

Effect of Educational Intervention on Nurses' Performance about Management of Dehydration for Children Under five Years

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Abstract :

Background: Dehydration is a major cause of preschooler illness and death throughout the world it is often a result of diarrheal disease in children. **The aim** of this study was to evaluate the effect of educational intervention on nurses' performance about management of dehydration for children under five years. **Subjects and method:** A quasi-experimental research design was used. Eighty nurses who was working at Pediatric out-patient clinics and pediatric medical department and eighty children who had dehydration. Three Tools were used for data collection: Structured interview Schedule, Nurses' practice observational checklist, Health assessment related to nursing management of dehydration for children under five years. Management and administration of oral rehydration solution. **Results:** The present study revealed that, only 5.0% of nurses had good knowledge scores and 95.0% of them had satisfactory practices before the program intervention while this percentage improved to 100% of them immediately and one month after the program intervention **Conclusion:** A significant difference between total scores of nurses' knowledge and practice before and after educational intervention. **Recommendation:** In-service educational training program should be provided to all pediatric nurses about management of dehydration for children under five years to update their knowledge and clinical practice.

Keywords: Children under five years, educational intervention, management of dehydration, Nurses' performance.

Introduction

Dehydration is a significant depletion of body electrolytes and water, often secondary to acute gastroenteritis, or to other diseases that cause vomiting^(1,2). Dehydration is very common among children and can be life-threatening. According to the World Health Organization, and United Nations International Children's Emergency Fund data in 2017, diarrhea is a leading killer of children, accounting for approximately 8 percent of all deaths among children under age 5 worldwide in 2017. This translates to over 1,300 young children dying each day, or about 480,000 children a year, most deaths from diarrhea occur among children less than 2 years of age living in South Asia and sub-Saharan Africa⁽³⁾.

Total annual number of deaths related to diarrhea among children under 5 years, from 2.5 million in the year 2000 to 480,000 in the year 2017 decreased by 60 percent. Many more children could be saved through basic interventions this high incidence is usually associated with contaminated food and water and unhygienic conditions in poverty-stricken communities. Infants and toddlers have a small body mass and lose fluids and electrolytes more rapidly than adults. Early detection of symptoms is essential in the prevention and treatment of dehydration.

In Egypt, diarrhea is the second leading cause of death among under-5 children. Most diarrhea-related deaths in children are due to dehydration from loss of large quantities of water and electrolytes. Statistics show that 3,500 – 4,000 under-five children die of diarrhea every year^(3,4). Children are more likely than adults to die from diarrhea because they become dehydrated more quickly. About 2.2 million People in developing countries, around 525, 000 children, die every year from diseases associated with lack of access to safe drinking water, inadequate sanitation, and poor hygiene and overcrowding, in that 90% are children under five years of age⁽⁵⁾. Dehydration is a medical emergency, thus, several related symptoms and signs should be considered including: urine output, sunken eyes, lack of tears, dry mucous membranes, heart rate, respiratory rate and effort, capillary refilling time and skin turgor. American Academy of Pediatrics Guidelines Recommend making clinical decisions based on the degree of dehydration; mild (3-5%), moderate (6-9%), or severe (>10%)^(6,7).

Dehydration consists in four clinical elements: general and eyes appearance, hydration of mucous and tears. Each item is rated from 0 to 2, and the total score is

between 0 and 8. The three final categories are: no degree of dehydration score 0, mild dehydration score, 1-4, and moderate/severe dehydration score, 5-8. In the last 15 years, the Dehydration scale has been validated by different studies ⁽⁸⁾. The capillary refilling time is a simple and quick parameter to be obtained; the examiner presses fingernail for 5 seconds, and estimates the time needed to return at normal color after releasing the finger pressure. The value for the non-dehydrated children is less than 2 seconds, whilst severity of dehydration increases with prolonged time up to 4 seconds which corresponds to severe shock. Usefulness and validity of the capillary refilling time in the assessment and severity of dehydration were attested in a systematic review included in the National Institute for Health and Care Excellence guidelines of 2016^(6, 9).

There are two treatment goals when a child has diarrhea: elimination of the cause of diarrhea and prevention of dehydration. Could be averted through combined prevention and treatment strategies, intervention such as oral rehydration therapy, appropriate drug therapy, optimal breast-feeding practice, improved nutrition, increasing access to clean water, sanitation facilities, improved personal hygiene including food and water. The importance of oral rehydration is to replace

the lost fluids by increasing the amount of liquids the child drinks, has become recognized throughout most of the world. Oral rehydration solution is effective, safer and less costly than the intravenous rehydration^(10, 11).

