

Effect of Educational Guidelines on Knowledge, Reported Practices, and Obstacles facing Mothers having Infants with Hydrocephalus

Reda Elfeshawy 1A &1B, 2 Sabra Mohamed Ahmed, 3 Neama Salah Abd Elaziz SolimanElgendy, 4Ohoud Youssef El-Sheikh

1A. Assistant professor of Pediatric Nursing, Faculty of Nursing, Menoufia University, Egypt.

1B. Assistant professor of Pediatric Nursing, Nursing College., Al-Mustaqbal University, 51001 Hillah, Babil, Iraq,

Email: reda.abdelaty.mahmoud@uomus.edu.iq

2Assistant Professor of Pediatric Nursing, Faculty of Nursing, Sohag University, Egypt

3Fellow pediatric Nursing, Student's Hospital Mansoura University

4Assistant Professor of Pediatric Nursing, Faculty of Nursing, Mansoura University

Abstract

Background: As addressing the demands of an infant with hydrocephalus necessitates daily effort, mothers play a critical role in the treatment and care of these infants. Hence, this study **aimed to** explore the effect of educational guidelines on knowledge-reported practices, and obstacles facing mothers having infants with hydrocephalus. A quasi-experimental **design** was used to achieve the aim of this study. **Setting:** The current study was applied in the pediatric neurosurgery department at SohagUniversity Hospital. **Subject:** A purposive sample that involved 100 mothers having infants with hydrocephalus. **Tools:** Tool I: A structured interview questionnaire that included three parts (part 1: mothers' characteristics, part 2: mothers' knowledge about hydrocephalus, and part 3: mothers' reported practices regarding hydrocephalus) and tool II: Obstacles facing mothers having infants with hydrocephalus in caring. **Results:** This study displayed a highly statistically significant difference between the pre and post-instructional guidelines among mothers' total knowledge, reported practices, and obstacles facing mothers regarding their infants with hydrocephalus (P value = 0.001). **Conclusion:** educational guidelines have positive effects in improving knowledge, reported practices, and obstacles facing mothers having infants with hydrocephalus. **Recommendation:** Provide ongoing education and training that help mothers having infants with hydrocephalus to get better their knowledge, and practices and overcome the obstacles faced during caring for their infants who suffer hydrocephalus.

Keywords: Hydrocephalus, Infants, Knowledge, Mothers, Obstacles & Reported Practice.

Introduction

Hydrocephalus is the term for the ventricular system swelling in the brain resulting from an imbalance in the production and absorption of cerebral spinal fluid (CSF). The ventricular system dilates as a result of this mismatch, which also raises the CSF volume and often the intracranial pressure. Hydrocephalus can develop abruptly over a few hours or days. Additionally, it could be continuous, spanning several months or years. Hydrocephalus is not only a distinct condition but it is also associated with a multitude of other neurological diseases and conditions (Oliveras et al., 2020).

Based on Srivatsan et al. (2020), it can be classified as either communicative or non-communicative. An estimated 1.1 out of 1000 kids are expected to be born with congenital hydrocephalus, with the highest incidence occurring in Latin America and Africa (145–316 per 100,000 births). In low- and middle-income countries, the incidence was higher (123 per 100,000 births) than in higher-income ones (79 per 100,000 births). Almost 400,000 additional cases of pediatric hydrocephalus will occur worldwide, even though these numbers are underestimated.

Worldwide, there are about 88 cases of hydrocephalus for every 100,000 pediatric kids; the frequency is higher in South America and Africa. For every 10,000 live births, there are one to thirty-two incidences of infantile hydrocephalus (Isaacs et al., 2018).

Angry and vomiting were common signs of hydrocephalus in babies and early children, and these symptoms were also linked to many other health problems. Imaging tests become required when these symptoms coexist with signs that suggest an intracranial process, such as lethargy, seizures, and a larger circumference around the skull. Often, the first diagnostic test is a simple head Computed Tomography (CT) scan (Ragab et al., 2023). It displayed the ventricle size and usually suggests the presence of a mass lesion. The majority of hydrocephalus cases require the insertion of a ventriculoperitoneal shunt (VPS), which is one of the most common neurosurgical procedures. Complications connected to VPS implantation are common, and a patient's lifetime almost certainly will have periodic shunt revisions (Ebrahim et al., 2019).

As addressing the demands of an infant with hydrocephalus necessitates daily effort, mothers play a

critical role in the treatment and care of these infants. Collaboration between medical specialists and the patient's family, especially the mother, is essential for the management of hydrocephalus. Therefore, pediatric nurses play a critical role in helping moms become more aware and secure in their capacity to care for their children by giving the baby the right training, positive reinforcement, and psychological support (Kyarimpa et al., 2020). In addition, mothers of small children view their offspring as curses, worthless members of the family, and should not be hospitalized because of the lack of awareness held by the majority of mothers and the neglect of close relatives (Oliveras et al., 2020).

