

Maternal Knowledge and Practices regarding Home-Care Management of their Hydrocephalic Children with Ventriculoperitoneal Shunt

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Abstract

Background Hydrocephalus is a medical condition characterized by an abnormal accumulation of cerebrospinal fluid in the ventricles of brain. It is one of the most common neurosurgical problems in childhood, representing nearly one-third of all congenital malformations of nervous system.

Aim of the study: This study aimed to assess mothers' knowledge and practices regarding home-care management of their hydrocephalic children with ventriculoperitoneal shunt.

Methods: A descriptive correlational research design was used in this study with a convenient sample of 50 mothers accompanying their hydrocephalic children with ventriculoperitoneal Shunt whom treated in the neurosurgery units and neurosurgery outpatients clinics affiliated to Suez-Canal University Hospitals from the beginning of February 2019 to the end of September 2019. A structured interviewing questionnaire tool used to assess the level of mothers' knowledge, and reported practices regarding home care management of their hydrocephalic children with ventriculoperitoneal shunt.

Results: Revealed that, 60% and 80% of the studied mothers had insufficient level of knowledge about hydrocephalus, and home care management respectively. While, 68% of them had poor level of reported practices.

Conclusion & recommendations: The findings of this study concluded that, studied mothers had insufficient level of knowledge and poor reported practices level. Subsequently, the requisite for structured training programs at the hospitals to improve maternal knowledge and practices regarding home-care management of hydrocephalic children with ventriculoperitoneal shunt is recommended.

Key Words: Maternal, Hydrocephalus, Ventriculoperitoneal shunt, Home-care management

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I. Introduction

Hydrocephalus is a condition normally identified in early childhood, where progressive dilation of the ventricular system occurs due to imbalance between cerebrospinal fluid production and its absorption (Jouibari et al., 2011). The prevalence of congenital and infantile hydrocephalus has been estimated as 1.1 per 1,000 live and stillbirths (Tully and Dobyms, 2014).

Hydrocephalus is considered congenital when there is no obvious extrinsic cause and is usually present at birth. When hydrocephalus occurs as a complication of another condition as hemorrhage, infection or neoplasm it considered acquired or secondary hydrocephalus (Isaacs et al., 2018). Hydrocephalus is mainly managed by insertion of a permanent device that, divert excessive cerebrospinal fluid accumulated in the brain ventricles to the peritoneum, this device is known as ventriculoperitoneal (VP) shunt (Joseph et al., 2017).

The occurrence of hydrocephalus and its management are major challenges for both child and parents that, requiring multidisciplinary care from pediatricians, neurosurgeons, nurses and rehabilitative therapists. Parents of hydrocephalic children play a vital role in helping their children to overcome the tremendous challenges they face as a result of the illness and its management (Smith et al., 2013).

Hydrocephalic children with VP shunt are prone to many complications as shunt malfunctioning which causes failure rates up to 40-50% during the first year of insertion. Early identification and treatment of shunt malfunction is essential to prevent permanent neurological impairments or deaths (Smith et al., 2016).

Recognizing the symptoms of potential shunt malfunction is a parental responsibility especially with the unpredictability, variability and similarity of these symptoms to those of common childhood illnesses. Parents need to make a decision whether these non-specific symptoms require a diagnostic scan of shunt malfunction at hospital or watchful waiting at home (Oliveira, et al., 2010).

Home care management of hydrocephalic children with VP shunt is very crucial since child's health improvement depends on it. In addition to early recognition of signs that indicates VP shunt malfunction or infections, parents should know how to prevent skin breakdown over shunt area. Parents also, should be instructed about prevention of constipation since it may cause VP shunt to not work properly. Furthermore, parents should be knowledgeable about type of activity in which their hydrocephalic children with VP shunt can be engaged with and types of activity they should avoid (**Gürol et al., 2015**).

The pediatric nurse plays a vital role in the care of hydrocephalic children with VP shunt. Nursing responsibilities include careful assessment of signs of increased intracranial pressure, ensuring safe environment for the child and monitoring VP shunt for any signs of infection or malfunction. Wound care and maintaining skin integrity around shunt area are also, among nurses responsibilities. Nursing responsibilities also include, family guidance and preparation for home care management(**Joseph et al., 2017**).