Nurses assess the severity of dehydration as well as prescribe and supervise oral rehydration therapy to treat children with diarrhea. She also stressed the need for further nursing research especially related to homemade oral rehydration solution. Nursing intervention should be directed to prevent complication of diarrhea. Giving health education to the mother would help to gain more knowledge and reduce anxiety related to diarrhea. Health education regarding hygienic water, breast feeding, basic sanitation and hygienic practice helps to attain highest level of knowledge. Therefore, the nursing practice should be patient centered rather than task centered to prevent complications⁽¹²⁾.

Significance of the study

Dehydration is a common complication of illness observed in children presenting to the emergency department. Early recognition and early intervention are important to prevent progression to shock and cardiovascular collapse by providing educational intervention on nurses' performance about management of dehydration for children under five years

as nurses play an important role in management of these health problem.

Aim of the study

The study was conducted to evaluate the effect of educational intervention on nurses' performance about management of dehydration for children under five years

Subjects and Method

Study Design

A quasi-experimental research design was used.

Setting

The study was conducted at; Pediatric out-patient clinics and pediatric medical department at Tanta Main University Hospital and Qoutour General Hospital which affiliated to the Ministry of Health and Population

Subjects

A convenience sample of eighty pediatric nurses who were assigned as follow: 10 nurses from Pediatric out-patient clinics and 30 nurses from pediatric medical department of Tanta Main University Hospital. Ten nurses from Pediatric out-patient clinics and 30 nurses from pediatric medical department Qoutour General Hospital which affiliated to the Ministry of Health and Population. Eighty children diagnosis with dehydration who were selected with equal number of children from previously mentioned setting were also involved. The sample size was based on the following parameters confidence

level error level 5% type I error 0.05 and power of test 95%.

Inclusion criteria of children

- Both sexes .Children have signs and symptoms of acute gastroenteritis (diarrhea of recent onset not caused by chronic disease with or without accompanying nausea, vomiting, fever, or abdominal pain) presenting to Pediatric out-patient clinics. Free from any other disease such as immunity disease, tumor out liver cardiopulmonary disease, brain disease, metabolic disorders, food intolerance and medication reaction that could affect their quality of life.

Tools of data collection

Three tools were used to collect data.

Tool I: Structured Interview Schedule: It consisted of six parts: Part one: characteristics of nurses: which includes age, level of education, residence, experience and previous training about dehydration. Part two: Socio-demographic characteristics of studied children such as: age, sex, birth order and residence. Part three: Medical history of children suffering from dehydration related to diarrhea. Part four: Nurses' knowledge pre and post educational intervention about definition of dehydration, causes, degree of dehydration, sign and symptoms, clinical manifestation, complication and important investigation. Part five: Component and

value of oral rehydration solution, child feeding during gastroenteritis and measures to prevent complication. Part six: Management plan of dehydration under five years.

Scoring system of nurses' knowledge was as following: scoring for question was used: Correct and complete answer was scored (2), correct and incomplete answer was scored (1), and don't know or incorrect answer was scored (0). Less than 65% were considered poor knowledge. From 65 to less than 75% were considered fair, from 75 to 100% were considered good.

Tool II: Nurses' Practice Observational Checklist ^(13 -15): It was consisted of three parts:

Part I: Health assessment related to nursing management of dehydration for children under five years which included the following: General appearance and behavior, capillary refill time, tearing and salivation, mucous membrane moisture, skin color and moisture, and intake and output chart. Part II: Anthropometric measurement for children such as: Weight, height, mid arm, and skin fold thickness. Part III: Physiological measurement: such as temperature, Pulse respiration and blood pressure.

Tool III: Management and Administration of Oral Rehydration Solution: It was developed by the researcher after reviewing related

literatures ⁽¹²⁾ to observe the following: Administration and preparation of oral rehydration solution, insertion and rehydration of nasogastric tube, intravenous therapy and management of dehydration in children which include child feeding during gastroenteritis and administration of medication.

Scoring system for nurses' practice were as follows: The score of practice for each item were ranged from 0-2. Done correct and complete was scored (2), done correct and incomplete was scored (1), and not done was scored (0).

The total score of nurse's practices were 86 and, it was calculated as follows: - less than 65% were considered unsatisfactory practice and from 65% to 100% were considered satisfactory practice.

