERIA

We were search for any English literature documenting Kangaroo mother care.

Search strings used in systematic review was:

Kangaroo mother care, Breastfeeding, newborn, children, quality improvement, child birth

## INFORMATION SOURCES

Studies was identified by searching in an electronic database ( PubMed, Cochrane) by scanning a reference list of articles using the chosen keywords forKangaroo mother care.

## STUDY SELECTION

We were including studies irrespective of sample size. Every record was screened by two reviewers independently using the title. Those accepted by both was subjected to abstract review. In case of any disagreement, arbitration was done by a senior member of the team. For the selected abstracts, full articles were obtained, and a quality check was performed using a modified SIGN checklist. Those selected at this stage was considered to be eligible for the review.

## DATA ITEMS AND DATA COLLECTION PROCESS

Information was extracted from all the eligible studies in a predesigned format. For each of the outcomes, the studies included were summarized separately.

**DATA ANALYSIS and INTERPRETATION** – Classification and arrangement changes the crude information was gathered through poll in to valuable data by getting sorted out and incorporating the pieces of information contained in every survey i.e., perception and reactions are changed over in to reasonable and precise insights are utilized to coordinate and investigate the information.

# CHAPTER 4

# RESULTS

**Q1. Gender**

**Table 1 Gender**

| Gender | No. of respondent | Percentage |
|---|---|---|
| Male | 29 | 58% |
| Female | 21 | 42% |

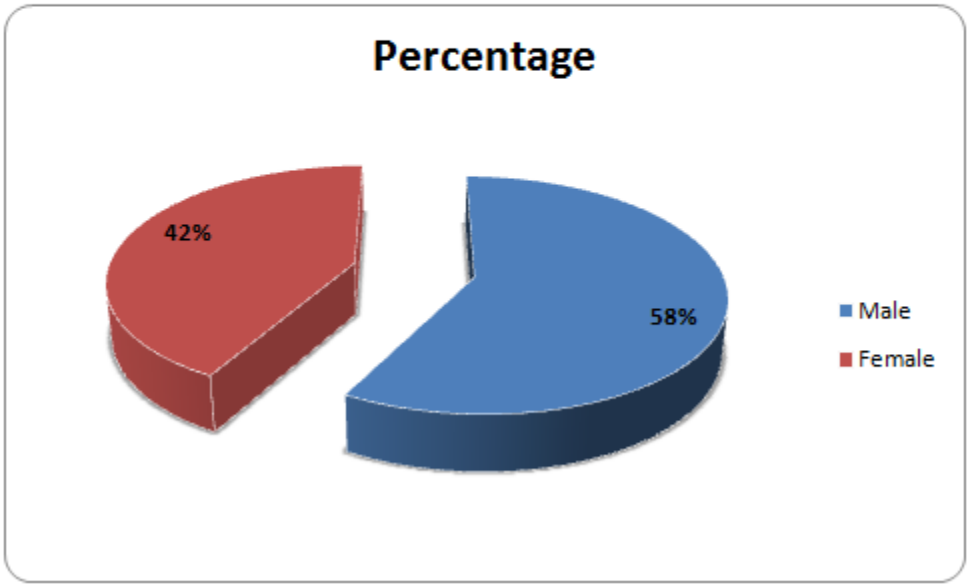


**Figure 3 Gender**

**ANALYSIS:**

In the above pie chart show that the 58% of the respondents are male and 42% of the respondents are female with the same.

**Q2. Age**

**Table 2 Age**

| Criteria | Frequency | Percentage |
|---|---|---|
| <21 | 36 | 72% |
| 22-30 | 5 | 10% |
| 31-40 | 3 | 10% |
| 41-50 | 4 | 8% |
| Above 50 | 2 | 4% |

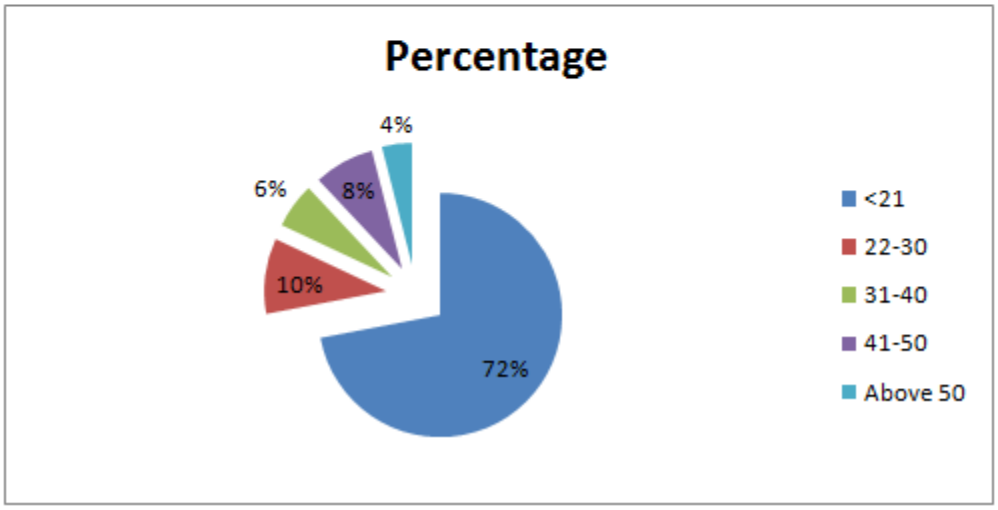


**Figure 4 Age**

**ANALYSIS**

As per shown in the above pie graph, 72% of respondent age was between below 21, 10% of respondents age was 22-30, 6% of respondents age was between 31-40, and 8% of respondents age was between 41-50, only 4% of respondents age was above 50 years.