Many obstacles are facing mothers who care for their infants with hydrocephalus. Financial issues were a key concern for most mothers caring for infants with hydrocephalus, this is because mothers find it challenging to meet everyone's needs due to the way they are raised. These can include taking care of the newborn's basic needs, covering the cost of the hospital, driving the child there and back, purchasing support equipment for them, and building buildings that facilitate their movement (Murali et al., (2019). Additionally, coping strategies are essential to reducing stress and burnout. In 2020, Kafi and Mohamed describe that the family and medical professionals must work together to manage a baby's hydrocephalus. The role of a nurse is to assist the family in taking care of the infant's condition. Emphasizing that hydrocephalus is a permanent condition and that regular evaluations are necessary for the youngster is essential. The ultimate objective is to help infants realize their full potential by providing them with the right care and education and by setting reasonable expectations for them (Hockenberry et al., (2021).

To help mothers of infants with ventriculoperitoneal shunts understand their infants' health conditions, learn and apply proper infant care techniques, and identify and report any abnormalities in their children's body temperature or level of consciousness, healthcare providers should provide mothers with enough information. Adequate access to comprehensive information contributes to the child's health maintenance, mother and child quality of life improvement, possible problems resulting from substandard practices, and child outcomes and prognosis improved (Copley et al., 2021).

Significance of the study

In pediatric neurosurgical practices, hydrocephalus is one of the most common conditions seen. The National Institute of Neurological Disorders and Stroke estimates One to two newborns out of every 1000 to have hydrocephalus each year. Globally, there are about 160000 ventricular peritoneal shunt implantations and 750000 neonates with hydrocephalus, according to Mtui et al. (2021). A child with hydrocephalus can be physically and emotionally challenging for mothers to care for because the condition of the child affected by hydrocephalus is considered complex in providing care and requires many services and greater attention, so the mother is the first responsible for his care. Being aware of their particular challenges and learning useful adaption strategies can significantly improve their quality of life and the health of their unborn child. The general public, legislators, and healthcare professionals will all get more understanding from this (Murali et al., (2019).

In light of the increased infants' number with hydrocephalus, there are many mothers have lack knowledge and know the right practices when dealing with their infants having hydrocephalus and how they solve the obstacles that face and hinder them from caring for their infants. The heightened consciousness that follows could lead to developing programs, legislation, and support networks that cater to the special needs of these moms and their infants. Consequently, this study provides the mothers with educational guidelines that could be used to develop and improve their knowledge and practices to support them in providing care for their infants with hydrocephalus and also to help them exceed the obstacles that hinder the process of giving the care.

The aim of the study

To explore the effect of educational guidelines on knowledge, reported practices and obstacles facing mothers having infants with hydrocephalus through:

- Assess knowledge, reported practices, and obstacles facing mothers having infants with hydrocephalus.
- Design educational guidelines according to mothers' needs.
- Implement educational guidelines for knowledge, reported practices, and obstacles facing mothers having infants with hydrocephalus.
- Evaluate the effect of educational guidelines on knowledge, reported practices, and obstacles facing mothers having infants with hydrocephalus.

Research hypothesis

H1. Educational guidelines will have a positive effect on improving mothers' knowledge and reported practices regarding hydrocephalus.

H1. Mothers who receive educational guidelines are expected to have fewer obstacles and better coping strategies regarding the care of their infants with hydrocephalus.

Subjects and Methods

Research Design

A quasi-experimental design was used to achieve the aim of this study. This type of design is a verifiable study used to inspect the outcomes of an intervention on its target population without random assignment.

Research Settings

The current study was applied in the pediatric neurosurgery department at Sohag University Hospital. The pediatric neurosurgery department is on the third floor, it includes four rooms, in each one there were six beds, and its total capacity was 24 children. It serves a large population from urban and rural areas around Sohag Governorate because it provides free services.

Research Subjects

A purposive sample that involved 100 mothers having infants with hydrocephalus was included. The sample size was determined using power analysis based on the population flow rate, a confidence interval of 95%, a precision level of 5%, and a p-value of ≤ 0.05 . The study included mothers who agreed to participate in the research and had children meeting the following criteria:

- Infants' ages range from one month to twelve months.
- Medical records or a professional diagnostic validate the infant's hydrocephalus diagnosis.
- No other physical or mental illnesses are present in the infants.

Data Collection Tools

Tool 1: Structure Interview Questionnaire

It was created by the researchers to gather the necessary data and had three parts:

Part I: The studied mothers' characteristics include (age, marital status, education, residence, mothers' occupation, family number, and the presence of a

family history of hydrocephalus).

Part II: Mothers' knowledge about hydrocephalus and ventriculoperitoneal shunt. This part consisted of 38 multiple choice questions about (the definition of hydrocephalus, causes, signs and symptoms, complications, home care, follow-up, the meaning of valve, components of a ventriculoperitoneal shunt, the function of the valve, the purpose of operation valve installation, equipment used, and follow-up to operation valve).

