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Evaluating the Impact of Sodium Chloride Treatment on the Recovery of Episiotomy Wounds in Postnatal Women at Selected Medical Facilities in Kolar District

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Abstract

The study aimed to evaluate the efficacy of sodium chloride in promoting the healing of episiotomy wounds among postnatal mothers in selected hospitals in Kolar district. It employed a true experimental pre- and post-test control group design and utilized a standardized REEDA scale to assess wound healing. A total of 20 postnatal mothers were randomly assigned to either the experimental group, where sodium chloride was applied to the episiotomy wounds, or the control group, which received standard care. The study found a significant decrease in healing scores in the experimental group post-application of sodium chloride compared to pre-application, indicating improved wound healing. Additionally, the control group showed a slight decrease in healing scores, albeit not as significant as the experimental group. Demographic data revealed that most participants were aged 18–22 years, with secondary education being predominant. Primigravida mothers constituted the majority, and the length of episiotomy wounds varied, with the majority being less than 3 cm. Overall, the findings suggest that sodium chloride application may be effective in enhancing episiotomy wound healing. However, further research involving larger sample sizes and longer follow-up periods are warranted to validate these findings and inform clinical practice effectively.

Keywords: Sodium chloride, pre and post-test, control group, episiotomy wound, primigravida mothers, healing

INTRODUCTION

"A *nice clean cut is better than a jagged tear."*

Episiotomy is a surgical procedure that involves cutting the perineum (skin between the vagina and the anus) during labor to enlarge the vaginal opening. The procedure is intended to prevent vaginal tears during delivery.

Episiotomy, a frequent surgical intervention during the second stage of labor, was first introduced in 1742 as a method involving perineal incisions to ease the delivery process. In the 1970s and early 1980s, the episiotomy rate rose to approximately 50% of all births and as high as 90% in some maternity units. Women having their first baby needed to have episiotomies. During the mid to late 1980s, many studies were carried out to examine the "routine use" of episiotomy. Researchers determined that an episiotomy does not result in less childbirth trauma, improved healing, or fewer maternal problems than a tear. In India, the birth rate is becoming very high (72.3 per thousand births). The incidence of episiotomy was high. More moderate forms of genital cutting account for an

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estimated 80% of the practice worldwide. Episiotomy was once routinely performed to prevent tearing during labor, particularly to avoid tears that reach to the anus. The number of episiotomies performed remains high in the US, but there is now a great deal of controversy over whether these should be routine.

The rate of episiotomy has wide geographic variation from 8% in the Netherlands, 20% in England, 50% in the USA, and 99% in some eastern European countries, it is also high in many developing countries. Defining a "good episiotomy rate" is therefore difficult [1–4].

Episiotomy is frequently performed by physicians with the belief that it reduces perineal damage, minimizes the risk of postpartum pelvic floor issues by preventing damage to the anal sphincter muscles, decreases blood loss during delivery, and averts trauma to the newborn. According to the latest edition of Williams Obstetrics by Cunningham, MacDonald, and Gant [5], the procedure's preference among obstetricians is due to its ability to replace potentially jagged natural tears with a clean, straight surgical cut, which is simpler to suture and generally heals more effectively than natural lacerations. They also noted that episiotomy could lower the occurrence of cystocele, rectocele, and stress urinary incontinence. When an episiotomy is necessary, a medio-lateral incision is often favored over a median (midline) incision because the latter poses a greater risk of causing damage to the anal sphincter and rectum. The REEDA (Redness, Edema, Ecchymosis, Discharge, Approximation) scale, developed by Davidson for postpartum assessment of episiotomy healing, evaluates the incision site for redness, edema, ecchymosis, discharge, and approximation of the wound edges.

Despite being relatively minor, the stitches from an episiotomy can significantly impact comfort and pain levels due to the high vascularity and sensitivity of the perineal region, which is engaged in many activities including sitting and walking. Many women heal from an episiotomy without complications, yet some may face a prolonged recovery if the incision extends unintentionally into the rectum. Additional potential complications include bleeding, infection, swelling, and localized pain. The typical healing time for an episiotomy is around 4 to 6 weeks depending on the size of incision and the type of suture material used to close the wound.

The management of an episiotomy starts right after birth, encompassing a mix of localized wound care and strategies for pain relief. The approach to caring for an episiotomy varies across different medical facilities, with a variety of methods employed to mitigate pain and promote wound recovery, such as warm compresses, sitz baths with warm water, infrared therapy, cooling pads, and the application of antiseptic agents. A common choice for episiotomy wound care in hospitals is betadine, an antiseptic that contains 10% povidone-iodine, known for its effectiveness in reducing bacteria that could lead to skin infections. The fundamental aspects of healing for an episiotomy include adequate blood circulation, oxygenation, nourishment, and preventing infections.

In an era where healthcare costs are escalating, delivering cost-efficient care has become a paramount goal. Cost-saving measures are more feasible when nurses and midwives understand the impact of their care on the healing process of an episiotomy wound. Empowering nursing staff and healthcare practitioners to modify their routine practices is vital. The use of a sodium chloride solution is advantageous due to its isotonic nature, which supports the natural healing process without causing disruptions. It stands out for its accessibility, effectiveness, affordability, and safety due to its minimal toxicity and compatibility with the body's physiological conditions [6–8].

The application of normal saline within the first 24 hours after childbirth is beneficial as it reduces inflammation and edema without causing discomfort or harm to newly formed tissues, thereby facilitating the healing process. In Tamil Nadu, where an estimated 1286.796 births occur annually, approximately half of these births (52.5%) are vaginal deliveries, with midwives and obstetricians routinely performing episiotomies due to perceived benefits. However, several systematic reviews have

indicated that episiotomy may not offer the expected advantages and should not be performed routinely. These studies have found that episiotomy does not reduce the risk of perineal trauma, hasten perineal healing, prevent pelvic floor relaxation, or improve outcomes for newborns. Furthermore, episiotomy has been linked to increased perineal pain and sexual difficulties. Mediolateral episiotomy, characterized by an incision made within 3 mm of the midline at the posterior fourchette, directed laterally at an angle of at least 60° toward the ischial tuberosity and downward away from the rectum, is the most performed type of episiotomy in Europe and India. In India, midwives play a crucial role in providing comprehensive care to women aged 15 to 45 years, encompassing antepartum, intrapartum, and early and late postpartum care. Given the importance of minimizing genital tract trauma for women and healthcare providers, a multidisciplinary approach involving midwives, obstetricians, and other relevant healthcare professionals is essential for the management of perineal trauma. Midwives, in alignment with national and institutional directives, bear significant responsibilities in advocating for the judicious use of episiotomy, alongside providing intrapartum care, postpartum follow-up, and assisting in deliveries.

Despite recommendations advising against the routine application of episiotomy, its practice remains prevalent in Tamil Nadu. The state has seen a notable 14% decrease in births, from 1,081,965 in 2010 to 921,657 in 2016, while institutional deliveries have slightly increased from 99.81% to 99.97%. There is a pressing need for forward-looking studies that examine the demographic factors, labor and postpartum conditions associated with episiotomy, as well as the traditional practices of healthcare providers during labor and after birth. Such research could lead to more targeted strategies aimed at lowering the rate of episiotomy, thus fostering clinical practice grounded in robust scientific evidence. The condition of the perineum is evaluated based on the type and volume of vaginal discharge, any abnormal swelling, changes in color, tissue healing, and any discomfort experienced. In cases where an episiotomy has been conducted, the healing process is monitored by checking for signs of redness, swelling, bruising, discharge, and how well the wound edges have come together. The presence of a bad smell along with discharge suggests an infection, necessitating a closer inspection of the cut and surrounding area for warmth and soreness. Ideally, a healing episiotomy site should exhibit no redness, discharge, or swelling. While most of the healing occurs in the initial two weeks, complete healing of the episiotomy might extend from four to six months [9–12].

NEED FOR THE STUDY

Episiotomy, a common surgical intervention during childbirth, has a prevalence of 50–90% in developing nations and has long been a standard medical procedure in many countries.

This operation can lead to increased pain in the perineal region during the postnatal phase, complicating bowel movements and potentially making sexual activity painful due to the replacement of elastic vulvar tissues with scar tissue.

The discomfort from perineal cuts or tears can disrupt the mother’s ability to bond with her newborn and successfully initiate breastfeeding. Despite the widespread use of episiotomy, many women report significant issues, including pain, incontinence, and delayed healing post-procedure. Interestingly, numerous women do not experience immediate pain during the episiotomy due to the intense stretching of vaginal tissues during delivery, allowing for an easy incision. However, the recovery period is often marked by considerable discomfort. The potential side-effects of an episiotomy are infection, bruising, swelling, bleeding, extended healing time, and painful scar which may require a period of abstinence from sexual intercourse, future problems with incontinence.

Macarthur AJ and Macarthur C [13] conducted a study to explore the occurrence of perineal pain within six weeks following vaginal delivery to evaluate the correlation between perineal trauma and postpartum discomfort. Their findings indicated that perineal trauma was more prevalent among

primiparous women, individuals undergoing operative vaginal deliveries, and those receiving epidural analgesia during the second stage of labor. Acute postpartum perineal pain was commonly reported across all participants, particularly among those with heightened perineal trauma [14].

In a study by Larsson P.G, Platz-Christensen JJ, Bergman B, and Wallstersson G [15] on the effects of episiotomy and subsequent perineal issues, it was observed that the episiotomy group exhibited a significantly elevated infection rate ($p<0.001$) and experienced lengthier healing periods. The subjective discomfort reported by patient's post-episiotomy was notably heightened. Patients who underwent episiotomy after delivery reported more perineal pain compared to those with an intact perineum or minor tears. Episiotomy was identified as a leading cause of postpartum perineal pain and dyspareunia. Moreover, the rate of episiotomy rose with prolonged second-stage labor duration, particularly among women of Indian subcontinent descent, where rates were notably higher compared to those of Caucasian women. Episiotomy is performed on over 90% of first-time mothers delivering in major US hospitals, while in the Netherlands only 8% of births.

In numerous medical facilities, episiotomy has become a routine procedure during the first childbirth to prevent perineal lacerations and pelvic floor damage, thereby minimizing birth trauma. Perineal discomfort is frequently linked with vaginal delivery involving episiotomy. Proper care of episiotomy is a crucial aspect of postnatal management, and sitz baths are commonly employed to alleviate episiotomy-related pain and discomfort. Approximately, 33% of women undergoing vaginal deliveries received an episiotomy in the year 2000. In Karnataka, the female population accounts for 43% of the total population. According to census data, the overall percentage of normal deliveries with episiotomy in Karnataka is recorded at 58.6%. The crude birth rate stands at 22.5 per thousand live births, with a maternal mortality rate of 2 per thousand live births in 2007. Elevated levels of maternal mortality are often linked with factors such as perineal sepsis, harmful practices, infections related to perineal wounds, and low levels of female literacy.