Significance of the study:-

Hydrocephalus is one of the most frequent problem seen in pediatric neurosurgical practice. As estimated by the National Institute of Neurological Disorders and Stroke that, 1 to 2 of every 1,000 was born with hydrocephalus every year. Also, it is estimated that, 750,000 child suffer from hydrocephalus worldwide and 160,000 VP shunts are implanted each year as well (**Jea et al., 2017**). Parents of children with chronic conditions are in need for acquiring knowledge and developing skills that help in fulfilling the physical, psychological and behavioral needs of their children (**Khan et al., 2013**). Parents of children with hydrocephalic VP shunt have many concerns about home care management of their children. Pediatric nurses play a crucial role in equipping parents with needed knowledge and skills for improving child's health and reducing rate of complications (**Gürol et al., 2015**).

Aim of the study: the study aimed to assess mothers' knowledge and practices regarding home-care management of their hydrocephalic children with VP shunt.

This aim is achieved through the following objectives:-

- Assess studied mothers' knowledge regarding home-care management of their hydrocephalic children with VPshunt.
- Assess studied mothers' reported practices regarding home-care management of their hydrocephalic children with VP shunt.
- Find out the relation between studied mothers' knowledge and reported practices regarding home-care management of their hydrocephalic children with VP shunt.

Research questions:

- Do mothers had sufficient knowledge regarding home care management of their hydrocephalic children with VP shunt?
- Do mothers had good practices regarding home-care management of their hydrocephalic children with VP shunt?
- What is the relation between studied mothers' knowledge and reported practices regarding home-care management of their hydrocephalic children with VP shunt?
- What is the relation between studied mothers' knowledge, reported practices regarding home-care management of their hydrocephalic children with VP shunt and their demographic characteristics?

II. Subject And Methods

Research design:

The current research design was a descriptive correlational design aimed to assess mothers' knowledge and reported practices regarding home-care management of their hydrocephalic children with VP shunt.

Setting:

The research was conducted at neurosurgery unit and neurosurgery outpatient clinic affiliated to Suez Canal University Hospitals at Ismailia City.

Subject:

A convenient sample comprised 50 mothers accompanying their hydrocephalic children with VP shunt attended for treatment or follow-up at the previously mentioned settings.

Tools of data collection:

Data were collected using a structured interviewing questionnaire developed by the researcher in simple Arabic Language and consisted of 4 parts as follow;

Part I: It is concerned with demographic characteristics of the studied mothers as age, residence, educational level and occupation.

Part II: Concerned with demographic characteristics of the hydrocephalic children with VP shunt as age, gender, gestational age and type of hydrocephalus.

Part III: It is related to assessing studied mothers knowledge about hydrocephalus (definition, causes, types, signs of increased intracranial pressure treatment and complications), and their knowledge regarding home care management of VP shunt.

Part IV: Concerned with assessing studied mothers' reported practices as regards home care management of VP shunt as protection of the shunt area, prevention of infection, bathing, feeding, elimination, allowed activity, drug therapy and follow up visits.

Scoring system:

Items concerning assessment of studied mothers knowledge about hydrocephalus and home care management of VP shunt were consisted of 20 closed ended questions. While items concerned with assessing studied mothers' reported practices regarding home care management of VP shunt were 25 closed questions. A total scores of 90 were given for all the questions. The studied mothers answers were compared with a model key answer where, (2) scores was given for correct answer, (1) for incorrect answer and (0) for don't know the answer. The total score was calculated by summing up and converted into a percent score. The total score of questionnaire that included the part of knowledge was 40 score and the part of reported practices was 50 score. Subsequently, studied mothers level of knowledge was classified as sufficient $\geq 60\%$ and insufficient $< 60\%$, while, their reported practice level was classified as good ≥ 60 and poor $< 60\%$.

Validity and Reliability: The content validity of the knowledge questionnaire was revised by a panel of experts at the Pediatric Nursing specialty, then modifications accordingly done. An Alpha Coefficient was used to check the reliability of the tools. The reliability of the knowledge questionnaire is established at 0.93.

Pilot study: A pilot study was done on 5 mothers to assess clarity, feasibility, and the time needed to complete the study tool. It was done at February 2019. Modifications were made based on the results of the pilot study. The mothers participated in the pilot study were excluded from the current study sample.

Procedure:

- The preparatory phase began before the development of the study. It was started with reviewing recent literature related to the research problem using articles, books, internet, and periodicals to develop tool of data collection.
- An approval was obtained from the Scientific Research Ethical Committee in Faculty of Nursing, Suez Canal University before the study has started.
- An official permission to conduct the study was obtained from the medical and nursing director of neurosurgery unit and neurosurgery outpatient clinics affiliated to Suez Canal University Hospitals
- The researcher interviewed each mother individually using the study tool after explaining the aim of the study and its effect on both studied mothers and their hydrocephalic children with VP shunt. This was done for 20-30 minutes according to the physical and mental readiness of the studied mothers.
- The data collected from the beginning of February 2019 to the end of September 2019 by visiting the neurosurgery outpatient clinics in morning and the neurosurgery unit in the evening two days per week.