Scoring system for mothers' knowledge

A scoring system was used to evaluate the mothers' knowledge under study based on their replies; each question received one (1) grade for a correct response and zero (0) for a wrong answer; the total score of the questionnaire equals thirty-eight grades. The knowledge scores of the mothers under study were divided into three categories: satisfactory knowledge for studied mothers who scored 60% and more and unsatisfactory knowledge for scored less than 60% of the total scores.

Part III: Mothers' reported practices regarding caring for their infants with hydrocephalus. It was adapted from **Kafil & Mohamed., (2020)**. It included procedures about (measurement of infant head circumference, measurement of infant abdominal girth, infant wound care, measurement of infant vital signs, infant fever management, positioning the infant, and feeding the infant).

Scoring system for mothers' reported practices

A grading system was used to evaluate the mothers' stated practices for the care of their children with hydrocephalus based on the replies from the mothers who were the subject of the study. Each step scored (2) if done correctly, (1) if done incorrectly, and (Zero) if not done step. The total scores of mothers' reported practices were 138 (10 scores for assessing infant head circumference, 12 scores for assessing infant abdominal girth, 14 scores for assessing infant wound care, 42 scores for assessing infant vital signs, 16 scores for assessing infant fever management, 22 scores for assessing infant positioning and 22 scores for assessing infant feeding) then converted into percentage and categorized as the following:

- Adequate practices $> 65\%$ (More than 90 scores).
 - Inadequate practices $\leq 65\%$ (Less than 90 scores).
- The cut-off point of the final categorization (adequate practice-inadequate practice) was adopted from the original form of the tool **Kafil & Mohamed., (2020)**.

Tool (II): Obstacles facing mothers having infants with hydrocephalus in caring.

It was adapted from **Hockenberry et al., (2021)**. It included (adherence to medication, financial problems, position of the infant, transportation / carrying manner, lack of social support, psychological issues, and dealing with the physical condition of their infants). These challenges were mentioned by **Hockenberry et al., (2021)** as the main challenges faced by mothers in caring for their infants with hydrocephalus. So, close-end questions were used to address these challenges.

Tools validity

Five pediatric nursing professors evaluated the tools to verify their content. Content coverage, clarity, relevance, application, phrasing, length, structure, and overall look of the tools were all evaluated. Some sentences have been rephrased and rearranged, among other minor changes, in response to the advice and suggestions of experts and its content validity index was 96%.

Tool's reliability

Cronbach's alpha, which measures the tools' internal consistency, was used to assess the reliability of the instruments, where the full questionnaire's Cronbach's alpha was 0.806.

Ethical considerations

The Scientific Research Ethical Committee at Sohag University granted formal approval to carry out the study. Before completing the informed consent form, mothers were fully told about the study and their role, and participation in the study was entirely optional. The research's goal and nature were explained, along with the potential for withdrawal at any time and the confidentiality of the data, which was only accessible with the participants' consent. These ethical issues were considered in the design of the study. Respect was shown for ethics, morals, culture, and beliefs.

Pilot study

Before beginning data collection, a pilot study was conducted to evaluate the applicability, validity, and time commitment of filling out the study materials. It was used on 10% equal (10) mothers in the mentioned settings who had infants with hydrocephalus. No changes were made. Mothers from the main study sample were included in the pilot trial.

Fieldwork

The actual fieldwork was done over four months, commencing in July 2023 and ending in October 2023. The researchers were available during the morning shift three days weekly, from 9:00 a.m. to 1:00 p.m.

In the preparatory phase, these steps were undertaken

In this phase, the researchers met the managers of the selecting setting to get approval for the data collection phase after explaining and providing the protocol and the used tools in this study. After getting the managers' agreement, the researchers started to collect the data by introducing themselves to the eligible mothers and providing orientation and explanation regarding the purpose and objectives of the study. The primary aim was to seek their collaboration while assuring them of the confidentiality of their responses and the utilization of information solely for scientific research purposes. Written informed consent was obtained from the mothers who agreed to participate in the study.

Assessment phase

The researchers went to the hospital and took a purposive sample of mothers of infants with hydrocephalus, then made a pretest for the mothers' knowledge, reporting practices, and the obstacles facing mothers in caring for their infants with hydrocephalus. The Arabic questionnaire format was used for the daily, two-week data collection.

Implementation phase

The eight weeks that the educational guidelines were conducted took place over three days each week. As a result, the material has been organized into 9 sessions distributed as follows; 3 sessions for knowledge regarding hydrocephalus and ventriculoperitoneal shunt, 5 sessions for demonstration of procedures and care of infants with hydrocephalus related to measurement of infant head circumference and abdominal girth, wound care, vital signs, fever management, positioning, and feeding. The last session was for training mothers about how they overcome the obstacles faced during the care of their infants.

Each session lasted between twenty and thirty minutes, including discussion times. At the commencement of the first session, an introduction to the instructional guidelines was finished. Each session started with a recap of the last, written in simple

Arabic language to suit the mothers' cognitive abilities. There were several different *instructional methods* employed, such as lectures, discussions, demonstrations, and re-demonstrations. To address the substance of the recommendations, modify mothers' knowledge, and reporting practices, and reduce obstacles faced during the care of their child with hydrocephalus, appropriate *teaching aids*, such as posters, photographs, and flyers were produced and used during the implementation.