**Q3. Number of children**

**Table 3 Number of Children**

| Criteria | Frequency | Percentage |
|---|---|---|
| No | 14 | 28% |
| 1 | 20 | 40% |
| 2 | 9 | 18% |
| 3 | 3 | 6% |
| 4 | 4 | 8% |

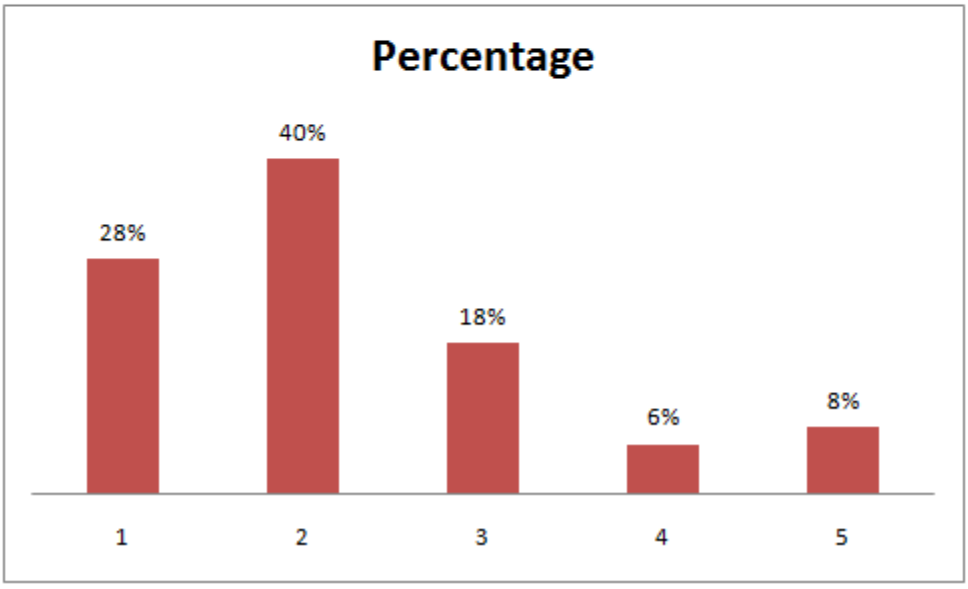


**Figure 5 Number of Children**

**ANALYSIS:**

As per shown in the above pie graph 28% of respondents has no child, 40% of respondents has only 1 child, 18% of respondents were 2 children, 6% of respondents were 3 children, 8% of respondents were 4 children.

**Q4 How satisfied are you with the quality of care provided to your infant during the kangaroo mother care implementation at Apollo Hospital**

**Table 4 Satisfied with quality of care provided**

| Criteria | Frequency | Percentage |
|---|---|---|
| Very satisfied | 15 | 30% |
| Somewhat satisfied | 14 | 28% |
| Neither satisfied nor dissatisfied | 8 | 16% |
| Somewhat dissatisfied | 4 | 8% |
| Very dissatisfied | 9 | 18% |