Ethical considerations: An oral consent was obtained from the studied mothers after clarification of the aim and nature of the study. Ethical issues were ensured to all the studied mothers including anonymity, confidentiality and the right to withdraw from the study at any time.

Statistical Design Statistical analysis was done using SPSS version 20 statistical software package. Data were presented using percentage, frequency, and Mean \pm SD for the descriptive data such as demographic characteristics. The correlation between variables was done by using Pearson's and Spearman's tests according to type of the manipulated data. Significant level was set at $P < 0.05$.

III. Results

Table (1): Distribution of the studied mothers according to their demographic characteristics (n = 50)

Items	No	%
Age in years		
<20	5	10
20 <25	12	24
25 < 30	14	28
30 < 35	12	24
35 \leq 40	7	14
$\bar{X} \pm SD$	27.48 \pm 5.79	
Residence		

Urban	15	30
Rural	35	70
Educational level		
Illiterate	4	8
Read and write	12	24
Secondary school education	28	56
University education	6	12
Occupation		
House wife	18	36
Working	32	64

Table (1): clarifies that, 28% of the studied mothers are aged between 25 to less than 30 years, with a mean age of 27.48 years, while 70% of them came from rural areas. Meanwhile, half of the studied mothers were graduated from secondary schools and 64% of them were working.

Table (2): Distribution of the studied children according to their demographic characteristics (n = 50)

Items	No	%
Age (in years)		
Less than 1 year	26	52
1 < 3	10	20
3 < 6	14	28
$\bar{X} \pm SD$	2.71 ± 2.09	
Gender		
Female	17	34
Male	33	66
Gestational age		
Pre term	12	24
Full term	29	58
Post term	9	18
Types of hydrocephalus		
Congenital	28	56
Acquired	22	44

Table (2): shows that, 52% of the studied children were aged less than 1 year, with a mean age of 2.71 years, while 66% of them females. Also, half of the studied children were full term, and had congenital hydrocephalus.

Table (3): Distribution of the studied mothers according to their knowledge about hydrocephalus (n = 50)

Items	Correct		Incorrect	
	No	%	No	%
Definition	20	40	30	60
Causes	16	32	34	68
Types	8	16	42	84
Signs of increased intracranial pressure	18	36	32	64
Treatment	12	24	38	76
Complications	9	18	41	82

Table (3): reveals that, nearly two thirds and more (60%, 68%, 64%) of the studied mothers had incorrect knowledge about definition, causes and signs of increased intracranial pressure in hydrocephalus respectively. Compared with, 84%, 76% and 82% of the studied mothers had incorrect knowledge about types, treatment and complications of hydrocephalus respectively.

Table (4): Distribution of the studied mothers according to their level of knowledge about hydrocephalus (n = 50)

Level of knowledge	No	%
Sufficient (≥ 60%)	20	40
Insufficient (<60 %)	30	60

Table (4): illustrates that, less than two thirds (60%) of the studied mothers had insufficient level of knowledge about hydrocephalus.

Table (5): Distribution of the studied mothers according to their knowledge regarding home-care management of VP shunt (n = 50)

Items	Correct		Incorrect	
	No	%	No	%
Definition of VP shunt	10	20	40	80
Complications associated with VP shunt	5	10	45	90
Signs of infection associated with VP shunt	8	16	42	84
Signs of VP shunt blockage	6	12	44	88
Warning signs that requires hospital visit	12	24	38	76

Table (5):shows that, the majority of the studied mothers (80%, 90%, 84%, 88%) of had incorrect knowledge regarding definition of VP shunt, its complications, signs of infection and signs of blockage of VP shunt respectively. In addition, 76% of the studied mothers had incorrect knowledge regarding warning signs that requires hospital visit.