Healing from an episiotomy or tear in the perineum requires a significant amount of time. But an episiotomy may cause long lasting pain. Normally the incision will heal within 10–14 days. The stitches are mostly of the kinds that are absorbed into the skin. By five weeks postpartum, the suture should be absorbed, and perineum should be healed sufficiently to have intercourse with minimal discomfort. A woman's comfort level depends mostly upon her ability to heal, her tissue type, and the extent of the incision. Numerous mothers experience prolonged recovery of episiotomy wounds during the postnatal period, leading to potential risks like puerperal sepsis. It is crucial for nurses to be knowledgeable about effective treatments for episiotomy wound care to alleviate mothers' discomfort and facilitate quicker healing [16].

A comparative analysis evaluated the healing effects of sodium chloride solution versus alternative cleansing solutions on episiotomy wounds. The research encompassed 11 trials with 310 postnatal mothers as participants. The results demonstrated that 62.9% of mothers who were treated with sodium chloride solution exhibited effective healing. In contrast, 38% of mothers who received other solutions experienced skin irritation. These findings indicate the superior efficacy of sodium chloride solution in lowering infection rates compared to other treatments, endorsing its use as a safe agent that supports the natural healing process.

Postnatal women are at increased risk of puerperal infections, which can be mitigated through meticulous hygienic practices, particularly in caring for the perineal area. Traumas like episiotomies, tears, and lacerations heighten the likelihood of postnatal infections. Emphasizing the proper management of episiotomy incisions is vital for ensuring optimal healing. Alleviating the pain and discomfort associated with episiotomy can be achieved through therapeutic measures like warm water sitz baths, which enhance blood circulation to the episiotomy site and expedite the healing process.

Episiotomy is a commonly performed surgical procedure worldwide, particularly in developing countries where its rate ranges from 50–90%. Despite being an accepted medical practice for many years, there has been a notable reduction in its frequency over time. For instance, in the United States, the percentage of episiotomies performed out of all vaginal deliveries dropped from 69.4% in 1983 to 19.4% in 2000. Studies have indicated that perineal trauma, more prevalent among primiparous women and those undergoing operative vaginal deliveries with epidural analgesia during the second stage of labor, is closely associated with perineal pain [17].

The role of midwives in perineal wound care following childbirth varies widely, with a range of practices employed. However, it is essential for midwives to recognize the impact of their care practices, both positive and negative, on wound healing outcomes. Balancing effective pain relief with the promotion of wound healing is crucial in this regard.

Considering the rising significance of cost in medical treatment decision-making and the evolving role of medical insurance companies, the use of normal saline emerges as a cost-effective, readily available, and minimally damaging option for wound care. Normal saline preserves the natural bacterial flora of the skin, maintains blood flow in capillaries, and aids in granulation without the need for local antibiotics or disinfectants. Its non-irritating nature and ability to relieve stiffness, muscle cramps, redness, and edema accelerate the healing process of episiotomies.

In light of these considerations, the researcher recognizes the necessity of incorporating the use of normal saline into nursing practice. Despite its effectiveness in promoting episiotomy wound healing, the widespread adoption of sodium chloride application remains limited compared to other treatments. Hence, there is a critical need to assess the efficacy of sodium chloride application in healing episiotomy wounds.

OBJECTIVES

- To assess the condition of episiotomy wound.
- To administer sodium chloride application on episiotomy wound in experimental group.
- To assess the effectiveness of sodium chloride in healing episiotomy wounds.
- To compare the healing of episiotomy wound in both experimental and control group.
- To determine the association between episiotomy wound healing with their selected demographic variable.

OPERATIONAL DEFINITIONS

Effectiveness

In this study, it refers to the outcome of care of episiotomy which will be assessed by observing the difference in healing pattern in mothers who are given normal saline and those who are on routine care.

Sodium Chloride

In this research, the term “sodium chloride application’ pertains to the method of cleansing the episiotomy incision site, extending from the fourchette to the anus, using a sterile cotton soaked in an isotonic solution.

Healing

This indicates the lack of redness, swelling, bruising, discharge, and the observation of a closely aligned wound, each being scored as zero and documented in the episiotomy wound evaluation using the REEDA scale.

Episiotomy Wound

This involves a surgical cut made in the perineal region, either on the right or left side, known as the mediolateral aspect, performed during the second stage of labor and sutured after the third stage. The study includes all types of episiotomy wounds that are non-infected, fresh, and not lacerated, and are

repaired using absorbable sutures.

Postnatal Mothers

This study pertains to females who underwent vaginal delivery and received either a left or right mediolateral episiotomy, observed from the first day to the fifth day postpartum.

Selected Hospital

In the present study, the selected hospital is Government Hospital KGF, Kolar district, Karnataka.

ASSUMPTIONS

- Many postnatal mothers might experience a delay in the healing of their episiotomy wounds.
- The use of sodium chloride could potentially impact the healing process of an episiotomy wound.
- Caring for an episiotomy wound with sodium chloride can be an easily accessible and minimally harmful approach that promotes granulation.

Delimitations

The research focuses on postnatal mothers who have received an episiotomy in specified hospitals within KGF, with the period for collecting data spanning 4 to 6 weeks.

Hypothesis

H1: A notable difference is anticipated between the initial and final assessment of episiotomy wound healing among postnatal mothers in both the experimental and control groups.

H2: The final assessment of episiotomy wound healing among postnatal mothers is expected to significantly correlate with certain demographic variables.

Research Variables

- *Independent variable*: Applying sodium chloride on episiotomy wound.
- *Dependent variable*: Healing of episiotomy wound.

Conceptual Framework

A conceptual framework serves as a collection of concepts and a framework of propositions that outline the relationships among these concepts, playing a pivotal role in the advancement of scientific knowledge. Its primary aim is to provide clarity, generalizability, and meaning to specific areas of study. In the context of nursing, a conceptual framework not only enhances communication but also ensures a structured approach across research, education, administration, and clinical practice.

For this study, the chosen theoretical underpinning is derived from Imogene M. King's goal attainment theory (Figure 1). This theory emphasizes the unique interpersonal dynamics within nursing, distinguishing the profession through the actions nurses undertake with and for individuals. Central to King's theory is the process through which individuals, often unfamiliar with one another, engage within a healthcare setting to seek and offer support in achieving a level of health conducive to fulfilling their life roles.

Key concepts integral to King's theory include perception, action, interaction, and transaction, each playing a critical role in every nursing encounter and collectively forming the foundation of the conceptual framework for this study [18].

Perception

Perception is defined as an individual's interpretation of reality, involving the processes of absorbing energy from the surroundings, and organizing it through information processing. This includes transforming energy, managing information, storing it, and eventually expressing it through observable behaviors.

Action

Action pertains to the endeavor undertaken by an individual to attain their perceived goal. In this research, it involves collaborative goal establishment aimed at enhancing the healing process of the episiotomy wound. The investigator administers sodium chloride and evaluates the wound using the REEDA scale.

Interaction

Interaction denotes the exchange of verbal and non-verbal cues between an individual and their surroundings or among multiple individuals. It encompasses purposeful perception and communication towards achieving a goal. In this context, the researcher evaluates the level of the episiotomy wound using the REEDA scale.

Transaction

Transaction refers to the dynamic process of interaction wherein individuals engage with their environment to attain goals that hold significance and guide human conduct. In this investigation, the application of sodium chloride leads to an enhancement in the healing progression of the episiotomy wound, signifying a transactional exchange between the intervention and the healing outcome.

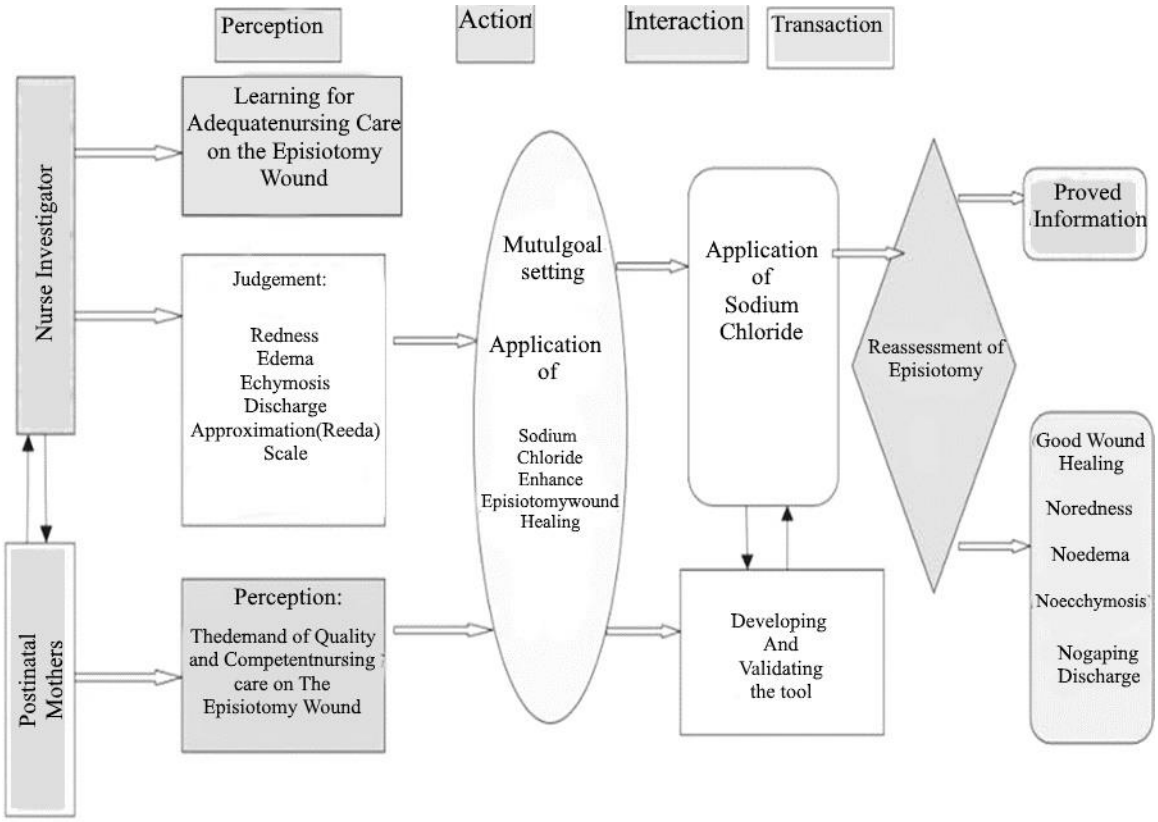

Figure 1. Conceptual framework based on Imogene King's goal attainment model.

REVIEW OF LITERATURE

Conducting a thorough review of literature is a crucial step in the research process, providing both researchers and readers with valuable context and insights into existing knowledge on the chosen subject. This phase involves identifying and exploring information pertinent to the topic, thereby creating a comprehensive overview of the current state of understanding. The literature review section encompasses an examination of both published and unpublished research findings as well as non-research literature relevant to the specific focus of the study. This extensive review aims to enhance comprehension and offer valuable insights into the selected research questions or issues under

investigation. Along with the review of books and journals, an attempt was also made to review literature through internet research and non-research literature were reviewed and organized under the following headings [19].