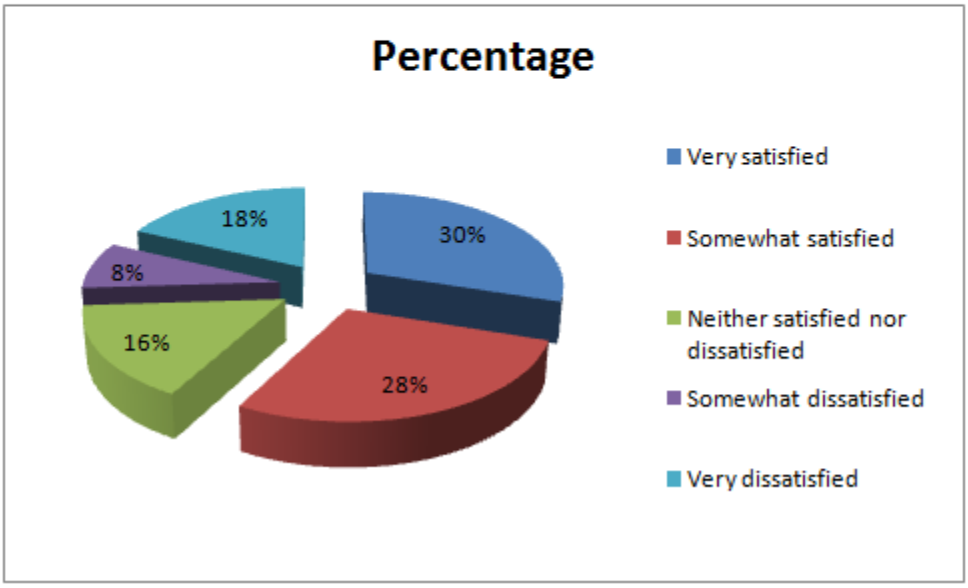


**Figure 6 Satisfied with quality of care provided**

**Analysis:** In above graph shown 30% of respondents very satisfied with the quality of care provided to your infant during the kangaroo mother care implementation at Apollo Hospital, 28% of respondents somewhat satisfied with that, 16% of respondents neither satisfied nor dissatisfied, 8% of respondents somewhat dissatisfied with that and 18% of respondents very dissatisfied with that.

**Q5 How often was you able to practice kangaroo mother care with your infant during the hospital stay?**

**Table 5 able to practice kangaroo mother care with your infant**

| Criteria | Frequency | Percentage |
|---|---|---|
| All the time | 24 | 48% |
| Most of the time | 15 | 30% |
| Sometimes | 7 | 14% |
| Rarely | 1 | 2% |
| Never | 3 | 6% |

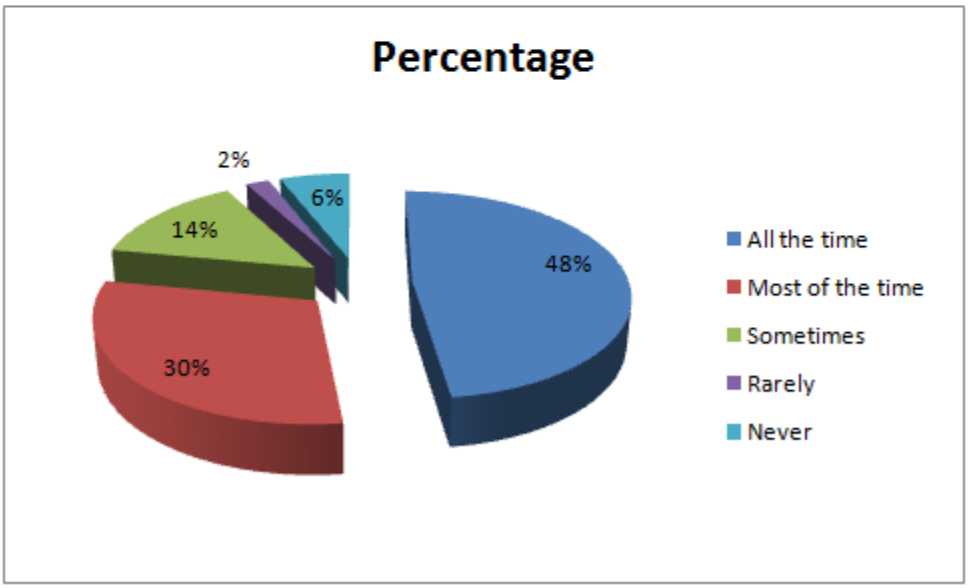


**Figure 7 able to practice kangaroo mother care with your infant**

**ANALYSIS AND INTERPRETATION:**

In the above pie chart show that 48% of the respondents all the time, 30% of the respondents most of the timewereable to practice kangaroo mother care with your infant during the hospital stay. 14% of the respondents sometime and 2% of the respondents rarely with the same and 6% of the respondents never agree with that.

**Q6 Did the hospital staff provide you with adequate information and guidance on practicing kangaroo mother care**

**Table 6 hospital staff provide you with adequate information and guidance**

| Criteria | Frequency | Percentage |
|---|---|---|
| Highly agree | 16 | 32% |
| Agree | 14 | 28% |
| Neutral | 10 | 20% |
| Disagree | 8 | 16% |
| Highly disagree | 2 | 4% |