Method

Informed consents were obtained from nurses and mothers to participate in the study after explaining the aim of the study and their right to withdraw from the study at any time without providing a reason and without any potential.

Confidentiality and privacy were maintained. The tools were presented to a jury of five experts in the field of pediatric nursing to check content validity, clarity, relevance, comprehensiveness, understanding, applicability and ease for implementation. Content validity index was 98.5%. To assess reliability, the study tools

were tested and the value of Cronbach's alpha coefficient was 0.822. A pilot study was carried out on (10%) 8 nurses and 8 children to test the tools for its clarity, applicability, feasibility and the necessary modification was done Pilot study was excluded from total sample of the study.

Implementation of the study: The study was conducted through four phases:

1-Assessment phase: It was done by the researcher for all study subjects to assess the studied nurses and children who met the inclusion and there is exclusion criteria of this study. The researcher also, firstly met doctors to explain the purpose and the educational intervention of the study to gain their cooperation after taking the permission from related authorities. During the initial interview, the purpose of the study and the procedures were explained and the informal consent was obtained from the participants.

Subjects were assured that all information would be confidential to assure the confidentiality of the participants. Nurses who participated in the studied sample were interviewed by the researcher in the nursing room to assess nurses knowledge about dehydration, component and value of oral rehydration solution and management plan of dehydration to using tool one. Also, taking sociodemographic and medical history of children suffering from dehydration from assessment sheet

afterward, the researcher explained to the nurses how to make health assessment related to nursing management of dehydration for children under five years (tool II). Every nurse was observed by the researcher three times to assess the actual care for the children (tool III).

2- Planning phase: Educational intervention was developed by researcher based on literature review according nurses' education needs and expected outcomes criteria were formulated, different methods audio-visual material was prepared such as: PowerPoint presentations, picture, posture to facilitate them learning, small lectures and group discussion.

3-Implementation phase: The researcher attended at 10.00 Am till 12.00 pm every day in the previously mentioned settings to collect the data and meet the nurses in nursing room. The researcher met the study nurses, divided into eight subgroups from ten nurses in each group according to the availability of them. The time of each session will be 30-45 minutes. Educational intervention was implemented by the researcher for all study subjects using interactive lectures, group discussion demonstration and redemonstration and video presentation. They attended the fifth sessions about:

First session: focus on definition of dehydration, causes, degree of dehydration,

sign and symptoms, clinical manifestation, complication and important investigation.

Second session: Definition of diarrhea, clinical manifestation, causes and dangerous sign and symptoms, important investigation, component and value of oral rehydration solution, child feeding during gastroenteritis and measures to prevent gastroenteritis.

Third session: Include general appearance and behavior, vital signs, including blood pressure and temperature, weight, capillary refill time, tearing and salivation, mucous membrane moisture, skin color and moisture and urine output.

Fourth session: focus on Anthropometric measurement for children such as: weight, height, mid arm, and skin fold thickness and Physiological measurement: such as temperature, respiration, and blood pressure.

Fifth session: Management and administration of oral rehydration solution administration, preparation of oral rehydration solution, Insertion and rehydration of nasogastric tube check list, intravenous therapy check list and management of dehydration in children.

4- **Evaluation phase:** Educational intervention was evaluated before, immediately, after implementation of the sessions, and after one month from health education intervention implementation using constructed tools (I and III). The data

was collected over a period of six months from beginning of January 2019 to June 2019.

Statistical analysis

The collected data were organized, tabulated and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 23, SPSS Inc. Chicago, IL, USA). For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, comparison between two groups and more was done using Chi-square test (χ^2). For comparison between more than two means of parametric data, F value of ANOVA test was calculated. For comparison between means of two related groups (before & after change) of non-parametric data, Z value of Wilcoxon Signed Ranks Test was used. Correlation between variables was evaluated using Pearson's correlation coefficient (r). For comparison between means of two groups of parametric data of independent samples, student t-test was used. For comparison between more than two means of non-parametric data, Kruskal-Wallis (X² value) was calculated. Significance was adopted at P <0.05 for interpretation of results of tests of significance.⁽¹⁶⁾

Results

I- Sociodemographic data; Table (1):As regards the age, it was observed that slightly more half of the studied nurses

(55%) ranged from $> 25 - \leq 35$ years while 16.3% were ranged from $> 35 - 45$ year with mean age of 30.075 ± 5.72 years. Most of them (81.2%) were married while 2.5% were widowed. According the educational level it was clear that 55% of them had bachelor degree of nursing while the least (3.8%) had diploma degree of nursing (1 year).