This article is divided into 3 sections:
Section I: Studies related to episiotomy.
Section II: Studies related to various methods used for episiotomy care.
Section III: Studies related to application of sodium chloride on episiotomy wound healing.

Section I: Studies Related to Episiotomy

A randomized control study was conducted at the Military Hospital Rawalpindi's Gynecology and Obstetrics Department from January 2006 to April 2008. The study divided 200 patients into two groups: one group of 100 patients received a mediolateral episiotomy at the time of the baby's head crowning (group 1), while the other 100 patients gave birth without an episiotomy (group 2). The research compared postpartum morbidity between the two groups, looking into complications from episiotomy such as perineal tears, subjective pain assessment at the perineum, postpartum dyspareunia, pressure sensations during the postpartum period, incontinence, and an objective evaluation of prolapse after childbirth.

In a separate investigation, it is conducted that 40 postpartum, first-time mothers who had undergone normal delivery with an episiotomy were studied to evaluate and describe perineal pain. The Brazilian version of the McGill Pain Questionnaire was used to gauge the intensity of pain, revealing that the average pain level among participants was 4.2, indicating a moderate intensity of perineal pain.

Regarding the routine versus restrictive use of episiotomy to prevent severe perineal tearing, the comparative benefits of midline versus mediolateral episiotomy remain uncertain. This study aimed to explore the impact of limiting episiotomy use versus routine application during vaginal births. The analysis included randomized trials comparing the restricted versus routine application of episiotomy, mediolateral episiotomy, and midline episiotomy, including trials that looked at combined approaches. Two reviewers independently evaluated the quality of the trials and collected data. The principal findings, drawn from eight studies involving 5541 women, showed that episiotomies were performed on 75.15% (2035/2708) of women in the routine episiotomy group compared to 28.4% (776/2733) in the restrictive group. Compared to routine episiotomy, a restrictive approach led to a reduction in severe perineal trauma, the need for suturing, and complications during healing, but was associated with an increase in anterior perineal trauma. The study found no significant differences in the occurrence of severe vaginal/perineal trauma, dyspareunia, urinary incontinence, or various measures of pain between restrictive and routine use of episiotomies, whether mediolateral or midline. The findings suggest that adopting a restrictive episiotomy policy offers several advantages over a routine episiotomy approach, including reduced posterior perineal trauma, fewer suturing requirements, and decreased healing complications. However, this approach is associated with a higher incidence of anterior perineal trauma.

In research focused on understanding the necessity and outcomes of episiotomy in vaginal births, the study aimed to illuminate the immediate effects of lateral episiotomy and identify factors influencing the frequency of this procedure. Conducted over October and November 2008, the investigation revealed that episiotomies were significantly more prevalent among first-time mothers compared to those with previous births (55% versus 12%, $p<0.001$), with the choice of maternity hospital being a crucial factor in determining the likelihood of an episiotomy. The conclusion drawn was that it is possible to lower episiotomy rates without adversely affecting the health of mothers or their newborns.

A study was conducted to assess the extent of post-partum pain delay or linger for several weeks after delivery. 445 women who delivered babies vaginally were selected from the hospital in Toronto, Canada. Results showed that the percentage of women who reported perineal pain up to one week after

childbirth varied among the women depending on the degree of perineal trauma.

A retrospective investigation was carried out to evaluate the connection between episiotomy and the incidence and severity of perineal damage among women undergoing forceps deliveries at Semmelweis Women's Hospital in Austria from February to July 1999. During this period, episiotomies were not standard practice and were performed either as midline or mediolateral incisions. The findings indicated that the occurrence and severity of perineal lacerations were significantly reduced in forceps deliveries when an episiotomy was conducted, with the mediolateral approach offering greater protection against perineal damage.

In a retrospective analysis at the University of Port Harcourt Teaching Hospital in Nigeria, spanning from January 1996 to December 2000, the frequency of risk factors for episiotomy and perineal trauma was assessed. Out of 4,720 vaginal births recorded during the study period, the episiotomy rate was 39.1% among all birthing women, and 77.1% among first-time mothers. The conclusion drawn from the study was that despite the high rate of episiotomy, it seemed to prevent severe third-degree and complete perineal tears.

A cross-sectional study in the United Kingdom focused on first-time low-risk mothers to ascertain episiotomy and perineal tear rates and identify associated risk factors. The study found that a significant majority (83%) of these women experienced some form of perineal trauma. Among them, 40% underwent only an episiotomy, 6% experienced both an episiotomy and a perineal tear, and 37% had perineal or other types of tears [20].

Section II: Studies Related to Various Methods Used for Episiotomy Care

A study was conducted to determine the most appropriate post-delivery care following episiotomy, optimal treatment for episiotomy pain, and the progression of repair stitches in Paris. A literature review spanning from 1990 to 2005 was carried out using Medline and the Cochrane library. Findings revealed that while personal hygiene is crucial for healing, no specific treatment has been universally accepted.

In another comparative study conducted at the University of Port Harcourt Teaching Hospital, the effects of two local anesthetic agents on postpartum perineal pain were assessed. The study compared 1% plain lidocaine with 0.25% plain bupivacaine infiltration for selective episiotomy repair. Results indicated that bupivacaine provided prolonged analgesia and required fewer doses of oral analgesics during the immediate postpartum perineal repair period.

Furthermore, an investigation was carried out to evaluate the effectiveness of teaching episiotomy and perineal care among primiparous women in selected hospitals in Karnataka. The study found that the teaching program significantly increased knowledge ($t=23$) and ability ($t=24.34$) in the experimental group. It was suggested that nurses and midwives play a crucial role in identifying and providing necessary supportive and educational care to clients who have undergone episiotomies.

Additionally, to assess the effect of aromatherapy on perineal healing, the perineal healing status was evaluated using the REEDA scale, and smears of episiotomy wounds were obtained. Results indicated that postpartum aromatherapy for perineal care could be effective in promoting perineal healing.

In an experimental study on the effect of heat and cold applications on the perineum after episiotomy during the first 24 hours after delivery in Chicago, 30 patients were treated with cold perineal packs and the other 30 patients were treated with heat. Results showed no difference in the REEDA score before or 2 hours after treatment.

A descriptive analysis was carried out to investigate the determinants affecting the healing of episiotomy wounds in a sample of 60 postnatal women at the Government Taluk Hospital in Kundapura.

The demographic performance of postnatal women and an observational checklist in episiotomy wound healing were used to collect data on the age of the mother, number of vaginal examinations done during labor, the head circumference of the newborn, and the hemoglobin level, which had no effect on episiotomy wound healing score. The research found that several factors, such as the number of childbirths a woman has had, how often she performs perineal self-care, the length of the episiotomy cut, and the number of stitches used, affect the healing process of episiotomy wounds. In a quasi-experimental study, the efficacy of applying ice packs filled with normal saline on episiotomy wounds was evaluated. The focus was on measuring changes in pain levels, swelling, and bruising. Results indicated a notable reduction in pain for mothers who used this method. The study recommends using ice packs with normal saline in both hospital postnatal wards and at home for postpartum care. Additionally, a comparative investigation explored the healing effects of using water and soap irrigation versus treatment with povidone-iodine and normal saline on patients with episiotomy wounds that were not healing properly. The study included 40 samples. In group I, water and soap have been used while in group II, normal saline and povidone-iodine have been used for irrigation of an ununion episiotomy wound. The result shows that 40% of episiotomy wound closure has occurred faster in the normal saline and povidone-iodine groups. In the water and soap irrigation group, 20% of episiotomy wounds got infections. The study concluded that povidone-iodine and normal saline enhance the episiotomy wound closure.

An experimental investigation was conducted to evaluate the impact of combining normal saline instillation with negative pressure wound therapy on wound healing in a porcine model. The wounds received four cycles of normal saline instillation daily. The findings indicated that the instillation therapy using normal saline resulted in an accelerated rate of wound filling. The study concluded that this therapy may facilitate the formation of granulated tissue rich in collagen, enhancing the quality of wound healing [21].

Section III: Studies Related to Effect of Sodium Chloride Solution on Episiotomy Wound Healing

A comparative study was conducted to determine the effectiveness of antiseptic solution, tap water, and sodium chloride solution in the healing of wounds. Group I was treated with an antiseptic solution, Group II with tap water, and Group III with a sodium chloride application. The wound was dressed in antiseptic solution, normal saline, and tap water. Healing of the wound was measured on the 9th day. The results show an inhibitory effect of antiseptic solution on wound healing. Wound infection occurred on all the wounds cleaned with antiseptic solution. The wounds had greenish exudate on their surfaces. There was delayed healing in this group compared to the other two groups. In a randomized control trial, 56 women with superficial wound dehiscence post-surgery were equally divided into two groups. The first group received irrigation treatments with normal saline and Firooz baby soap, while the second group was treated with normal saline and povidone iodine. The study tracked the development of granulation tissue, comparing surgical reasons, wound dehiscence length, and the lengths of hospital stays and wound healing. Patients treated with soap had irrigation periods averaging 4.18 ± 1.96 days, in contrast to the povidone-iodine group's 5.36 ± 2.83 days ($P = 0.414$). Granulation tissue appeared in the soap-treated group after an average of 3.88 ± 1.94 days versus 4.48 ± 2.92 days in the povidone iodine group ($P = 0.391$), with hospital stays lasting 5.48 ± 2.04 days versus 6.3 ± 2.95 days, respectively ($P = 0.423$). Since no significant differences were noted between the groups, the conclusion drawn is that irrigation using normal saline, and soap is equally effective, safe, and non-allergenic when compared to the use of povidone iodine.

In an investigation into the effectiveness of sodium chloride for treating episiotomy wounds, a study grouped 60 participants into two categories: 30 for treatment and 30 for control. These participants were randomly distributed into either group. The intervention group received sodium chloride applications on their episiotomy wounds, while the control group did not. Initial assessments using the REEDA scale showed over 90% of subjects in both groups ranked in the poor category for wound healing ($\chi 2 = 0.3770$, $p = 0.8282$), with none in the good category. After treatment, a significant majority (92.64%) of the mothers in the treatment group achieved good wound healing, in stark contrast to the control group, where none achieved this category ($\chi 2 = 403.554$, $p < 0.001$).

Another study compared the effectiveness of normal saline versus betadine on episiotomy wound healing in 120 multiparous women, equally divided into an experimental group and a control group. The experimental group had 10 cc of normal saline (9 in 1000 cc) applied to their wounds three times daily for ten days using a sterile syringe. Conversely, the control group received a solution of 10% povidone-iodine mixed with water, applied at the same frequency. Wound evaluations were conducted on the fifth- and tenth-days post-episiotomy using the REEDA checklist. Results indicated that the control group reported higher episiotomy pain scores on both the fifth and tenth days compared to the experimental group, with mean scores consistently higher across all three time points for the control group versus significantly lower scores in the experimental group.