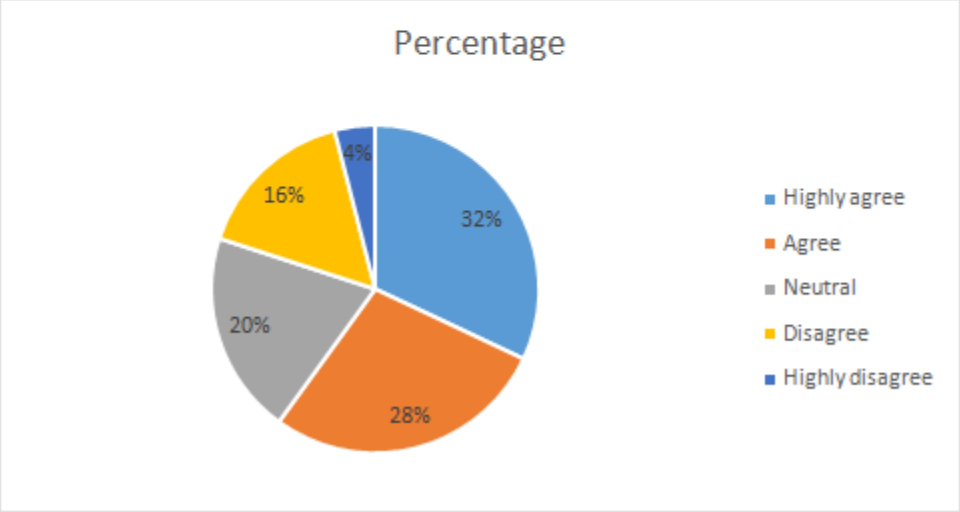


**Figure 8 hospital staff provide you with adequate information and guidance**

**ANALYSIS AND INTERPRETATION:**

In the above pie chart show that 32% of the respondents highly agree, 28% of the respondents agree with the hospital staff provides you with adequate information and guidance on practicing kangaroo mother care. 20% of the respondents neutral and 4% of the respondents highly disagree with the same.

**Q7 Did you feel comfortable practicing kangaroo mother care with your infant**

**Table 7 feel comfortable practicing kangaroo mother care with your infant**

| Criteria | Frequency | Percentage |
|---|---|---|
| Yes, very comfortable | 29 | 58% |
| Somewhat comfortable | 10 | 20% |
| Neither comfortable nor uncomfortable | 6 | 12% |
| Somewhat uncomfortable | 2 | 4% |
| Very uncomfortable | 3 | 6% |

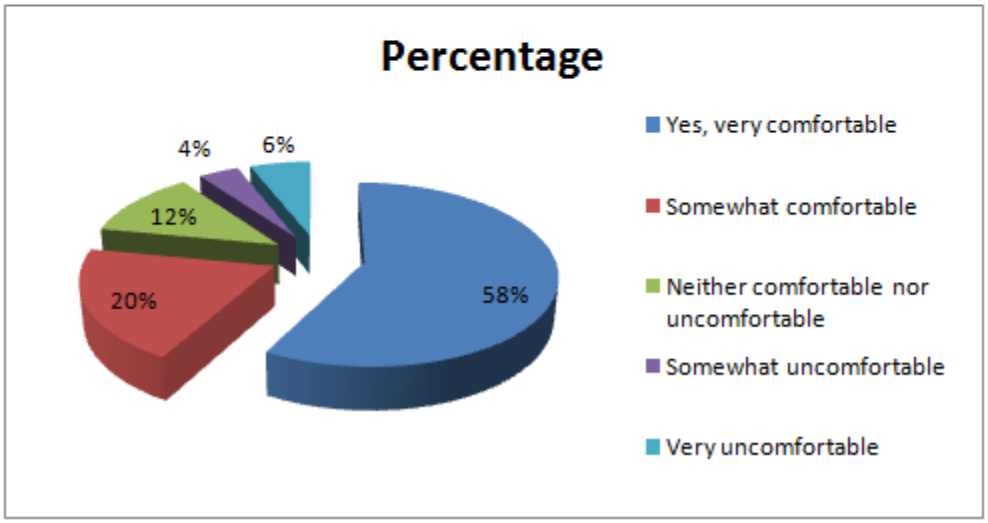


**Figure 9 feel comfortable practicing kangaroo mother care with your infant**

**ANALYSIS AND INTERPRETATION:**

In the above pie chart show that 58% of the respondents said yes very comfortable with practicing kangaroo mother care with your infant, 20% of the respondents somewhat confortable. 12% of the respondents neither confortable nor uncomfortable with that and 4% of the respondents somewhat uncomfortable with the same.

**Q8Do you believe that kangaroo mother care helped in improving your infant's health**

**Table 8 believe that kangaroo mother care helped in improving**

| Criteria | Frequency | Percentage |
|---|---|---|
| Yes, significantly | 25 | 50% |
| Yes, somewhat | 10 | 20% |
| Not sure | 6 | 12% |
| No, not really | 4 | 8% |
| No, not at all | 5 | 10% |