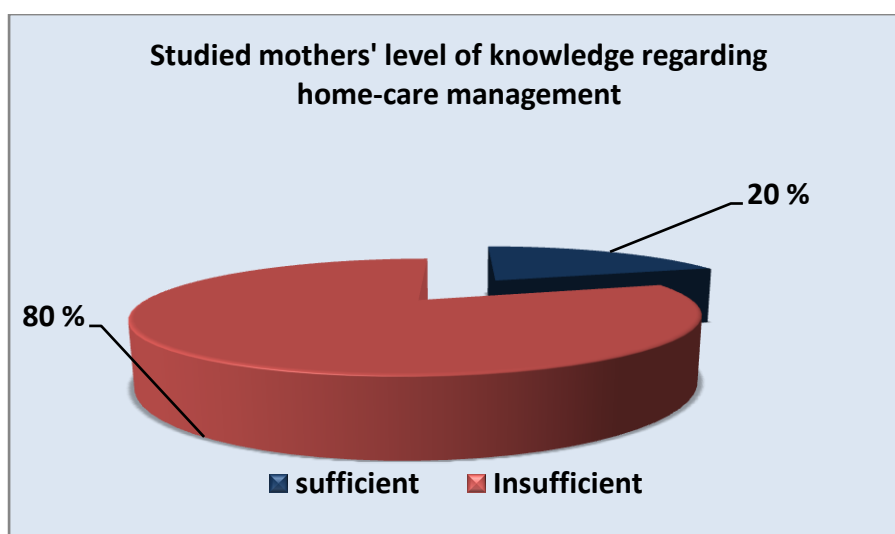


Figure (1): Distribution of the studied mothers according to their level of knowledge regarding home-care management of VP shunt (n = 50)

Figure (1):illustrates that, the majority (80%) of the studied mothers had insufficient level of knowledge regarding home-care of VP shunt.

Table (6): Distribution of the studied mothers according to their reported practices regarding home-care of VP shunt (n = 50)

Items	Correct		Incorrect	
	No	%	No	%
Protection of the shuntarea	15	30	35	70
Prevention of infection	10	20	40	80
Bathing	13	26	37	74
Feeding	14	28	36	72
Elimination	6	12	44	88
Allowed activity	5	10	45	90
Drug therapy	20	40	30	60
Follow up visits	24	48	26	52

Table (6):shows that, more than two thirds of the studied mothers (70%, 74%, 72%) had incorrect reported practices regarding, protection of the shunt area, bathing and feeding of their hydrocephalic children with VP shunt respectively. Also, half and more of the studied mothers (60%, 52%) had in correct reported practices regarding drug therapy and follow up visits respectively. Adding, the majority of the studied mothers reported incorrect practices regarding prevention of infection, elimination and allowed activity of their hydrocephalic children with VP shunt respectively.

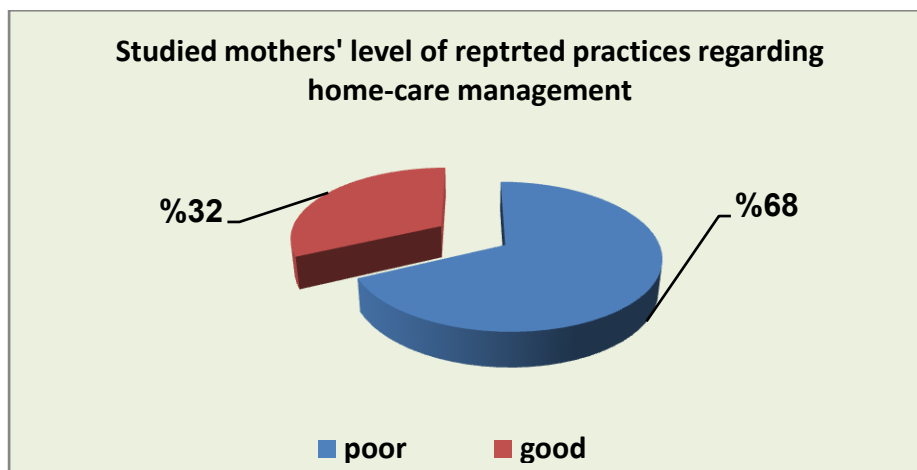


Figure (2): Distribution of the studied mothers according to their level of reported practices regarding home-care of VP shunt (n = 50)

Figure(2):illustrates that, 68% of the studied mothers had poor level of reported practices regarding home-care management of VP shunt.

Table (7): Correlation between maternal knowledge and reported practices regarding home caremanagement of VP shunt and their demographic characteristics (n = 50)

Item	Maternal knowledge		Maternal reported practices	
	r	P- value	r	P- value
Age	0.777	0.00*	0.798	0.00*
Residence	0.429	0.02*	0.449	0.01*
Educational level	0.833	0.00*	0.858	0.00*
occupation	0.873	0.00*	0.915	0.00*

*significance at p < 0.05

Table(7):Clarifies that, there was a statistical significant positive correlation between maternal knowledge and reported practices regarding home-care management and their demographic characteristics (age, residence, educational level and occupation) respectively.