The study examined the impact of normal saline compared to povidone-iodine on the healing of episiotomy wounds in nulliparous women through a randomized control trial involving 120 participants at Taleghany Maternity House in Arak, Iran. Participants were randomly allocated to either a case group, receiving 10 cc of normal saline, or a control group treated with povidone-iodine, thrice daily for episiotomy irrigation. Wound healing assessments were performed on the 5th and 10th days postpartum using the REEDA checklist. Statistical analysis, including T tests, $\chi 2$, and Mann-Whitney U tests, showed no significant difference in redness, edema, infection, discharge, and ecchymosis between the two groups on the 5th and 10th days, except for a slight difference in wound approximation on the 5th day and in ecchymosis and discharge on the 10th day, favoring the control group.

In another comparative investigation on the effectiveness of normal saline versus alternative solutions in episiotomy wound healing among postnatal mothers, 40 participants were divided equally into an experimental group receiving normal saline applications and a control group treated with different solutions. The findings revealed that by the 7th day, 84% of the episiotomy wounds in the experimental group showed satisfactory epithelialization, reaching 100% by the 21st day. In contrast, wounds treated with other solutions exhibited 72% epithelialization by the 7th day and 84% by the 21st day. Furthermore, 80% of wounds in the normal saline group demonstrated reparative activity with minimal inflammation by the 7th day. The conclusion drawn from this study was that normal saline significantly enhances the healing process of episiotomy wounds.

A study assessed the effect of water and soap irrigation with Povidone-iodine and normal saline in the treatment of patients with union episiotomy wounds. The study included 40 samples. In group I, water and soap have been used, while in group II, normal saline and povidone-iodine have been used for irrigation of the union episiotomy wound. The result shows that 40% of episiotomy wound closure has occurred faster in the normal saline and povidone-iodine groups. In the water and soap irrigation group, 20% of episiotomy wounds got infections. The study concluded that povidone, iodine, and normal saline enhance episiotomy wound closure.

In a comparative experimental study involving 849 randomly selected subjects, 409 patients were preoperatively treated with chlorhexidine alcohol, while 440 underwent cleansing with povidone-iodine. Infection rates were evaluated 30 days post-operation. Results showed a notably lower incidence of infection in the chlorhexidine alcohol group compared to the povidone iodine group (9.5% vs. 16.1%, $p<0.04$; relative risk 0.59, 95% CI, 0.41 to 0.85). Specifically, chlorhexidine alcohol proved significantly more effective in preventing both superficial (4.2% vs. 8.6%, $p=0.008$) and deep incision infections (1% vs. 3%, $p=0.05$), but showed no significant difference in organ space infection rates (4.4% vs. 4.5%). The study's findings support the conclusion that preoperative skin cleansing with chlorhexidine-alcohol is more effective than povidone-iodine in reducing the risk of surgical site infections following operations.

This study conducted a retrospective analysis to evaluate wound healing rates and the costs associated with using wet-to-dry normal saline gauze dressings versus amorphous hydrogel dressings in patients with diabetes. It included a total of 50 participants, equally divided into two groups: those treated with

wet-to-dry normal saline gauze dressings and those with amorphous hydrogel dressings. The findings indicated no significant difference in the rate of wound healing between the two groups. However, wound healing was notably more efficient (P = .006) in the normal saline group. The conclusion drawn was that both treatment modalities are equally effective in promoting wound healing, yet the use of a normal saline gauze dressing offers a more cost-effective solution.

A semi-experimental study evaluated the impact of ice packs containing normal saline on healing episiotomy wounds. The aim was to assess the level of pain, inflammation, and bruising of episiotomy wounds. The results showed that the mothers had significantly less pain from the episiotomy wound. After calculating the z-value, it was determined that the p-value was not statistically significant as it exceeded 0.05 in each scenario. However, further analysis revealed a significant difference in the healing ratings between the normal saline group and the control group, with a p-value of less than 0.0001 in the former and greater than 0.05 in the latter. Additionally, demographic variables such as age, parity, body weight, Hb gm% level, and the reason for episiotomy did not exhibit any significant influence, as indicated by p-values greater than 0.05. Consequently, the study concluded that the application of ice packs containing normal saline is suitable for use in both postnatal wards and home settings.

A comparative study on the effect of betadine and normal saline on episiotomy wound healing. The objective of the study is to determine the effectiveness of betadine and normal saline in episiotomy wound healing. The clinical trial strategy of the study was conducted on 100 cases. 50 were given betadine and 50 with normal saline, and the efficacy was determined according to wound healing, redness, infection, and suture absorption at the 1st, 5th, and 10th postoperative days. The results of independent t test p values are significant only on day 1 of 0.01, and paired t test show a significant difference (p = 0.00) in the control group only at days 1 to 2 with a mean of 15. In the intervention group, there was a significant difference on days 1–2 (p = 0.00, mean = 31.7) and on days 2 and 3 (p = 0:04, mean = 5.7). The result shows that normal saline is more effective in episiotomy wound healing during postpartum [22].

RESEARCH METHODOLOGY

Research methodology serves as a systematic approach to problem-solving, encompassing the entire process from identifying initial problems to reaching final conclusions. It involves investigating methods for obtaining, organizing, and analyzing data. Methodology studies encompass the development, validation, and evaluation of research tools and techniques. This study outlines the research design, setting, population, and sampling criteria for selecting samples, as well as the instruments and tools utilized for data collection.

Brief Description of Different Steps Undertaken for the Study

- *Research approach.*
- *Research design*
- *Research settings*
- *Variables under study*
- *Population*
- *Sample and sampling technique*
- *Development of the tool*
- *Description of the tool*
- *Content validity*
- *Reliability*
- *Pilot study*
- *Data collection procedure*
- *Plan for data analysis*

Research Approach

The research approach serves as a comprehensive framework outlining the fundamental steps in conducting research. For this study, the chosen research approach is the experimental approach, which involves significant control over the research environment. This approach entails manipulating certain variables to examine their impact on other variables.

Research Design

The research design outlines the methodology, structure, and strategy employed to address the research questions. It serves as the comprehensive framework or blueprint chosen by researchers to execute the study. In this case, an experimental design featuring a pre-test/post-test control group was utilized.

VARIABLES UNDER THE STUDY

"A variable is a potentially measurable component of an object or event that may fluctuate in quantity and quality "or that may be different in quantity and quality from one individual object or event to another individual object or event of the same general class.

Dependent Variable

The dependent variable is the variable the researcher is interested in understanding, explaining, or predicting. The dependent variable in this study is healing of episiotomy wound.

Independent Variable

The independent variable is the phenomenon in the hypothesis that is not manipulated by the investigator in the experimental study to test the hypothesis. It is the variable that is manipulated by the researcher to study its effect on the dependent variables. In this study, the independent variable is the application of sodium chloride on the episiotomy wound.

Attributed Variables

Pre-existing characteristic of the entity under investigation, in which the researcher simply observes and measures.

In this study, attributed variables are:

- Age
- Education status
- Religion
- Monthly income
- Gravida
- Episiotomy wound in centimeters.

SETTING OF THE STUDY

The setting of the study refers to the physical location and conditions in which data collection takes place. For this study, the investigator selected GH Hospital and Suria Nursing Home in Bangerpet, which are both located 10 kilometers away from KKECS College of Nursing in KGF. A total of 60 postnatal mothers were selected for the study.

Population

The term "Universe" is sometimes used to describe a complete group of individuals sharing a common attribute. The target population encompasses the full group of individuals relevant to the study from which participants are chosen and to whom the study's findings will be applicable. The target population for this research includes 60 postnatal mothers who have either a right or left mediolateral episiotomy wound, reflecting the researcher's focus and the group to which the study's outcomes are intended to extend.

SAMPLE

A sample is comprised of individuals from the population chosen to take part in a research investigation. In the present study on postnatal mothers with right or left mediolateral episiotomy wounds between the age groups of 18 to 32 years at selected hospitals.

Sample Size

A sample consists of the subjects of the population selected to participate in a research study. In the present study, the sample consisted of 60 postnatal mothers with right or left mediolateral episiotomy in selected hospitals in Kolar.

Sampling Technique

Sampling technique involves choosing representative individuals from a population for research, aiming to gather information about a phenomenon in a manner that reflects the entire population.
For this study, a non-probability purposive sampling technique was utilized, wherein all patients meeting the selection criteria were included, ensuring comprehensive representation.

CRITERIA FOR SELECTION OF SAMPLE

Inclusion Criteria

Postnatal mothers

- Willing to participate in the study.
- Present and available at the time of study.
- Able to read and write English and Kannada.

Exclusion Criteria

- Not available during data collection.
- Not willing to participate.
- LSCS mothers

DEVELOPMENT OF THE TOOL

"The instrument is a vehicle that could best obtain data pertinent to the study and, at the same time, to the body of general knowledge in discipline". The investigator developed a structured interview schedule to collect the socio-demographic data and observational checklist to assess the episiotomy wound using the REEDA scale.

The following steps were carried out for preparing the tool.

- Review of literature.
- Based on the opinions of the subject experts.
- Investigators' personal experience.

DESCRIPTION OF THE TOOL

The tool consists of two sections:

Part 1: A structured interview schedule was used to collect the socio-demographic data.

Part 2: An observational checklist was used to assess the episiotomy wound by using REEDA scale.

Part I

Part 1 consists of items from sociodemographic variables such as, age, religion, education, occupation, family income, gravida, and episiotomy wound.

Part II

It consists of an observational checklist for assessing the effectiveness of sodium chloride on the healing of episiotomy wounds among postnatal mothers. The scale used is a standardized REEDA scale, developed by Davidson in 1974.

It has five components:

- Redness
- Edema
- Ecchymosis
- Discharge
- Approximation

Each item on the scale was given a score ranging from 0 to 3. The maximum score was 15.

Minimum was 0. A higher score indicates poor episiotomy wound healing.
Level of wound healing:

- 0 to 2 cm: Good
- 3 to 5 cm: Moderate
- 6 to 8 cm: Mild
- 9 to 15 cm: Poor

CONTENT VALIDITY

"Content validity concerns the degree to which an instrument has an appropriate sample of items for the construct being measured".

The prepared instrument, along with the statement of the problem, objectives, and tool, were submitted to 10 experts, consisting of six nurse educators from the department of obstetrics and gynecological nursing, one psychologist, one physician, and one statistician, to establish the content's validity. A list of experts is given in the annexure. Suggestions by experts were subsequently incorporated into the tool.

RELIABILITY

"Reliability of an instrument is the degree of consistency with its measure that the attribute is supposed to measure." It is concerned with consistency, accuracy, precision, stability, equivalence, and homogeneity. Using the split-half method, reliability was determined to be $r = 0.94$, indicating that the tool demonstrated high reliability.