Then the researchers instructed the mothers about methods used to overcome the obstacles of caring for their infants with hydrocephalus including the following:

- Educate mothers to gain a comprehensive understanding of hydrocephalus.
- Establish a support network: Connect with other parents who have children with hydrocephalus.
- Regular medical follow-ups: Ensure regular visits to the healthcare provider for monitoring and adjusting the treatment plan as needed.
- Observe symptoms and changes: pay close attention to your infant's symptoms, such as changes in behavior, feeding difficulties, or abnormal head growth. Promptly report any concerns to the healthcare provider.
- Monitor shunt function: if the infant has a shunt to manage cerebrospinal fluid, become familiar with its functioning and signs of shunt malfunction.
- Assisting with developmental milestones: hydrocephalus may affect an infant's motor skills and developmental milestones. Work closely with healthcare professionals and therapists to develop an appropriate therapy plan to support your child's development.
- Feeding and nutrition: Consult a pediatrician or nutritionist to ensure the infant receives proper nutrition.
- Promote comfort and safety: Create a safe and comfortable environment for infants. Minimize hazards, such as sharp corners or objects that could cause injury.
- Emotional support
- Self-care: Remember to prioritize self-care to maintain mothers' physical and mental well-being.

Evaluation phase

After two months, the effect of educational guidelines on knowledge, obstacles, and coping strategies among mothers having infants with hydrocephalus was reevaluated, and comparisons between pre- and post-instructional guidelines were done.

Statistical analysis

Using the statistical package for social science (SPSS), version (20), the gathered data were coded, arranged, entered into a computer, and examined. The means, standard deviation, mean, and percentage distribution were used to analyze the data. Comparing qualitative variables was done using the Chi-square test while comparing quantitative variables was done using the Pearson correlation coefficient (r) for continuous parametric variables. $P < 0.05$ and $P < 0.001$ indicate a statistically significant difference, while $P > 0.05$ indicates a statistically insignificant difference. These findings were considered indicative of the significance of the data.

Results

Table (1): presents that 49% of the mothers involved in the study fall within the age range of 40 to <50 years. Concerning the educational level, 60% of them had a university education, 75% were living in rural areas, and (69%) were employees.

Figure (1): illustrates that 10% of the studied mothers reported a family history of hydrocephalus, while (90%) did not have a history.

Table (2): it is revealed that a significant improvement in mothers' knowledge about hydrocephalus and ventriculoperitoneal shunt was detected after receiving the **educational** guidelines at (P -value= 0.000**).

Figure (2): illustrates that 95% of studied mothers had satisfactory knowledge of post- guidelines application compared to 10.0% pre-guidelines application.

Table (3): demonstrates that there was a highly significant difference between the studied mothers' corrected reported practices caring for their infants with hydrocephalus pre-and post-educational guidelines application in all areas of practice at (P -value= 0.000**).

Figure (3): shows that (92%) of the studied mothers had inadequate total practice level pre-educational guidelines, compared to only 10% post-educational guidelines application.

Table (4): portrays that there was a high statistically significant difference observed in all areas related to obstacles faced by mothers in caring for their infants with hydrocephalus regarding pre- and post-application of the educational guidelines (P -value= 0.000**).

Table (5): indicates that there was a strong negative correlation (-0.788, - 0.857) between the obstacles faced by mothers, their knowledge, and their practices about hydrocephalus with statistically significant at (P -value <0.001).

Table (1): The Studied Mothers distribution regarding their Characteristics (n=100).

Items	No.	%
Age in years		
- ≤30 : < 40	38	38.0
- 40: < 50	49	49.0
- 50 and more	13	13.0
Mean ±SD	33.8±6.293	
Education		
- Illiterate	15	15.0
- Secondary	25	25.0
- University	60	60.0
Residence		
- Rural	75	75.0
- Urban	25	25.0
Mothers' occupation		
- Housewife	31	31.0
- Employee	69	69.0