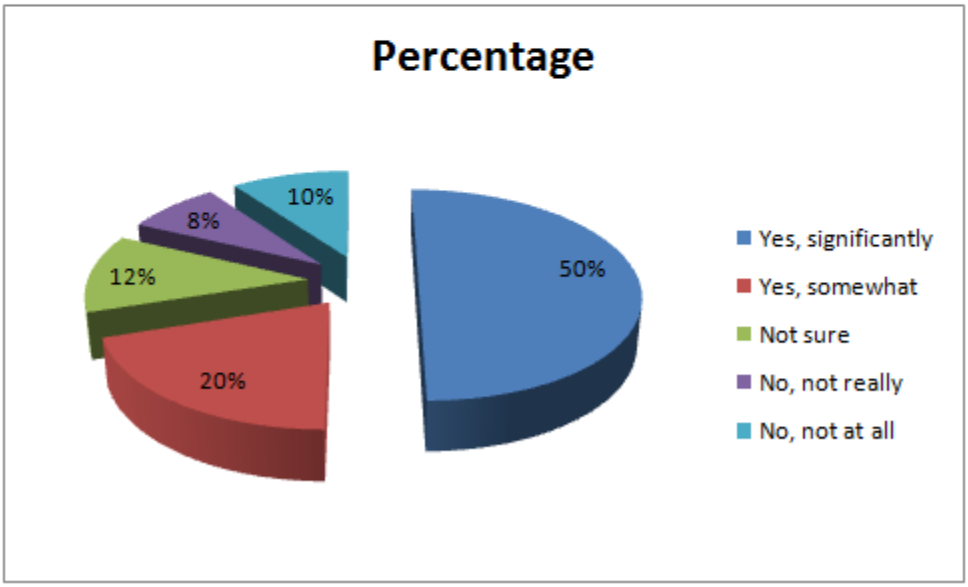


**Figure 10 believe that kangaroo mother care helped in improving**

**ANALYSIS AND INTERPRETATION:**

In the above pie chart show that 50% of the respondents said yes that kangaroo mother care helped in improving your infant's health, 20% of the respondents yes somewhat believes that. 12% of the respondents not sure with that and 8% of the respondents No not really with the same.

**Q9Would you recommend kangaroo mother care to other parents of premature infants**

**Table 9 recommend kangaroo mother care to other parents of premature infants**

| Criteria | Frequency | Percentage |
|---|---|---|
| Yes, definitely | 30 | 60% |
| Yes, probably | 10 | 20% |
| Not sure | 3 | 6% |
| No, probably not | 2 | 4% |
| No, definitely not | 5 | 10% |

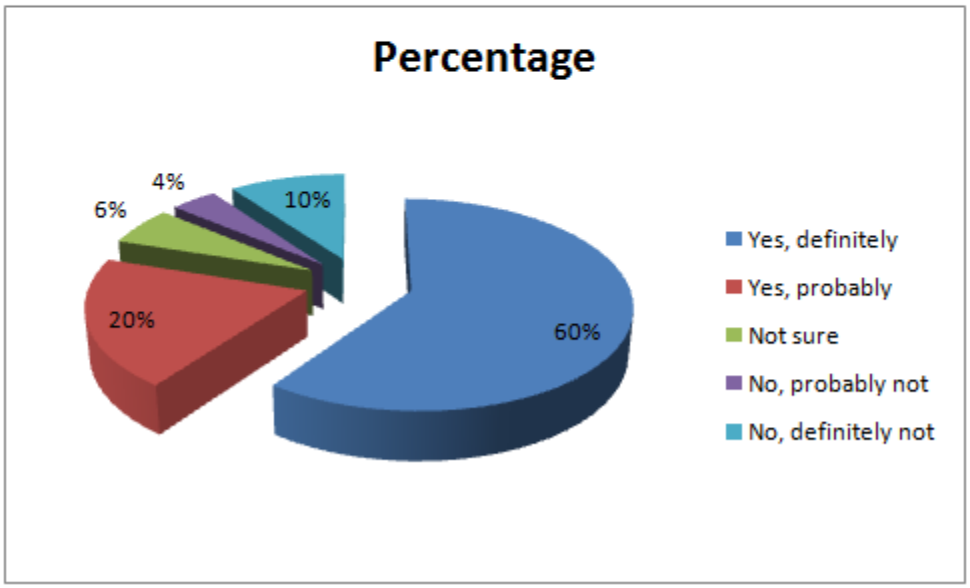


**Figure 11 recommend kangaroo mother care to other parents of premature infants**

**ANALYSIS AND INTERPRETATION:**

In the above pie chart show that 60% of the respondents definitely yes with recommend kangaroo mother care to other parents of premature infants. 20% of the respondents Yes, probably and 6% of the respondents Not sure with that, 4% of respondents no probably not with that statement.

**Q10Were you satisfied with the level of involvement and support provided by the hospital staff during the kangaroo mother care implementation**

**Table 10 satisfied with the level of involvement and support provided by the hospital**

| Criteria | Frequency | Percentage |
|---|---|---|
| Very satisfied | 25 | 50% |
| Somewhat satisfied | 10 | 20% |
| Neither satisfied nor dissatisfied | 6 | 12% |
| Somewhat dissatisfied | 4 | 8% |
| Very dissatisfied | 5 | 10% |