PILOT STUDY

A pilot study is conducted after the planning stage of research to examine and validate various aspects of the research design.

This preliminary study serves as a smaller version of the main research, aiming to evaluate the feasibility of the primary study and to gather insights for its enhancement.

For this particular research, the pilot study was carried out with 5 postnatal mothers from GH Hospital and 5 from Suria Hospital, during the period from December 10, 2022, to December 22, 2022. The participants were chosen using a simple random sampling method (lottery method). The objectives of the study were communicated to the postnatal mothers, and confidentiality was guaranteed before beginning data collection. Following the pilot study, the tool was deemed to be effective, workable, and well-received. The results indicated a notable improvement in the episiotomy wound healing scores in the experimental group in the post-test compared to the pre-test, demonstrating significant healing ($p<0.05$). Conversely, in the control group, a minor improvement in healing scores was observed between the pre-test and post-test, with significance assessed using inferential statistics (unpaired t-test). No modifications were deemed necessary following the pilot study.

DATA COLLECTION PROCESS

The data collection was scheduled from 10/2/2022 to 25/03/2022 for a period of 6 weeks. Before the

investigator obtained formal permission from the concerned authority of the hospital in Karnataka, she introduced herself to the subject and explained the purpose of the study. The study's objectives were elucidated to the participants, and their informed consent was obtained prior to commencing the research.

A separate room for treatment was allocated, which was convenient for giving treatment to the mothers as it provides privacy during routine perineal care, and sodium chloride was given. Daily, 1–2 samples are selected for the experimental and control groups, and episiotomy wounds are assessed using the REEDA scale for both groups. The control group did not receive any intervention.

PLANS FOR THE DATA ANALYSIS

The data was planned and analyzed based on the objectives and assumptions of the study using descriptive and inferential statistical tests.

The plan for data analysis is as follows:

Section 1: Data on demographic variables of postnatal mothers.

Section 2: Data on assessment of episiotomy wound healing among postnatal mothers.

- Assessment of episiotomy wound healing among postnatal mothers in pre-test and post-test.
- Distribution of REEDA scores, mean, difference in mean, and standard deviation among postnatal mothers.

Section 3: Data on association between the post-test scores of episiotomies wound and their socio-demographic variables of the experimental and control group.

SAMPLE SIZE AND ESTIMATION

Population

- The collective group of individuals sharing a common trait is often termed the Universe.
- The target population encompasses the complete membership of a specified group of subjects, from which the study participants are chosen and whose data will be extrapolated.
- The target population represents the entire group of interest to the researcher and serves as the basis for generalizing study findings. In this study, the target population comprises 60 postnatal mothers with either right or left mediolateral episiotomy wounds.

Sample

A sample includes individuals from the population which is chosen to take part in a research investigation. In the present study, the sample is postnatal mothers with right or left mediolateral episiotomy wounds between the age groups of 18 to 32 years at selected hospitals.

Sample Size

A sample consists of the subjects of the population selected to participate in a research study. In the present study, the sample consisted of 60 postnatal mothers with right or left mediolateral episiotomy in selected hospitals in Kolar.

Sampling Technique

"Sampling technique refers to the method used to choose representative individuals from a population for research purposes. It involves selecting subjects from a population to gather information about a particular phenomenon in a manner that accurately reflects the entire population. For this study, a non-probability purposive sampling technique was employed, wherein all patients meeting the selection criteria were deliberately chosen to participate in the study.

CRITERIA FOR SELECTION OF SAMPLE

Inclusion Criteria

Postnatal mothers

- Willing to participate in the study.
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Exclusion Criteria

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- Not willing to participate.
- LSCS mothers

RESULTS

The data itself doesn't inherently address the research questions; therefore, it needs to be systematically organized and analyzed to provide meaningful answers. The aim of this analysis is to simplify and make sense of the data so that the research problem can be explored and tested effectively. Analysis involves categorizing, arranging, manipulating, and summarizing the data to obtain insights into the research questions. Its purpose is to condense the data into a comprehensible and interpretable format to facilitate the examination of relationships pertinent to the research. This section presents the analysis and interpretation of data collected from postnatal mothers (30 in the experimental group and 30 in the control group) to evaluate the efficacy of sodium chloride in healing episiotomy wounds. The collected data were structured, tabulated, and interpreted using descriptive and inferential statistical methods, aligning with the study's objectives.

Objectives of the Study

- To assess the condition of episiotomy wound.
- To administer sodium chloride to episiotomy wound in the experimental group.
- To assess the effectiveness of sodium chloride in healing episiotomy wounds.
- To compare the healing of episiotomy wounds in both the experimental and control groups.
- To determine the association between episiotomy wound healing and their selected demographical variables.

The data were presented under the following sections.

Section I: Data on demographic variables of postnatal mothers.

Section II: Data on assessment of episiotomy wound healing among post-natal mothers

a. Assessment of episiotomy wound healing among postnatal mothers in pre-test and posttest.
b. Distribution of REEDA scores, mean, difference in mean, and standard deviation among postnatal mothers.

Section III: Data on association between post-test scores of episiotomy wounds and their sociodemographic variables of experimental and control groups.

Section IV: Analysis of the test of significance of the hypothesis.

Section V: Data on demographic variables include age, sex, family income per month, dietary pattern, marital status, and education.

Section I: Data on demographic variables of postnatal mothers

Table 1 depicts that most of the subjects, i.e., 77.5% of the respondents, were between the age groups of 18 and 22 years, 22.5% of them were between the age groups of 23 and 27 years, and none of them were between the age groups of 28 and 32 years in the experimental group. In the control group, 16 were in the age group of 28–32 years, and 49% were in the age group of 18–22 years (Figure 2).

Table 1. Frequency and percentage distribution of postnatal mothers according to their age (N = 60).

Age (in years)	Experimental group		Control group	
	Frequency	*Percentage*	*Frequency*	*Percentage*
18–22	21	77.5	14	49.0
23–27	09	22.5	00	0.0
28–32	0	0.0	16	51.0
Total	30	100%	30	100%

The data presented in Table 2 reveals that in the experimental group, an equal number of respondents, i.e., 8 (26.7%), have a monthly income ranging from below 3000, 3001–6000, and 9001 and above in their family, and only 6 (20%) respondents have their family monthly income ranging from 3001–6000. Whereas in the control group, 11 (36.7%) respondents have their family income below 3000 per month, 8 (26.7%) of them have their income ranging from 3001–6000 per month, 7 (23.3%) of the respondent's family monthly income ranges from 9001 and above, and only 4 (13.3%) respondents have their family monthly income ranging from 6001–9000 (Figure 3).

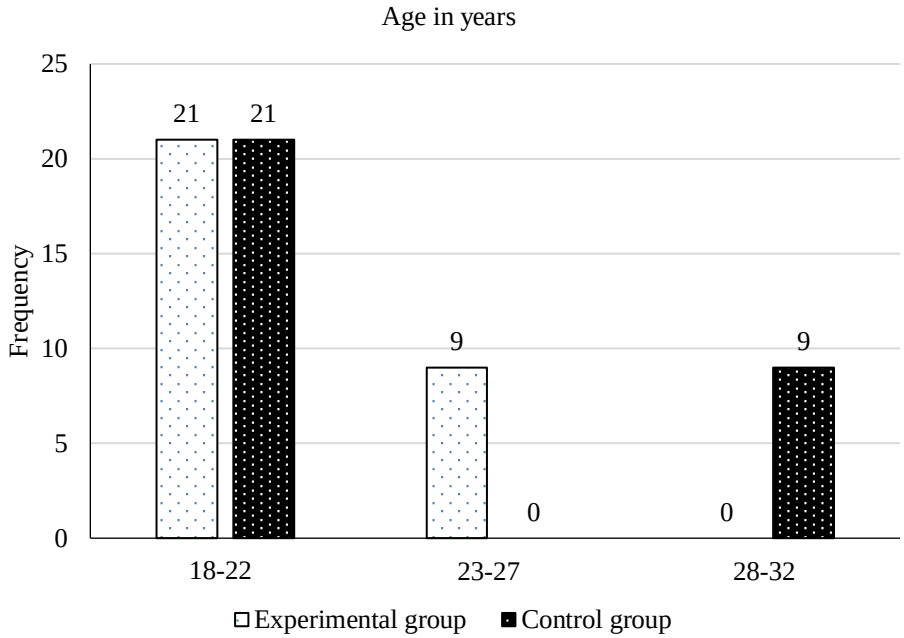

Figure 2. Cylindrical diagram representing frequency distribution of the postnatal mothers according to their age in years.

Table 2. Frequency and percentage distribution of the postnatal mothers according to their family monthly income (N = 60).

Family monthly income (in rupees)	Experimental group		Control group	
	Frequency	*Percentage*	*Frequency*	*Percentage*
Below 3000	8	26.7%	11	36.7%
3001–6000	6	20%	8	26.7%
6001–9000	8	26.6%	4	13.3%
9001 and above	8	26.7%	7	23.3%
Total	30	100%	30	100%

Table 3 shows that 86.7% (26) of the postnatal mothers had secondary education, while only 13.3% (4) had primary education in the experimental group. In contrast, in the control group, 90% (27) of the respondents had secondary education and 10% (3) had primary education. None of them belonged to the graduate and above, or other categories in both groups (Figure 4).

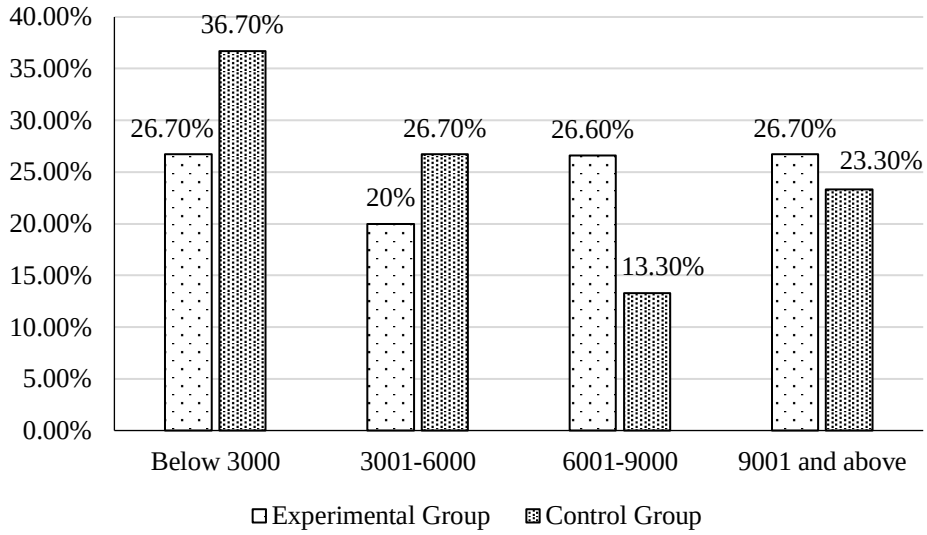

Figure 3. Cone diagram representing frequency distribution of postnatal mothers according to their family monthly income.