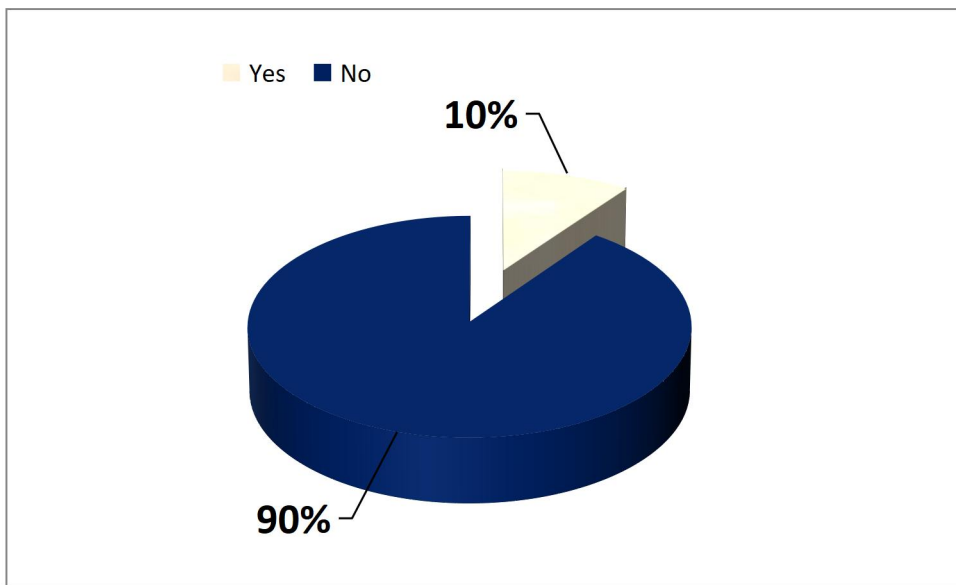


Figure (1): Family history of hydrocephalus distribution among the studied mothers

Table (2): Correct Knowledge Regarding Hydrocephalus and Ventriculoperitoneal Shunt among the studied Mothers Pre and Post- Educational Guidelines Application (n=100).

Mothers' Correct Knowledge Regarding Hydrocephalus	Mothers' knowledge about Hydrocephalus					
	Pre - guidelines		post – guidelines		X ²	P. Value
	No.	%	No.	%		
- Definition of hydrocephalus	30	30	87	87	11.22	0.000*
- Causes	35	35	86	86	8.78	0.000*
- Signs and Symptoms	28	28	77	77	9.66	0.000*
- Complications	27	27	78	78	8.77	0.000*
- Home Care	36	36	69	69	8.69	0.000*
- Follow up	28	28	80	80	5.68	0.000*
Mothers' knowledge about ventriculoperitoneal shunt						
- Meaning of valve	35	35	79	79	8.33	0.000*
- Components of ventriculoperitoneal shunt	30	30	88	88	8.77	0.000*
- The function of the valve	36	36	79	79	9.44	0.000*
- Purpose of operation valve installation	43	43	90	90	10.55	0.000*
- Equipment used	32	32	89	89	9.22	0.000*
- Follow up to operation valve	35	35	75	75	7.67	0.000*

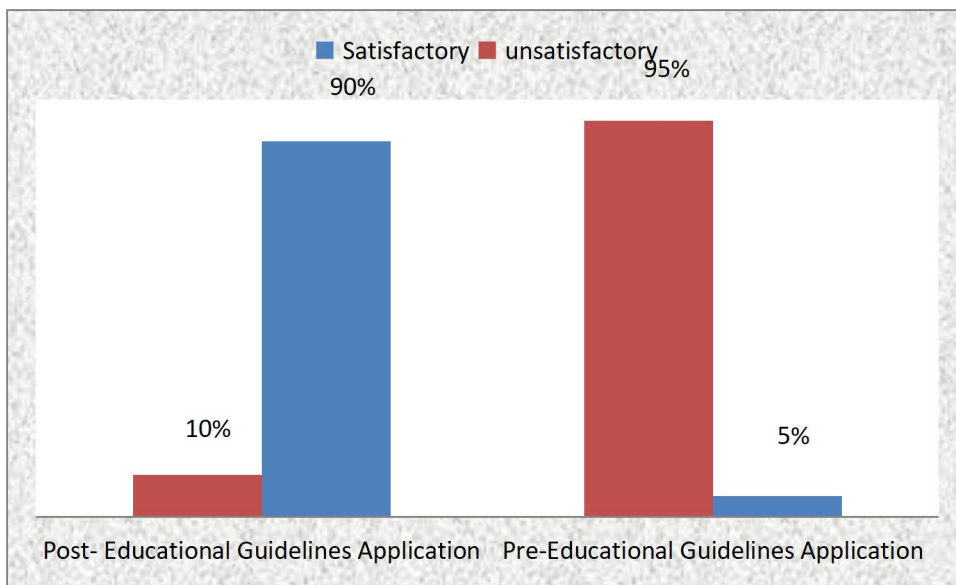


Figure (2): Total knowledge Levels regarding Hydrocephalus between Studied Mothers pre and Post-of Educational Guidelines Application (n=100).

Table (3): Corrected Reported Practices among the studied mothers regarding Care of Their Infants with Hydrocephalus Pre and Post-Educational Guidelines Application (n=100).