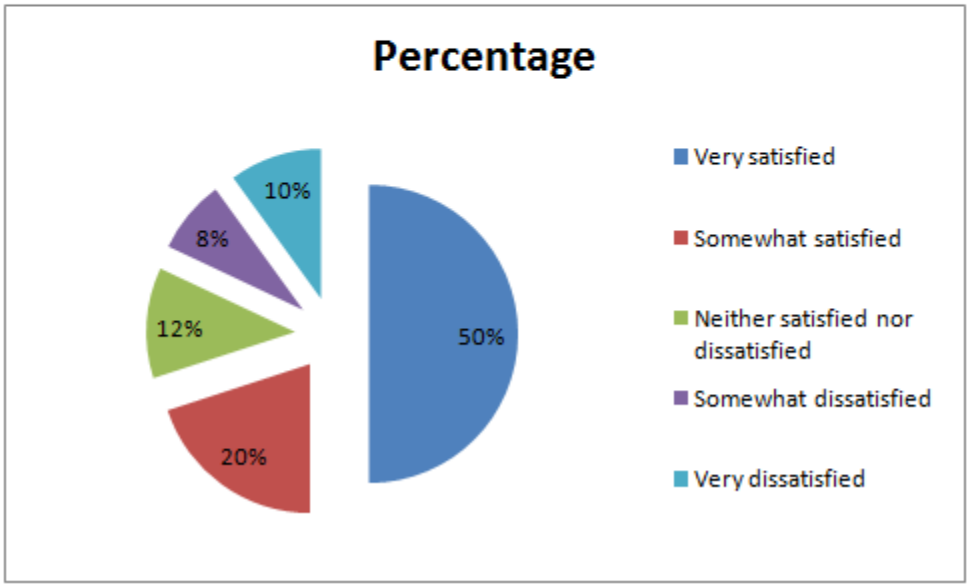


**Figure 12 satisfied with the level of involvement and support provided by the hospital**

**ANALYSIS AND INTERPRETATION:**

In the above pie chart show that 50% of the respondents very satisfies with that, 20% of the somewhat satisfied with that, 12% of the respondents neither satisfies nor dissatisfied and 8% of the respondents somewhat dissatisfied with the same.

**Q11 How important was kangaroo mother care for you and your infant during the hospital stay**

**Table 11 important was kangaroo mother care for you**

| Criteria | Frequency | Percentage |
|---|---|---|
| Extremely important | 25 | 50% |
| Very important | 10 | 20% |
| Moderately important | 5 | 10% |
| Slightly important | 6 | 12% |
| Not important at all | 4 | 8% |

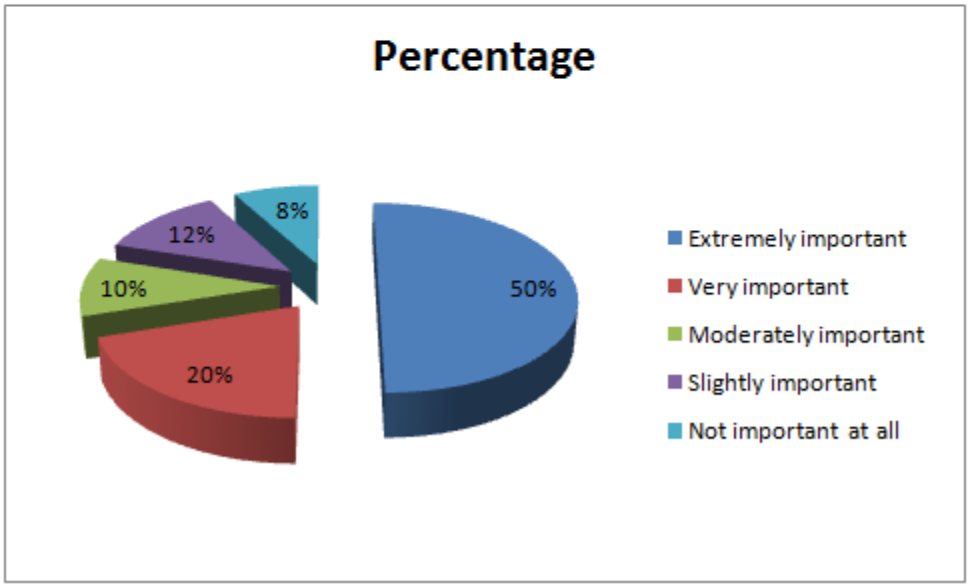


**Figure 13 important was kangaroo mother care for you**

**ANALYSIS AND INTERPRETATION:**

In the above pie chart show that 50% of the respondents extremely important with kangaroo mother care for you and your infant during the hospital stay 20% of the respondents very important, 10% of the respondents moderately and 12% of the respondents slightly important with the same.

**Q12 Did you experience any challenges or difficulties while practicing kangaroo mother care with your infant**

**Table 12 experience any challenges or difficulties while practicing kangaroo mother**

| Criteria | Frequency | Percentage |
|---|---|---|
| Yes, a lot | 30 | 60% |
| Yes, somewhat | 5 | 10% |
| A little bit | 10 | 20% |
| No, not really | 3 | 6% |
| Not at all | 2 | 4% |