Table 3. Frequency and percentage distribution of the postnatal mothers according to their educational status (N = 60).

Educational status	**Experimental group**		**Control group**	
	Frequency	***Percentage***	***Frequency***	***Percentage***
No formal education	0	0%	0	0%
Primary education	4	13.3%	3	10%
Secondary education	26	86.7%	27	90%
Graduate and above	0	0%	0	0%
Total	30	100%	30	100%

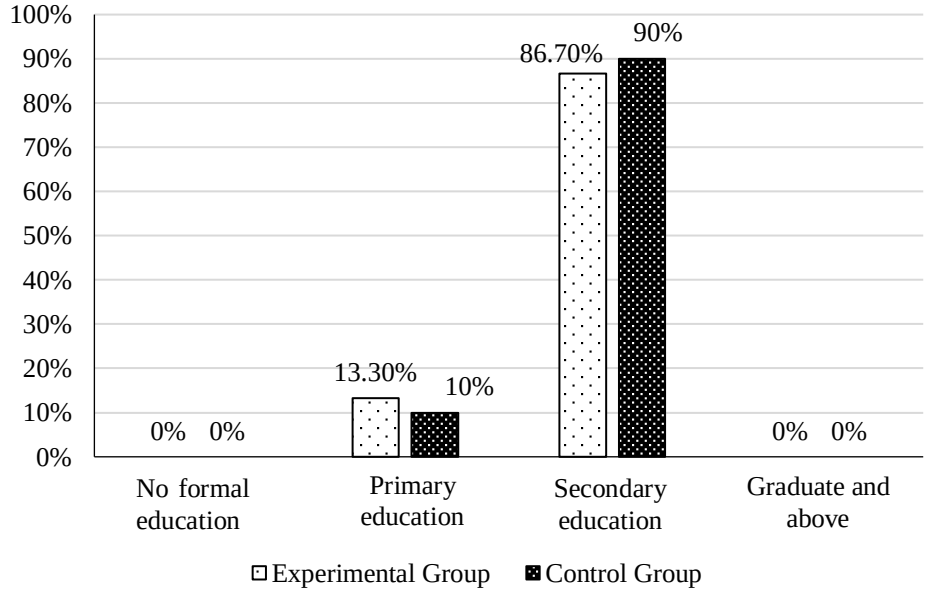

Figure 4. Bar diagram representing frequency distribution of postnatal mothers according to their educational status.

Table 4 reveals that 70% (20) of postnatal mothers are primigravida, 16% (6) were having second gravida, and 13% (4) were having third and above both in experimental and control groups (Figure 5).

Table 4. Frequency and percentage distribution of the postnatal mothers according to their gravida.

Gravida	Experimental group		Control group	
	Frequency	***Percentage***	***Frequency***	***Percentage***
First	20	70%	20	70%
Second	6	16.7%	6	16.7%
Third and above	4	13.3%	4	13.3%
Total	30	100%	30	100%

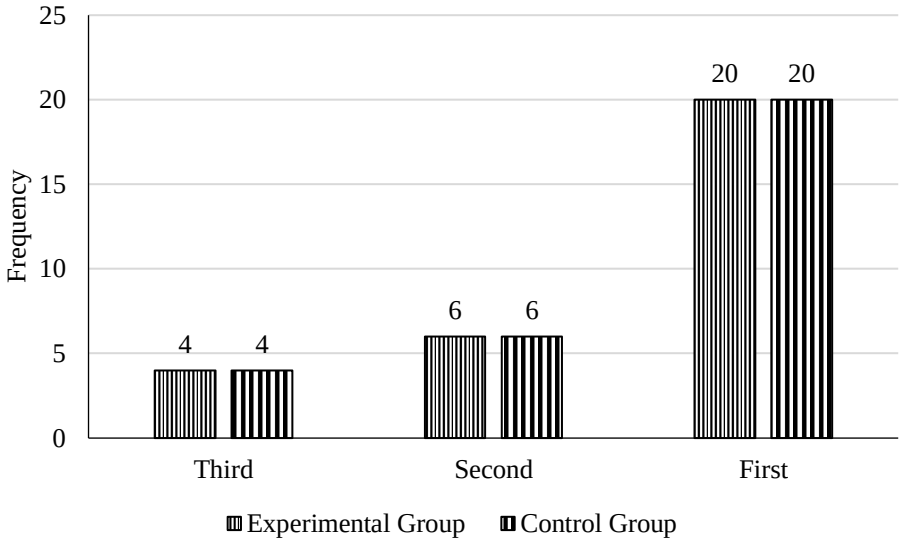

Figure 5. Cylindrical diagram representing frequency distribution of the postnatal mothers according to their gravida.

Table 5. Frequency and percentage distribution of the postnatal mothers according to length of episiotomy wound (N = 60).

Length of episiotomy wound	Experimental group		Control group	
	Frequency	***Percentage***	***Frequency***	***Percentage***
3 cm	56.70%	57%	76.70%	77%
< 3cm	0	0	0	0
4 cm	43.30%	43%	23.30%	23%
Total	30	100%	30	100%

Table 5 reveals that 56.7% (17) of the postnatal mothers' episiotomy wounds are 3 cm, and 43.3% (13) of them are 4 cm, and none of them are < 3cm in the experimental group. Whereas in the control group, 76.7% (23) of them are 3 cm, and 23.3% (7) are 4cm. None of the subjects belong to < 3cm (Figure 6).

Section II: Data on Assessment of Episiotomy Wound Healing Among Postnatal Mothers

The episiotomy wound healing among postnatal mothers was assessed by the REEDA Scale, consisting of five items. Each item's score was from zero to three; the minimum score was zero and the maximum score was 15. The higher score indicates poor wound healing. According to the total score obtained by each subject, the level of wound healing was classified into four categories.

- Good: 0 to 2 cm
- Moderate: 3 to 5 cm
- Mild: 6 to 8 cm
- Poor: 9 to 15 cm

The pre-test score in Table 6 disclosed that the majority (76.6%, 23) of the experimental group and

73.4% (22) of the control group had moderate wound healing, and 26.6% (08) of the control group and 23.4% (07) of the experimental group had mild wound healing and severe cramps. None of them had good or poor wound healing (Figure 7).

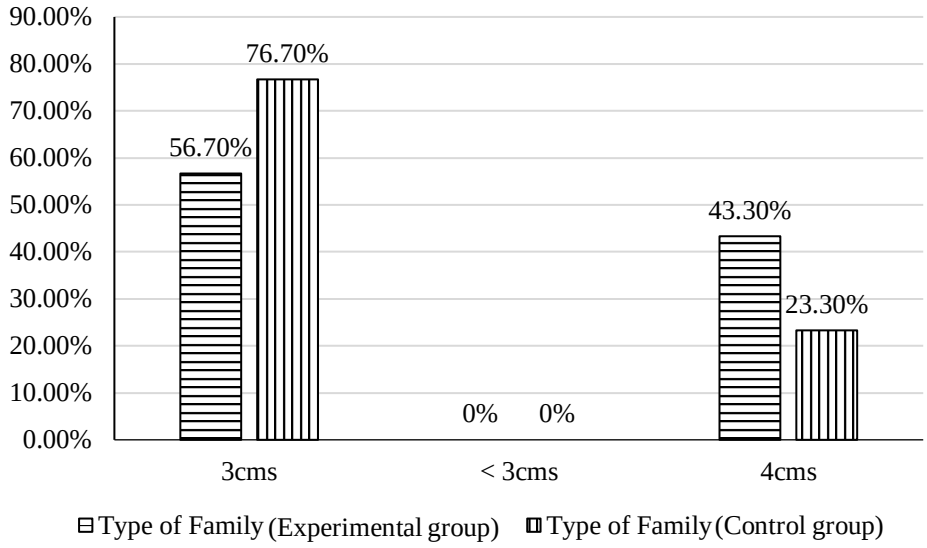

Figure 6. Bar diagram representing frequency distribution of postnatal mothers according to their length of the episiotomy wound in centimeter.

Table 6. Assessment of episiotomy wound healing among postnatal mothers in pre-test (N = 60).

Total score	**Experimental group**		**Control group**	
	Frequency	***Percentage***	***Frequency***	***Percentage***
Good	0	0%	0	0%
Mild	07	23.4%	08	26.6%
Moderate	23	76.6%	22	73.4%
Poor	0	0 %	0	0 %
Total	30	100%	30	100%

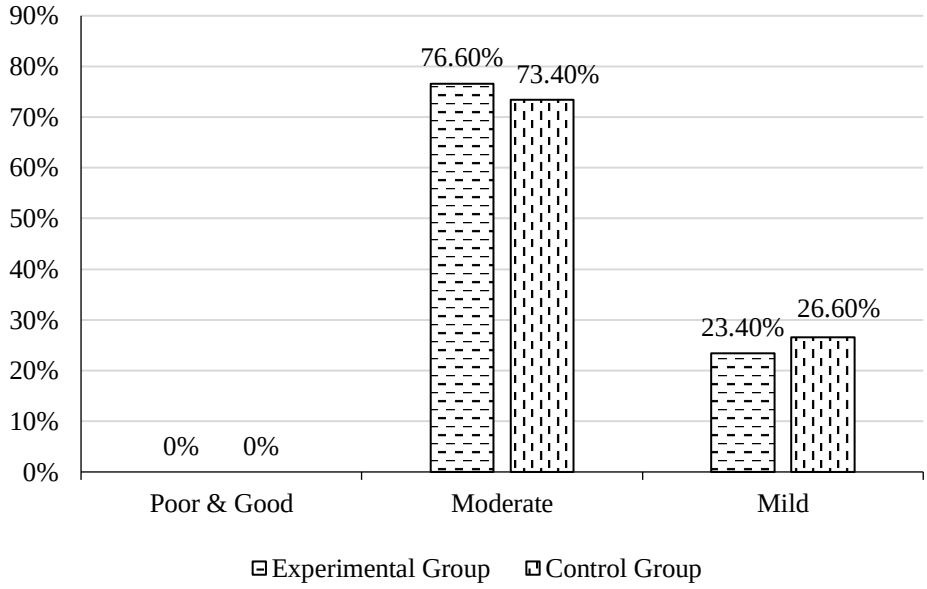

Figure 7. Bar diagram representing the level of episiotomy wound healing among postnatal mothers in pretest.

Table 7. Assessment of episiotomy wound healing among postnatal mothers in post-test (N = 60).

Total score	Experimental group		Control group	
	Frequency	*Percentage*	*Frequency*	*Percentage*
Good	28	93.3%	0	0%
Moderate	0	0%	0	0%
Mild	02	6.67%	20	66.7%
Poor	0	0%	10	33.3%
Total	30	100%	30	100%

The post-test score in Table 7 disclosed that, in the experimental group, the majority (80%) had good wound healing, and only 2 postnatal mothers had mild wound healing. These results showed that the scores were reduced due to the effect of sodium chloride application. Whereas in the control group, 5 had mild wound healing, 33% had poor wound healing, and none of them had wound healing (Fig. 7).