Items	Pre- guidelines	Post – guidelines	X ²	P. Value
	%	%		
- Measurement of infant head circumference	28	85	0.409	0.000**
- Measurement of infant abdominal girth	25	67	0.497	0.000**
- Infant wound care	38	78	0.437	0.000**
- Taking vital signs	30	87	0.488	0.000**
- Fever management	20	67	0.206	0.000**
- Infant positioning and handling	28	87	0.486	0.000**
- Infant feeding	28	88	0.409	0.000**

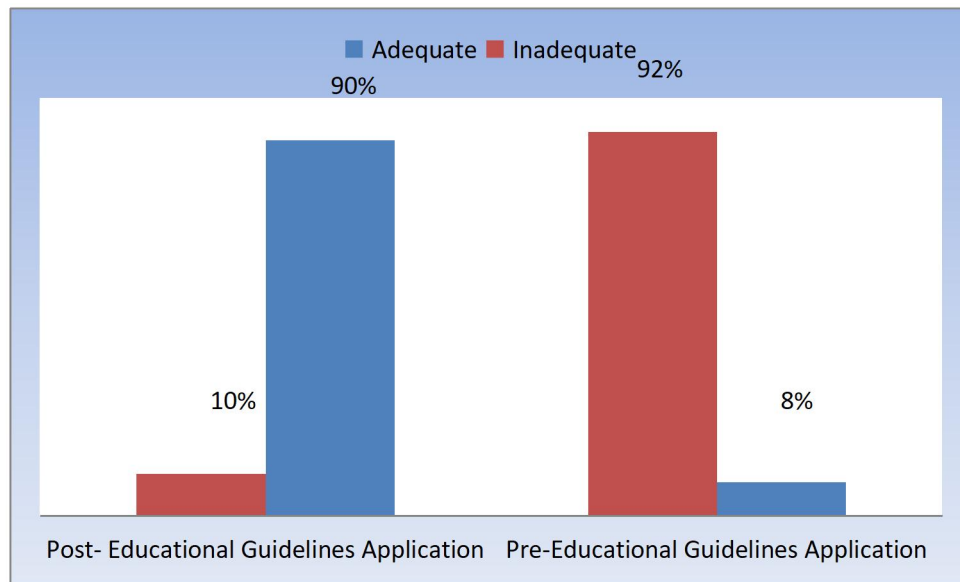


Figure (3): Total Reported Practice Levels regarding Hydrocephalus between Studied Mothers Pre and Post-Educational Guidelines Application (n=100).

Table (4): The Obstacles Facing Mothers in Their Caring with Infants Having Hydrocephalus Pre and Post-Educational Guidelines Application (n=100).

Items	Pre- guidelines		Post – guidelines		X ²	P value
	No.	%	No.	%		
- Adherence to medication	35	35	77	72	6.176	0.000*
- Financial problems	38	38	82	83	6.473	0.000*
- Position of infant	33	33	76	69	7.118	0.000*
- Transportation/ carrying manner	36	36	88	78	7.479	0.000*
- Lack of social support	45	45	88	80	7.955	0.000*
- Psychological problems	37	37	86	84	7.527	0.000*
- Dealing with the physical condition of their infants	39	39	90	76	7.984	0.000*

Table (5): Correlation between the Mothers' Knowledge, Reported Practices and Obstacles Concerning Hydrocephalus (n=100).

Items	Obstacles	
Mothers' knowledge	- 0.788	<0.001**
Mothers' reported practice	- 0.857	<0.001**

Discussion

A sufficient amount of comprehensive information is provided to support the preservation of the infant's health, enhance the mother and child's quality of life, improve the infant's prognosis and

results, and lessen any issues that may arise from subpar practices for mothers of infants with hydrocephalus and ventriculoperitoneal shunts (Copley et al., 2021). For this reason, this study was conducted to explore the effect of educational guidelines on knowledge, obstacles, and coping

strategies among mothers having infants with hydrocephalus.

After analyzing the personal data of the mothers under investigation, it was found that less than half of the mothers were between the ages of 40 and 50. This discovery ran counter to the findings of a study named "Description of hydrocephalus knowledge in pregnant women," which was carried out in Indonesia by **Prathiwinda et al., (2022)** and revealed that 50% of the participants were pregnant women. In addition, these results were at odds with those of **Rozensztrauch et al., (2021)**, who carried out a preliminary cross-sectional study in Poland under the title "The quality of life of children with myelomeningocele" and discovered that parents' ages ranged from 22 to 25.

According to the results of the current study, three-fifths of the mothers had a university degree and more than three-fifths of the mothers were employed. These results are consistent with those of **Abd-EL Baky et al. (2023)**, who discovered that less than two-thirds of the mothers in their study—titled "Effect of educational intervention on the quality of life for mothers having children with ventriculoperitoneal shunt"—were housewives with only secondary education. The research was carried out in Egypt.

Additionally, these outcomes agree with those of **Abd-EL Baky et al., (2023)**, who said that around half of the mothers were college graduates. The study's conclusions showed that more than 25% of the sample's mothers were urban dwellers. This result is in line with the study done by **Rozensztrauch et al. (2021)**, which showed that over half of the mothers lived in cities. This conclusion is further supported by a qualitative study conducted by **Gürol et al., (2018)**, titled "The experienced problems of mothers having children with hydrocephalus," which found that fifty percent of the moms were city dwellers.