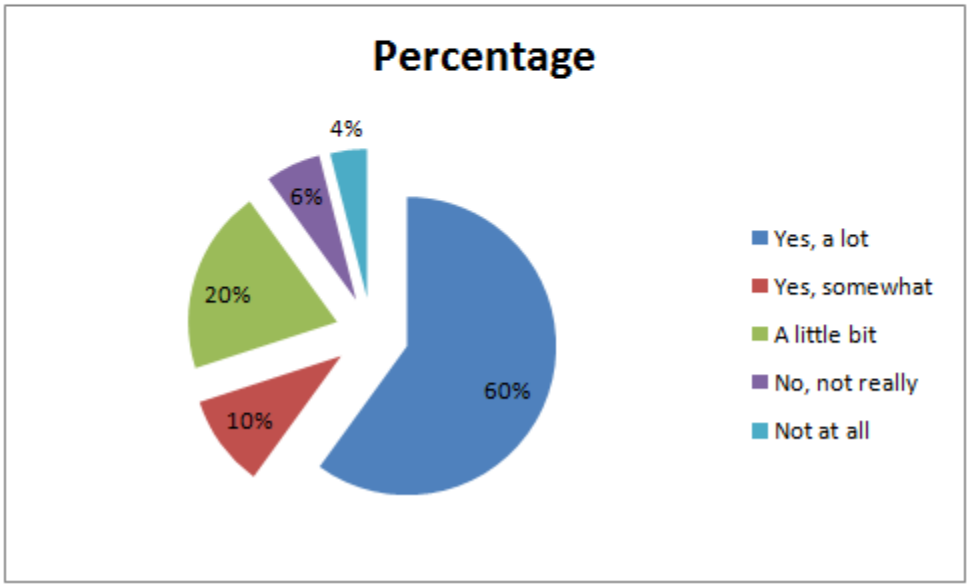


**Figure 14 experience any challenges or difficulties while practicing kangaroo mother**

**ANALYSIS AND INTERPRETATION:**

In the above pie chart show that 60% of the respondents said yes a lot experience any challenges or difficulties while practicing kangaroo mother care with your infant, 10% of the respondents yes somewhat agree with that, 20% of the respondents a little bit and 6% of the respondents no not really agree with that statement.

**Q13Do you think that kangaroo mother care should be implemented in all hospitals for premature infants**

**Table 13 think that kangaroo mother care should be implemented in all hospitals for premature infants**

| Criteria | Frequency | Percentage |
|---|---|---|
| Yes, definitely | 16 | 32% |
| Yes, probably | 14 | 28% |
| Not sure | 10 | 20% |
| No, probably not | 8 | 16% |
| No, definitely not | 2 | 4% |

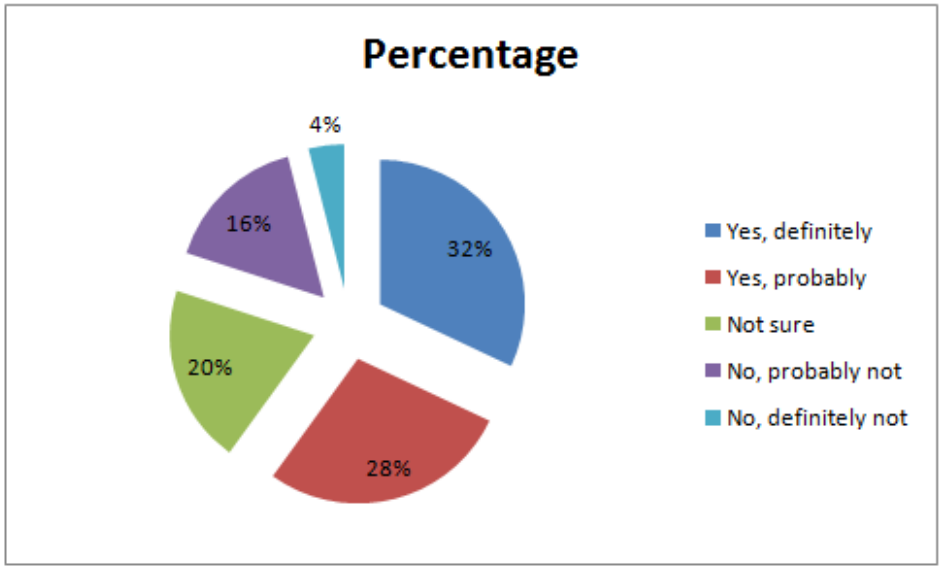


**Figure 15 think that kangaroo mother care should be implemented in all hospitals for premature infants**

**ANALYSIS AND INTERPRETATION:**

In the above pie chart show that 32% of the respondents yes definitely think that kangaroo mother care should be implemented in all hospitals for premature infants, 28% of the respondents yes probably think that. 16% of the respondents not sure and 4% of the respondents no definitely not with the same.