Regarding years of experience, nearly half of them (46.3%) was between 10 – 15 years of experience while 21.2% was between 5 - < 10 years of experience. Regarding to residence, it was observed 51.2% of them were from urban areas while 48.8% from rural areas. In relation to nurse previous training on care of child it was found that 55.0% hadn't previous training.

Figure (1): shows socio-demographic characteristics of the studied children with dehydration. Regarding the age of the studied children, it was observed that 47.5% of them ranged from 3 – 5 years while 18.8% were aged less than-one years. The same figure also showed that 65.0% of them were female. In addition, 38.8% of studied children were in the second birth order while 15.0% were in the third birth order. Regarding to residence, it was observed that more than two thirds of them (70.0%) were from urban.

II- knowledge of the studied nurses related to dehydration: Table(2):

illustrates percentage distribution of levels and mean scores of total knowledge of the studied nurses related to dehydration. It was found that 5.0% only of them had good knowledge scores before the program intervention while this percentage improved to 100% of them immediately and one month after the program intervention and there was a statistically significant difference as ($P= 0.0001^*$).

III- Assessment related to nursing management of dehydration for children under five years: Figure(2):

it was obvious that, more than half of the studied children (55.0%) had moderate dehydration while the least of them (10.0%) had mild dehydration. It was indicated that 81.2% of the studied children had prolonged capillary refill time ranged between (2-4sec) while 11.3% of them had capillary refill time more than (> 4 sec). Also, this table showed that 80.0 % the studied children had dried mucous membranes of mouth while 20.0% of them had very dry mucous membranes. Concerning the assessment of skin recoil, it was observed that 78.8% the studied children had delayed skin recoil time for (2 sec) while 12.4% of them had very prolonged skin recoil time more than (> 2 sec).

Percentage Distribution of the Studied Children related to Anthropometric Measurements

IV-Anthropometric Measurements of the Studied Children. Table (3): shows the percentage distribution of the studied children related to anthropometric measurements. It was found that 47.5% of the studied children were considered weight between 5 - < 10 kg with the mean of 8.207 ± 3.32 . Regarding to their height (cm), it was found that 53.8% were between 60 - < 80 cm and 22.5% were between 40 - < 60cm, with the mean of 12.310 ± 0.583 . The same table also showed that mid arm circumference 46.2% of the studied children were between 12 - < 13 while 16.3% of them were more than 13 cm, with the mean of 12.310 ± 0.583 . Concerning to their skin fold thickness, it was observed that three quarters of studied children (75.0%) were between 11 - < 14 mm, with the mean of 12.273 ± 1.45 .

Figure (3): Mean Scores of Physiological Measurementsof the studied children.It was found that 53.8% of the studied children had body Temperature between 38 - < 39 while 21.2% of them had body Temperature less than < 38(cc), with the mean of 38.413 ± 0.506 . Regarding to their respiration, it was found that 87.5 %were between 30 - < 60 (breath/minute) and 1.3% had more than ≥ 90 (breath/minute), with the mean ofwith the mean of 43.787 ± 11.664 .

V-Nurses Practice related to Management and Administration of

Oral Rehydration Solution. Table (4): shows thelevel of nurses practice sub items related to management and administration of oral rehydration solution. It was revealed from this table that, the mean of total nurse's practice scores before the program was 65.03 ± 5.34 while, immediately after the program implementation the mean was improved to 85.81 ± 0.42 . Also, one month later, the nurses' mean practices score was 84.87 ± 1.21 . The difference was statistically significant between pre, post and after one month as $P = 0.0001$.

VI- relation between Total Nurses' Knowledge and Practice Scores related to Management and Administration of Oral Rehydration Solution. Figure (4): shows thecorrelation between total nurses'knowledge and practice sub items scores related to management and administration of oral rehydration solution before and after program implementing. It was revealed that there was a positive relationbetween the degree of the studied nurses' total knowledge score and their totalpractice score as($P= 0.029$).

Table (5): explain the relation between total knowledge of nurses before and after implementing of health education and demographic data. A significant relationwas found between the educational level, years of experience, previously in-service training program, and nurses'

knowledge before and after implementing of health education as (P= **0.013**, P= **0.026**, P= **0.047**, P= **0.003**).