This study indicated that, concerning mothers' knowledge of hydrocephalus, almost of mothers had unsatisfactory knowledge before the application of guidelines; however, ninety percent of them had improvement in the knowledge level after the application of guidelines. This result is supported by that of **Kafi & Mohamed (2020)**, who carried out a study in Ismailia, Egypt, entitled "Maternal Knowledge and Practices Regarding home-care Management of Their Hydrocephalic Children with a ventriculoperitoneal shunt," and whose findings showed that almost two-thirds of the mothers had inadequate knowledge of hydrocephalus. Results from this study were comparable to those of **Caus et al.,**

(2021), who conducted a study in Brazil titled "Caregivers' evaluation of an educational material targeted to children with hydrocephalus" and reported that the response rate of knowledge regarding hydrocephalus treatment was the majority.

This finding is at odds with that of **Morgan et al.'s (2020)** study in Nigeria, "Assessment of the knowledge of risk factors of congenital hydrocephalus among mothers attending antenatal clinics in a rural tertiary hospital in Irrua," which found that over half of the mothers were aware of how to identify hydrocephalus during labor. This may be because the two samples' features differ from one another. Even though the same study's conclusions were supported, only a small percentage of moms were able to pinpoint the issues or challenges seen in the child. The study's findings conflicted with those of **Caus et al. (2021)**, who stated that they understood the definition of a ventriculoperitoneal shunt to be satisfactory.

According to the results of the current study, there was a highly significant difference between the mothers who were studied and their corrected reported practices for caring for their infants with hydrocephalus before and after the application of educational guidelines in all areas of practice. Regarding the care of their infants with hydrocephalus, the suggestions, according to the researchers, have a good impact on the moms under study. These findings were consistent with **Ünver et al., (2020)** study, which was carried out in Turkey and reported that the mothers were taking their children's head circumferences. The study was titled "Effect of giving brochures to ventriculoperitoneal shunted children's mothers about preventing shunt infections". This result corroborated the "theory of KAP" proposed by **Fan et al., (2020)**, which postulated that adopting healthy behaviors is a result of possessing and using the appropriate information. Further research by **Rana et al., (2020)** discovered a connection between enough personal knowledge and successful illness promotion, control, and prevention. Insufficient knowledge is associated with ill health and unhelpful disease prevention practices, as per a study conducted by **Ricardo et al., (2018)**.

Regarding the practices that the mothers under study reported, the current study's findings revealed that the majority of them had inadequate total practice levels before educational guidelines in comparison with great enhancement after the implementation of educational guidelines. These outcomes align with the research conducted by **Abd-EL Baky et al., (2023)**, which found that most mothers' reported methods for

caring for their infants with ventriculoperitoneal shunts were inadequate. According to the researchers, this could be explained by the fact that over half of the mothers in the study had inadequate understanding of hydrocephalus, which in turn caused them to report practices that were not insufficient.

Concerning the obstacles that mothers faced during the care of their infants with hydrocephalus. The current study demonstrated that there was a high statistically significant difference and significant reduction observed in all areas regarding obstacles faced by mothers in caring for their infants with hydrocephalus in pre- and post-application of the educational guidelines. These results demonstrate the importance of educational guidelines in assisting moms to overcome the challenges associated with caring for infants who have hydrocephalus. The results of this study similarly corroborate those of **Gürol et al., (2015)**, who found that during the period of treatment following the diagnosis of hydrocephalus, the main challenges faced by all moms were those related to transportation and finances. The results of this study also concur with those of **Kyarimpa et al., (2020)**, who observed that the financial, physical, social, and psychological experiences of the caregiver might be difficult and frustrating when raising a kid with hydrocephalus.

In conclusion, the current study demonstrated a statistically significant negative correlation between mothers' obstacles, their knowledge, and their practice regarding hydrocephalus. This suggests that mothers' knowledge and practices tend to decline as the obstacles rise. The negative correlation emphasizes how critical it is to address the obstacles mothers encounter to enhance their knowledge of and adherence to hydrocephalus-related behaviors.

Conclusion

Based on the results of the current study, it can be concluded that:

Educational guidelines have positive effects in improving knowledge, reported practices, and obstacles, facing mothers having infants with hydrocephalus. There was a strong negative correlation between the obstacles faced by mothers, their knowledge, and the reported practices regarding hydrocephalus (P value <0.001).

Recommendations

Based on the results of the study, the following suggestions are made:

- Provide ongoing education and training that help mothers having infants with

hydrocephalus in caring and improve their knowledge regarding hydrocephalus.

- Ensuring that these guidelines are widely available and accessible to all mothers is of utmost importance. This can be achieved by incorporating it into training programs and workshops, as well as by distributing printed copies, posters, and booklets in healthcare facilities.
- To generalize the results, more research with a larger sample size might be conducted in different settings.