# CHAPTER 5:
# FINDINGS AND RECOMMENDATIONS

**Findings:**

- Gender distribution of the respondents showed that 58% were male and 42% were female.
- Age distribution of the respondents indicated that 72% were below 21 years old, 10% were between 22-30 years old, 6% were between 31-40 years old, 8% were between 41-50 years old, and only 4% were above 50 years old.
- Distribution of respondents based on the number of children they had revealed that 28% had no children, 40% had only 1 child, 18% had 2 children, 6% had 3 children, and 8% had 4 children.
- Satisfaction levels with the quality of care provided during kangaroo mother care implementation at Apollo Hospital were as follows: 30% were very satisfied, 28% were somewhat satisfied, 16% were neither satisfied nor dissatisfied, 8% were somewhat dissatisfied, and 18% were very dissatisfied.
- Frequency of practicing kangaroo mother care during the hospital stay was reported as follows: 48% practiced it all the time, 30% practiced it most of the time, 14% practiced it sometimes, 2% practiced it rarely, and 6% never practiced it.
- Perception of hospital staff providing adequate information and guidance on practicing kangaroo mother care was as follows: 32% highly agreed, 28% agreed, 20% were neutral, and 4% highly disagreed.
- Comfort levels with practicing kangaroo mother care were reported as follows: 58% were very comfortable, 20% were somewhat comfortable, 12% were neither comfortable nor uncomfortable, and 4% were somewhat uncomfortable.
- Belief in the effectiveness of kangaroo mother care in improving the infant's health was as follows: 50% believed it helped a lot, 20% believed it helped somewhat, 12% were not sure, and 8% did not believe it helped.

- Willingness to recommend kangaroo mother care to other parents of premature infants was as follows: 60% definitely yes, 20% yes probably, 6% not sure, and 4% probably not.
- Importance placed on kangaroo mother care during the hospital stay was reported as follows: 50% found it extremely important, 20% found it very important, 10% found it moderately important, and 12% found it slightly important.
- Challenges or difficulties experienced while practicing kangaroo mother care were reported as follows: 60% experienced a lot of challenges, 10% experienced some challenges, 20% experienced a few challenges, and 6% did not experience any challenges.

**RECOMMNDATIONS**

Based on the findings from the systematic review on point-of-care quality improvement in Kangaroo Mother Care (KMC) for hypothermic children, the following recommendations can be made:

**Improve healthcare provider training:** Enhance the competency of healthcare professionals in implementing KMC through comprehensive and ongoing training programs. This should include training on the importance of respectful and dignified care, effective communication, and providing adequate information and guidance on practicing KMC.

**Enhance implementation of KMC:** Increase the utilization and adherence to KMC by addressing the identified challenges and difficulties faced by parents. Develop strategies to support parents in practicing KMC consistently, addressing concerns and providing necessary resources and support.

**Address barriers to implementation:** Identify and address individual, systemic, and socio-cultural factors that act as barriers to the successful implementation of KMC. This includes addressing provider attitudes, workload management, accountability, facility culture, availability of medicines and supplies, power dynamics between patients and providers, and gender norms.

**Quality improvement initiatives:** Implement quality improvement initiatives specifically focused on KMC, aiming to improve the quality of care provided during KMC implementation. This includes ensuring that healthcare facilities have the necessary resources, guidelines, and protocols in place to support KMC practices and monitoring the quality of care provided to infants and their mothers during KMC.

**Enhance patient satisfaction:** Take measures to improve patient satisfaction with the quality of care provided during KMC implementation. This can be achieved through promoting respectful and dignified care, effective communication, addressing concerns and difficulties faced by parents, and ensuring parents feel comfortable and supported in practicing KMC.

**Dissemination and awareness:** Increase awareness among healthcare providers, parents, and the community about the benefits and importance of KMC. This can be done through educational campaigns, workshops, and dissemination of evidence-based information on KMC and its positive impact on neonatal outcomes.

**Collaborative efforts:** Foster collaboration among stakeholders including healthcare facilities, policymakers, researchers, and communities to support the implementation of point-of-care quality improvement in KMC. This includes sharing best practices, conducting further research, and advocating for policies that prioritize the implementation of evidence-based KMC programs.

It is important to note that these recommendations should be tailored to the specific context and resources available in each healthcare setting. Regular evaluation and monitoring should be conducted to assess the effectiveness and sustainability of the implemented interventions.

## CONCLUSION

The study highlights several key aspects related to the demographic profile of respondents, satisfaction levels with the quality of care, challenges faced during KMC practice, and perceived benefits of KMC.

The study revealed that there is room for improvement in the implementation of KMC, as evidenced by lower levels of satisfaction among some respondents and reported challenges in practicing KMC consistently. However, it is encouraging to note that a significant proportion of respondents expressed satisfaction with the quality of care provided during KMC implementation and believed in the positive impact of KMC on improving infant health.

The identified barriers to implementation, such as provider attitudes, workload management, and socio-cultural factors, should be addressed to enhance the successful adoption of KMC practices. Additionally, the study underscores the importance of comprehensive healthcare provider training, dissemination of evidence-based guidelines, and ongoing quality improvement initiatives focused on KMC.

It is evident that there is a need for collaborative efforts involving healthcare facilities, policymakers, researchers, and communities to support the implementation of point-of-care quality improvement in KMC. By addressing the identified challenges and incorporating the recommendations derived from this study, healthcare facilities can strive towards providing high-quality care and optimizing outcomes for hypothermic children through KMC.

Further research and evaluation are necessary to assess the long-term impact of point-of-care quality improvement in KMC, as well as to explore additional factors that may influence the successful implementation of KMC programs. By continuing to refine and strengthen KMC practices, we can contribute to improving the health and well-being of newborns and infants, and ultimately reduce the burden of hypothermia-related morbidity and mortality.

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