Table (8): Correlation between maternal knowledge and their reported practices regarding home caremanagement of VP shunt (n = 50)

Item	Maternal Knowledge	
	r	p
Maternal reported practice	0.945	0.000*

*significance at p < 0.05

Table(10):It reveals that, there was a statistical significant positive correlation between maternal knowledge and their reported practices regarding home care management of VP shunt.

IV. Discussion

Hydrocephalus is a condition in which an excessive amount of cerebrospinal fluid (CSF) accumulates within the cerebral ventricles resulting in ventricular dilation and increased intracranial pressure(Neilson & Breedt, 2013). Insertion of VP shunt is a common procedure performed in infants with hydrocephalus, that requires proper and careful monitoring for the best results. However, complications occur even with careful management (Romero et al., 2014). Teaching parents for continued home care, monitoring, and follow-up care improves long-term results in infants and saves costs associated with readmissions and shunt revisions and eliminate a high amount of distress in parents (Michael & Edwards, 2014).

The current study results which, included 50 mothers of hydrocephalic children with VP shunt, their main age was 27.48 years, 70% of them came from rural areas, 56% graduated from secondary schools and 64% were working mothers. These result were almost similar to those of Abd El Azizet al., (2017), whom studied effect of Nursing Management Protocol for Mothers of Children Having Ventricular Peritoneal Shunt, and reported that, studied mothers' mean age was 32.97 years, their half (51.3%) came from rural areas, about two thirds graduated from secondary schools and the majority of them were house wives.

Concerning studied children's age, half of them were aged less than 1 year, almost two thirds were males and nearly their half were diagnosed with congenital hydrocephalus. These findings were in accordance with a previous study done by **Murali et al.,(2019)**, about Effectiveness of Structured Teaching Program on Knowledge Regarding Home Care Management of Children with Hydrocephalus and Shunt among their Parents. In which, they found that, nearly half of the studied children were aged less than 1 year, two thirds of them were males and diagnosed with congenital hydrocephalus.

As regards, maternal knowledge about home care management of their hydrocephalic children with VP shunt, the results of the current study revealed that, the majority of the studied mothers had insufficient level of knowledge. This result agrees with **Smith et al.,(2009)**, whom studied Parent's Involvement in Decisions when their Child is Admitted to Hospital with Suspected Shunt Malfunction: Study Protocol and found that, parents had poor knowledge regarding home care management of their hydrocephalic children. This result owed to lack of parents' education about hydrocephalus and home care management. As stated by **Hockenberry and Wilson, (2018)** the more the parents can understand about the health problem of his child the better equipped them to manage care of their child.

In relation to maternal reported practices, the current study showed that, two thirds of the studied mothers had poor level of reported practices regarding home care management of their hydrocephalic children with VP shunt. This finding agreed with **Smith et al., (2013)**, whom studied Parents' Experiences of Living with a Child with Hydrocephalus and reported that, studied parents had poor practices regarding home care management of hydrocephalic children with VP shunt. This finding emphasize on importance of empowering parents with skills needed to deliver proper home care for the child. As stated by **Naftel et al., (2013)**, that, parents of hydrocephalic children must be empowered through education and social support.

In the current study, there was a statistical significant positive correlation between demographic characteristics of the studied mothers (age, educational level, residence and occupation) and their knowledge and reported practices regarding home care management of their hydrocephalic children with VP shunt. These findings were supported by **Murali et al.,(2019)**, whom reported a statistical significant association between parent' demographic characteristics and both their knowledge and practices regarding home care management. These results proven that, maternal' sufficient knowledge and good practices are linked to their age and educational level. Since, both knowledge and practices level become better with the increase in age and level of education.

Also, the current study revealed a statistical significant positive correlation between maternal knowledge and their reported practices regarding home care management of VP shunt. This result was in accordance with those of **Khalafallah et al., (2017)** whom studied The Impact of Protocol of Care for Mothers of Children with Ventriculoperitoneal Shunt on Occurrence of Postoperative Complications and found a statistical significant correlation between mothers knowledge and practice. This result is owed to the fact that increased level of maternal knowledge subsequently leads to improvement in their practice regarding home care of their hydrocephalic children with VP shunt.

V. Conclusion and Recommendations:

The current study concluded that the majority of the studied mothers have insufficient level of knowledge, and slightly more than two-thirds need improvement in their practice with a statistical significant relation between the studied mothers' level of knowledge and level of reported practices regarding home care management of their hydrocephalic children with VP shunt. So, the current study recommended the implementation of structured training programs on home care management of hydrocephalic children with VP shunt for mothers. Also, the current study recommended providing a care guide for the care of children with hydrocephalus and shunt, including the child's shunt-related information for the parents.

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