References:

- **Abd-EL Baky S., Al Sharkawi S., Mahmoud F. & Abdelaziz, S., (2023):** Effect of educational intervention on quality of life for mothers having children with a ventriculoperitoneal shunt, *Journal of Nursing Science*, 4 (1): 1030.
- **Caus P., Filho H. & Avila M., (2021):** Caregivers' evaluation of an educational material targeted to children with hydrocephalus. *Child's Nervous System*. 37 (1):81–89.
- **Copley, P., Emelifeonwu, J., Gallo, P., Sokol, D., Kandasamy, J., Wallace, H., & Kaliaperumal, C. (2021):** Guideline for the management of long tunneled external ventricular drains in chronic hydrocephalus. *British Journal of Nursing*, 30(7), 416-421.
- **Ebrahim, A., El Shokhaiby, U., & Alkholy, A. (2019):** Management of postoperative ventricular peritoneal shunt complications in pediatric patients. *The Egyptian journal of hospital medicine*, 76: (6), 4346-4352.
- **Gürol, A., Erdem, Y., & Tasbasi, F. (2015):** The experienced problems of mothers having children with hydrocephalus: a qualitative study. *International Journal of Caring Sciences*, 8(2), 435-442.
- **Hockenberry J., Rodgers C. & Wilson D., (2021):** Wong's essential of pediatric nursing-e-book11th edition. Elsevier Health Sciences, Philadelphia. Pp: 524-529; 287.
- **Isaacs, A., Riva-Cambrin, J., Yavin, D., Hockley, A., Pringsheim, T., Jette, N., & Hamilton, M. (2018):** Age-specific global epidemiology of hydrocephalus: Systematic review, metanalysis, and global birth surveillance. *PLoS one*, 13(10), e0204926
- **Kafi R. & Mohamed M., (2020):** Maternal Knowledge and Practices regarding Home-Care Management of their Hydrocephalic Children with Ventriculoperitoneal Shunt". *IOSR Journal of Nursing and Health Science (IOSR-JNHS)*.9 (1): 30-37.
- **Kyarimpa R., Muramuzi D. & Muhwezi T., (2020):** Caregiver's experiences of having a child

- with hydrocephalus: a Phenomenological study at Ruharo mission hospital. Faculty of Nursing and Health Sciences, Bishop Stuart University - Mbarara, Uganda. doi: <https://doi.org/10.1101/2020.06.25.20139683>
- **Mtui E., Gruener G. & Dockery P., (2021):** Fitzgerald's Clinical Neuroanatomy and Neuroscience E-Book 8th edition. Elsevier, Poland. PP: 283:294.
 - **Morgan, E., Agbeboh, P., Poluyi, C., Ikwuegbuenyi, C., Aphiar, A., & Asogun, A. (2020):** Assessment of the knowledge of risk factors of congenital hydrocephalus among mothers attending antenatal clinics in a rural tertiary hospital Irrua, Edo State. *Journal of Neurosciences in Rural Practice*, 11(01), 045-052.
 - **Murali A., Job K. & Udayakumaran S., (2019):** Effectiveness of structured teaching program on knowledge regarding home care management of children with hydrocephalus and shunt among their parents. *Journal of Pediatric Neurosciences*.14 (3):114-119.
 - **Oliveras, L., Ortega, J., Leidinger, A., Haji, M. A., Genovés, M., & Belloch, J. (2020):** Infant hydrocephalus in sub-Saharan Africa: Impact of perioperative care in the Zanzibar archipelago. *Neurocirugía (English Edition)*, 31(5), 223-230.
 - **Prathiwindya M., Niriyana W., Mahadewa T. and Maliawan S., (2022):** Description of hydrocephalus knowledge in a pregnant woman at Puskesmas Denpasar Utara. *Intisari Sains Medis*. 13 (1): 367- 370.
 - **Ragab, A.N., Mahmoud, E.H., & Ismail, S.S. (2023):** Assessment of Mothers' Knowledge, Attitudes and Practices Regarding Care of their Infants with Hydrocephalus. *International Journal of Membrane Science and Technology*.
 - **Rozensztrauch A., Iwa' nska M. & Baglaj M., (2021):** The Quality of Life of Children with Myelomeningocele: A Cross-Sectional Preliminary Study. *International Journal of Environmental Research and Public Health*.18 (1): 10756.
 - **Srivatsan, A., Burkhardt, J., & Kan, P. (2020):** Commentary: A cohort comparison analysis of fixed pressure ventriculoperitoneal shunt valves with programmable valves for hydrocephalus following nontraumatic subarachnoid hemorrhage. *Operative Neurosurgery*, 18(4), E104-E105.
 - **Tully, H. & Dobyms, W. (2014):** Infantile hydrocephalus: a review of epidemiology, classification and causes, *European Journal of Medical Genetics*, August; 57(8): 359–368. doi:10.1016/j.ejmg.2014.06.002.
 - **Ünver S., Tutunculer B., Özkan Z. & Findik U., (2020):** Effect of Giving Brochures to Ventriculoperitoneal Shunted Children's Mothers About Preventing Shunt Infections. *Pediatric Infection Journal*, 14(3):e97-e105.