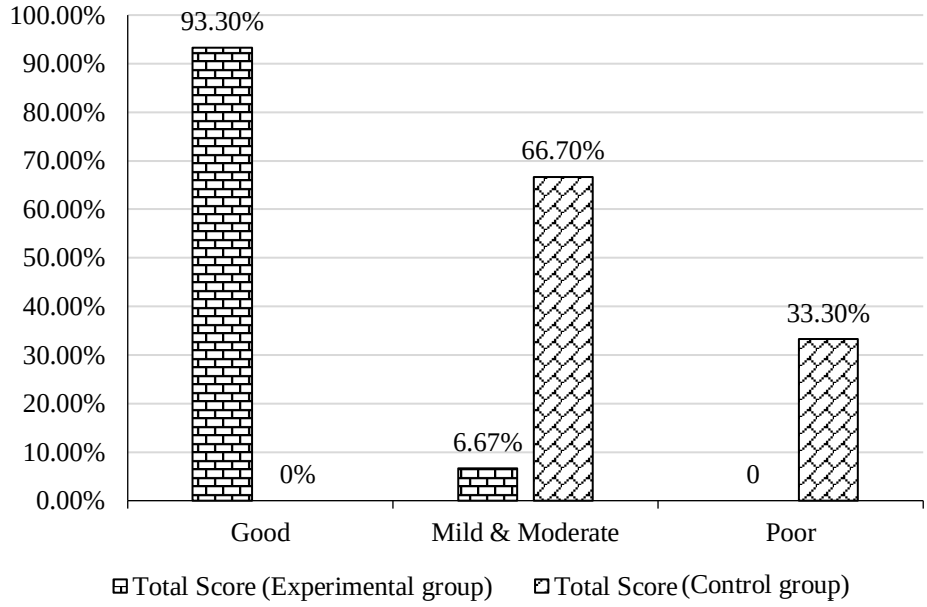

Figure 8. Cylindrical diagram representing the level of episiotomy wound healing among postnatal mothers in post-test.

Section III: Assess the Effectiveness of Sodium Chloride on the Level of Episiotomy Wound Healing Among Postnatal Mothers in Experimental Group and Without Sodium Chloride in Control Group

The data presented in the Table 8 indicates that in the experimental group, the mean score during the pre-test was 34 with a standard deviation of 3.1, while during the post-test, the mean score decreased to 23.8 with a standard deviation of 3.2. The computed t-value between the pre-test and post-test scores is 31.56 ($P<0.001$), indicating a highly significant improvement in episiotomy wound healing with the administration of sodium chloride among postnatal mothers (Figure 8).

Table 8. Mean, standard deviation, and "t" value of pre-test and post-test scores of experimental and control groups (N = 60).

Scores	Experimental group			Control group		
	M	*SD*	*t-value*	*M*	*SD*	*t-value*
Pre-test	34	3.1	t=31.56 df=29	33.6	2.7	t=0.6 df = 29
Post-test	23.8	3.2	p<0.001 HS	34	3.4	p>0.001 NS

Keys: M: Mean, N: Number of samples, SD: Standard deviation, df: Degrees of freedom, HS: Highly significant, NS: Not significant T_{tab}: 3.659

Similarly, in the control group, the mean score during the pre-test was 33.6 with a standard deviation of 2.7, and during the post-test, the mean score remained relatively constant at 34 with a standard deviation of 3.4 (Figure 9). The computed t-value between the pre-test and post-test scores is 0.6 (P>0.001), suggesting that there is no significant improvement in episiotomy wound healing among postnatal mothers without the use of sodium chloride.

There is a significant reduction in the level of episiotomy wound healing after providing sodium chloride in experimental group. The findings indicate that the computed value 31.56 is greater than 't' table value (3.659) at 29 degrees of freedom, so the hypothesis 1 is accepted.

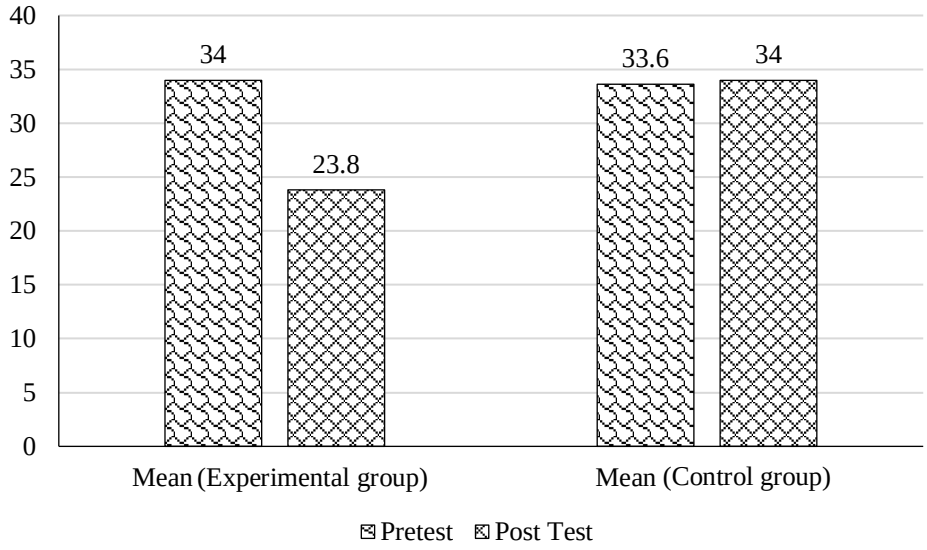

Figure 9. Pyramid diagram representing the distribution of mean value among pre-test and post-test.

Section IV: Analysis of the Test of Significance of the Hypothesis

Table 9. Comparison between the pre-test and post-test scores of experimental and control groups (N = 60).

	Pre-test	**Post-test**
	t-test (Unpaired)	*t-test (Unpaired)*
Calculated value	0.235	15.2
Table value	3.46	3.46
Degrees of freedom	df=58	df=58
Significance	p>0.001 Not significant	p<0.001 Highly significant

Key: Df: Degrees of freedom

Table 9 indicates that in the pre-test, the computed unpaired t-value between the experimental and control groups is 0.235 (P>0.001) with 58 degrees of freedom, which is found to be statistically insignificant as it is lower than the critical t-value from the table. However, in the post-test, the computed unpaired t-value between the experimental and control groups is 15.2 (P<0.001) with 58 degrees of freedom, indicating a highly significant difference. This suggests a substantial variance in the levels of episiotomy wound healing among postnatal mothers in the experimental and control groups. Notably, the computed t-value of 15.2 exceeds the critical t-value (3.46) from the table, leading to the acceptance of hypothesis 2.

Table 10 shows the association between post-test scores of episiotomy wounds and selected socio-demographic variables of post-natal mothers in the experimental group by using chi-square analysis. It

was evident that there was no significant association between age, educational status, family income, gravida, and length of episiotomy wound.

Section V: Data on Demographic Variables Include Age, Sex, Family Income Per Month, Dietary Pattern, Marital Status, and Education

Table 10. Data on association between post-test scores of episiotomy wounds and their selected socio-demographic variables in experimental group.

S.N.	Demographic variables	Description	Level of wound healing				Chi-square value
			Good	Moderate	Mild	Poor	
1.	Age (in years)	18–22	21	0	0	0	X^2 =2.902, df=9, NS P>0.05
		23–27	9	0	0	0	
		28–32					
2.	Monthly income (in ₹)	Below 3000	21	0	0	0	X^2=1.742, df=9, NS P>0.05
		3001–6000	09	0	0	0	
		6001–9000	0	0	0	0	
		9001 and above	0	0	0	0	
3.	Educational status	No formal education	17	0	0	0	X^2 =1.183, df=9, NS P>0.05
		Primary education	0	8	0	0	
		Secondary education	3	0	0	0	
		Graduation			0	0	
4.	Gravida	First	21	0	0	0	X^2 =1.215, df=6, NS P>0.05
		Second	9	0	0	0	
		Third and above	0	0	0	0	
5.	Length of episiotomy wound	<3cms	18	0	0	0	X^2=1.742, df=9, NS P>0.05
		3cms	2	0	0	0	
		4cms	10	0	0	0	

Key: NS: not significant, df: degrees of freedom, X^2 = chi-square

DISCUSSION

This study was undertaken to evaluate the impact of sodium chloride on the healing of episiotomy wounds among postnatal mothers in selected hospitals within the KGF District. To meet the study's goals, a pre-test post-test control group experimental design was implemented. Sixty participants were chosen using a convenience sampling method. Data collection was carried out using a structured interview schedule. The results have been analyzed and discussed in relation to the study's objectives, and the data is systematically presented here in [23]. The results of the study revealed some interesting findings which are discussed as follows.

Description of Demographic Variables

Age: Table 1 illustrates that most of the participants (77.5%) fell within the 18–22-year age range, while 22.5% were aged 23–27 years in the experimental group, with no participants in the 28–32-year age bracket. Conversely, in the control group, 16 participants were aged 28–32 years, and 49% were within the 18–22-year age range.

Family monthly income (in rupees): The data presented in Table 2 reveals that in the experimental group, an equal number of respondents, i.e., 8 (26.7%), have monthly incomes ranging from below 3000, 3001–6000, and 9001 and above in their family, and only 6 (20%) respondents have their family monthly income ranging from 3001–6000. Whereas in the control group, 11 (36.7%) respondents have a family income of below 3000 per month, 8 (26.7%) of them have their income ranging from 3001–6000 per month, 7 (23.3%) of the respondents' family monthly income ranges from 9001 and above, and only 4 (13.3%) respondents have their family monthly income ranging from 6001–9000.

Educational status: In the experimental group, 86.7% (26) of the postnatal mothers had secondary education, while only 13.3% (4) had primary education. In the control group, 90% (27) of the respondents had secondary education and 10% (3) had primary education. None of them belonged to the graduate and above or other categories in both groups.

Gravida: The data reveals that 70% (20) of postnatal mothers are primigravida, 16% (6) had their second gravida, and 13% (4) had their third and above in both the experimental and control groups.

Length of episiotomy wound: The data reveals that 56.7% (17) of the postnatal mothers had episiotomy wounds less than 3 cm, and 43.3% (13) had wounds that were 4 cm in the experimental group. In contrast, in the control group, 76.7% had wounds less than 3 cm, and 23.3% (7) had wounds that were 4 cm. None of the subjects had wounds less than 3 cm.

FINDINGS OF THE STUDY BASED ON THE OBJECTIVES

Objective 1: To Assess the Condition of Episiotomy Wound Among Postnatal Mothers

It was found that most had mild wound healing, with only a few having moderate wound healing in the pre-test in both groups. In the experimental group, during the pre-test, the minimum REEDA score was five and the maximum score was six. The mean score was 5.73 with a standard deviation (SD) of 0.452. Similarly, in the control group during the pre-test, the minimum REEDA score was five and the maximum score was six. The mean score was 5.90 with an SD of 0.304.

Objective 2: To Assess the Condition of Episiotomy Wound in Both Experimental and Control Group after Sodium Chloride Therapy to Experimental Group

In the experimental group during the post-test, the minimum REEDA score was two and the maximum was three. The mean score was 2.20 with a standard deviation (SD) of 0.405. In the control group, the minimum REEDA score was three and the maximum was seven. The mean score was 3.65 with an SD of 0.893.

The post-test scores depicted that in the experimental group, the majority (80%) had good wound healing, while only 20% had moderate wound healing, and none of the postnatal mothers had mild or poor wound healing. These results indicate that the scores were reduced because of sodium chloride application. In contrast, in the control group, 95% had moderate wound healing, and none of them had good wound healing. Therefore, we can summarize that the episiotomy wound healing was improved after sodium chloride therapy. The study results revealed that the episiotomy wound healing was rapid after sodium chloride therapy.

Objective 3: To Find out the Association between Post Test Scores of Episiotomy Wounds with Their Selected Demographic Variables Among Experimental Group

The results indicated that the selected sociodemographic variables such as age, family income, educational status, gravida, and length of episiotomy wound had no significant association with the episiotomy wound healing scores of postnatal mothers in the experimental group at $p > 0.05$ level. In conclusion, the use of sodium chloride therapy significantly enhanced the healing process of episiotomy wounds in postnatal mothers. Therefore, it can be asserted that sodium chloride therapy effectively contributes to episiotomy wound healing.

VALIDITY AND RELIABILITY

The tool's validity was evaluated through content validity, which involved consultation with experts from nursing and medical fields. Based on their recommendations, certain adjustments were made to the tool. Following these modifications, the experts approved the tool for evaluation purposes. After conducting a pilot study, the reliability of the tool was measured using the test-retest approach, yielding a correlation coefficient (r-value) of 0.83 for knowledge.

STATISTICAL ANALYSIS

Differences in demographic variables, knowledge scores, and knowledge gain scores between pre-test and post-test were assessed using various statistical methods. For categorical/dichotomous demographic variables, frequencies and percentages were reported. Knowledge scores were presented with mean and standard deviation. The difference between pre-test and post-test scores was evaluated

using paired t-tests for continuous variables and the Extended McNemar's test for categorical variables. The association between post-test knowledge scores and demographic variables was analyzed using the chi-square test. Additionally, the association between knowledge gain scores and demographic variables was examined using both one-way analysis of variance and independent t-tests. A significance level of $p < 0.05$ was used to determine statistical significance.

CHI-SQUARE TEST

The chi-square test is a non-parametric test of proportions used to test a hypothesis regarding the association between two variables. It was introduced by Karl Pearson and is commonly used when the association between two variables needs to be tested. This test is utilized to determine if the observed frequencies across different categories in the data align with the frequencies that would be anticipated under a certain hypothesis, known as the null hypothesis. The chi-square value (χ^2) quantifies the extent of divergence between theoretical expectations and actual observations. Through the chi-square test, it becomes possible to assess whether the observed differences between theoretical predictions and empirical data could be ascribed to randomness.

The quantity of x^2 is defined as:

$x^2 = \sum (O–E)^2/E$

$\sum$ (Observed frequency – expected frequency)^2/Expected frequencies where O = observed frequencies

E = Expected frequencies

Conditions of Chi-square Test

1. There must be a large number of observations (e.g., >50).
2. All observations must be independent.
3. Values or categories on independent and dependent variables must be mutually exclusive and exhaustive.
4. The sample must be randomly drawn from the population.
5. Calculations must be based on the actual numbers of observations and not on percentages, ratios, or observed values.
6. When the overall total is between 20 and 40, all expected values should be at least 5.

Standard Deviation

A measure of the dispersion among the elements in a set of data, standard deviation can be defined as follows

$$S = \frac{\sqrt{\sum_{i=1}^{n}(X_i - \bar{\mu})^2}}{n-1}$$

where: $\bar{\boldsymbol{\mu}}$ is the mean, i is the index

$\boldsymbol{n}$ is the total number of data points

$\boldsymbol{X_i}$ represents a data point

Student t-test

It was introduced by W.S. Gosset in 1905 under the pen name "Student" and is popularly known as the t-test, t-distribution, or Student's distribution. This approach is applied for small sample sizes when the standard deviation of the population is not known. It is a symmetrical distribution similar in shape to the normal distribution, and it approaches the normal distribution as the sample size (N) increases. This method can be used to test the statistical significance of the difference between the means of two different groups.

In t-test, we examine the logic

$$r = \frac{\text{difference in sample means}}{\text{standard error of difference of sample means}}$$

When the ratio is low, it suggests the data support the notion that both groups originated from the same population. Conversely, a high ratio indicates the samples probably did not come from a single population, leading to the conclusion that the treatment had a significant impact.

Independent t-test/unpaired t-test

When comparing the means of two independent sample groups, the independent t-test, also known as the Student's t-test, can be used. It is calculated using the formula:

$$t = \frac{(\bar{X}_1 - \bar{X}_2)}{\sqrt{\left(\frac{s_P^2}{n_1} + \frac{s_P^2}{n_2}\right)}}$$

When the difference between the means is divided by this standard error, the result is *t*. Thus, s^2p is the pooled variance.

The standard error of the difference between the means is where
n_1 is the sample size of the first sample.
n_2 is the sample size of the second sample.
s_1 is the standard deviation of the first sample.
s_2 is the standard deviation of first sample, x_1 is the mean of first sample, x_2 is the mean of second sample.

Implications

The findings of the study have several implications in the following field. It can be discussed in four areas namely nursing practice, nursing administration, nursing education, and nursing research.

Implications for Nursing Practice

1. Good supervision and application of sodium chloride in the episiotomy area need to be encouraged by senior nurses in the hospital and community area.
2. The procedures that cause perineal discomfort are episiotomy, degree of tears, and laceration of genital tract infections. In this area, nurses can utilize the sodium chloride application along with routine perineal care.
3. The sodium chloride therapy would help to reduce wound sepsis and genital infections and hasten healing. Nurses can also impart knowledge of self-perineal care along with the sodium chloride therapy application to enhance the healing of episiotomy wounds and reduce discomfort.

Nursing Education

1. The nursing curriculum is a means through which future nurses are prepared. Emphasis needs to be placed on preventive and health-promoting practices."
2. "The results of the study emphasize that learners should utilize their knowledge of sodium chloride application to enhance the healing of episiotomy wounds. This procedure can be incorporated into the nursing curriculum.
3. Periodic conferences, seminars, symposium etc. can be arranged on sodium chloride therapy for healing of episiotomy wound.

Nursing Administration

1. Nurse administrators or leaders should take an interest in formulating policies and principles to adopt the various modalities of treatment for postnatal care.
2. Through an in-service education program, nurses can be motivated to learn and practice sodium chloride therapy.
3. Regular supervision of the staff can also be carried out while doing these procedures.
4. The nurse administrators should make arrangements to see that sufficient manpower, money, and materials are available for giving sodium chloride therapy.

5. Evaluate the quality of nursing care by conducting regular clinical audits.

Nursing Research

1. Further research studies can be conducted to enhance the healing and relief of pain in episiotomy wounds in the field of the effectiveness of warm, moist compresses, sodium chloride, dry heat, and various antibiotic ointment applications.
2. For generalization of sodium chloride therapy, further studies could be conducted in the hospital for a longer duration for samples.
3. Awareness about the importance of conducting research in episiotomy wound healing can be created among the nurses who are working in the clinical and community areas.

Limitations

The following limitations were identified during this study:

1. The size of the samples was small. Hence, it is restricted to generalization.
2. The samples were drawn only from the two selected hospitals of KGF, Karnataka, so the wider generalization was limited to other health institutions.
3. Only wound healing was assessed, and no attempt was made to identify other attributes like pain perception, discomfort level, etc.
4. The samples were drawn from postnatal mothers between the ages of 18 and 37, which is a limited generalization of the findings to other postnatal mothers.

Recommendations

Based on the study findings, the following recommendations were made for further research:

1. A similar study can be conducted by selecting a larger sample on a long-term basis.
2. The study can be replicated in different settings.
3. A comparative study can be conducted on effectiveness of sodium chloride therapy and other modalities of treatment for episiotomy wound like aromatherapy.
4. Structured teaching program can be given to post-natal mothers regardingself-perineal care and its effectiveness can be evaluated.

Hypothesis

The following hypothesis were set for the study:

H1: There will be significant difference between healing scores of Experimental groups and control group after sodium chloride application.

H2: There will be significant association between the level of healing of episiotomy wound and selected demographic variables.

All hypotheses were tested at 0.05 level of significance.

Conceptual Framework

The conceptual framework for the study is based on Imogene king's goal attainment theory (1981) which aimed to evaluate the effectiveness of sodium chloride therapy on episiotomy wound healing.

Research Methods

The research approach selected for this study is experimental. The research design, an experimental (pre-test/post-test control group) design, was adopted in the study.

The independent variable in this study is the application of sodium chloride therapy to the episiotomy wound. The dependent variable in this study is the healing of the episiotomy wound. Healing of the episiotomy wound.

The study was based on Modified Wiedenbach's helping art of clinical nursing. The quantitative approach was used. The study was conducted in a selected hospital at KGF. The design adopted for the

study was a true experimental pre- and post-test control group design. A simple random sampling technique was adopted for this study. The data collection tools developed for generating the demographic data of the samples consist of age, family income, educational status, gravida, and length of episiotomy wound.

Observational checklist for assessing the effectiveness of sodium chloride therapy on the healing of episiotomy wounds among postnatal mothers. The scale used is a standardized REEDA scale developed by Davidson in 1974. It has five components, namely redness, edema, ecchymosis, discharge, and approximation. Each item on the scale was given a score ranging from 0 to 3.

The pilot study was conducted from 30.12.2021 to 06.01.2022.

The final study data was collected from 15.01.2022 to 16.02.2022 for a period of six weeks. The sample of the study consisted of 60 postnatal mothers for the experimental group and 30 postnatal mothers for the control group. Samples were selected by a simple random sampling technique. A pretest was conducted on the first day before the application of sodium chloride, which was given twice daily for three consecutive days to the experimental group. The post-test was conducted on the fourth day.

CONCLUSION

Nursing science entails the exploration and acquisition of novel insights aimed at enhancing nursing methodologies and patient care practices. Nurse scientist seeking to develop evidence-based practices in the clinical area. The major goal of nursing practices is to solve everyday practical problems through the utilization of scientific methods and the application of fundamental knowledge and principles. The study findings revealed that episiotomy wound healing was reduced in postnatal mothers by the effect of sodium chloride. Thus, sodium chloride application is effective in reducing episiotomy wound healing.

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