Table (6): explain the relationship between total practice of nurses before and after implementing of health education and demographic data. A significant relation was found between the educational level, years of experience, previously in-service training program, and nurses' practice before and after implementing of health education as (P= **0.001**, P=**0.0400**, P=**0.024**, P= **0.001**, P=**0.011**).

Table (1): Percentage Distribution of the Studied Nurses Related to Socio-demographic Characteristics.

Socio-demographic characteristics of nurses	(n=80)	
	No	%
Age in years:		
≤ 25	23	28.7
> 25 - ≤ 35	44	55.0
> 35 - 45	13	16.3
Range	20 - 45	
Mean ± SD	30.075 ± 5.72	
Marital status:		
Single	10	12.5
Married	65	81.2
Divorced	3	3.8
Widowed	2	2.5
Educational level		
Nursing School (3years)	23	28.7
Technical Institute of Nursing	10	12.5
Bachelor of Nursing Science	44	55.0
Diploma in Nursing (1 year)	3	3.8
Years of experience		
1 - <5	26	32.5
5 - < 10	17	21.2
10 – 15	37	46.3
Range	1 – 15	
Mean ± SD	7.587 ± 4.28	
Residence		
Rural	39	48.8
Urban	41	51.2
Previously in-service training program		
Yes	36	45.0
No	44	55.0

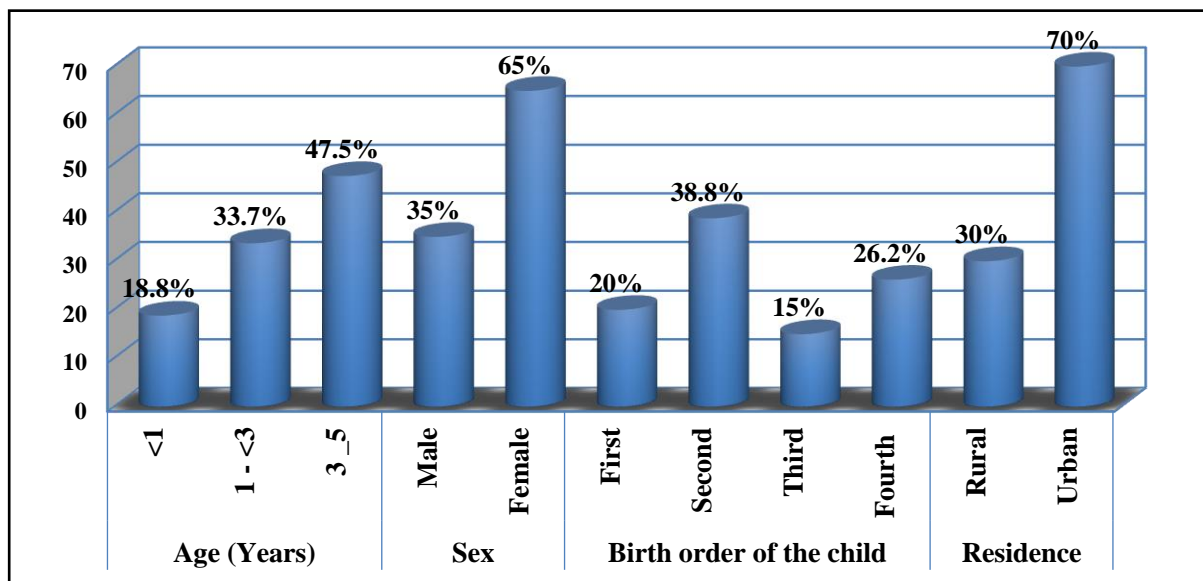


Figure (1): Socio-demographic Characteristics of the Studied Children

Table (2): Percentage distribution of total scores of the studied nurses knowledge related to dehydration.

Total knowledge of nurses related to dehydration	(n=80)						χ^2	P
	Before (n=80)		Immediate after (n=80)		One month after (n=80)			
	No	%	No	%	No	%		
Total knowledge score:							184.62	0.0001*
Poor knowledge	65	81.2	0	0.0	0	0.0		
Fair knowledge	11	13.8	0	0.0	0	0.0		
Good knowledge	4	5.0	80	100.0	80	100.0		
Total knowledge scores:	14 - 31		36 - 40		32 - 40			
Range	22.43±3.93		39.33±0.87		38.46±1.51			
Mean ± SD	1221.261							
F value	0.0001*							
P								

*Statistically significant difference at (P<0.05)

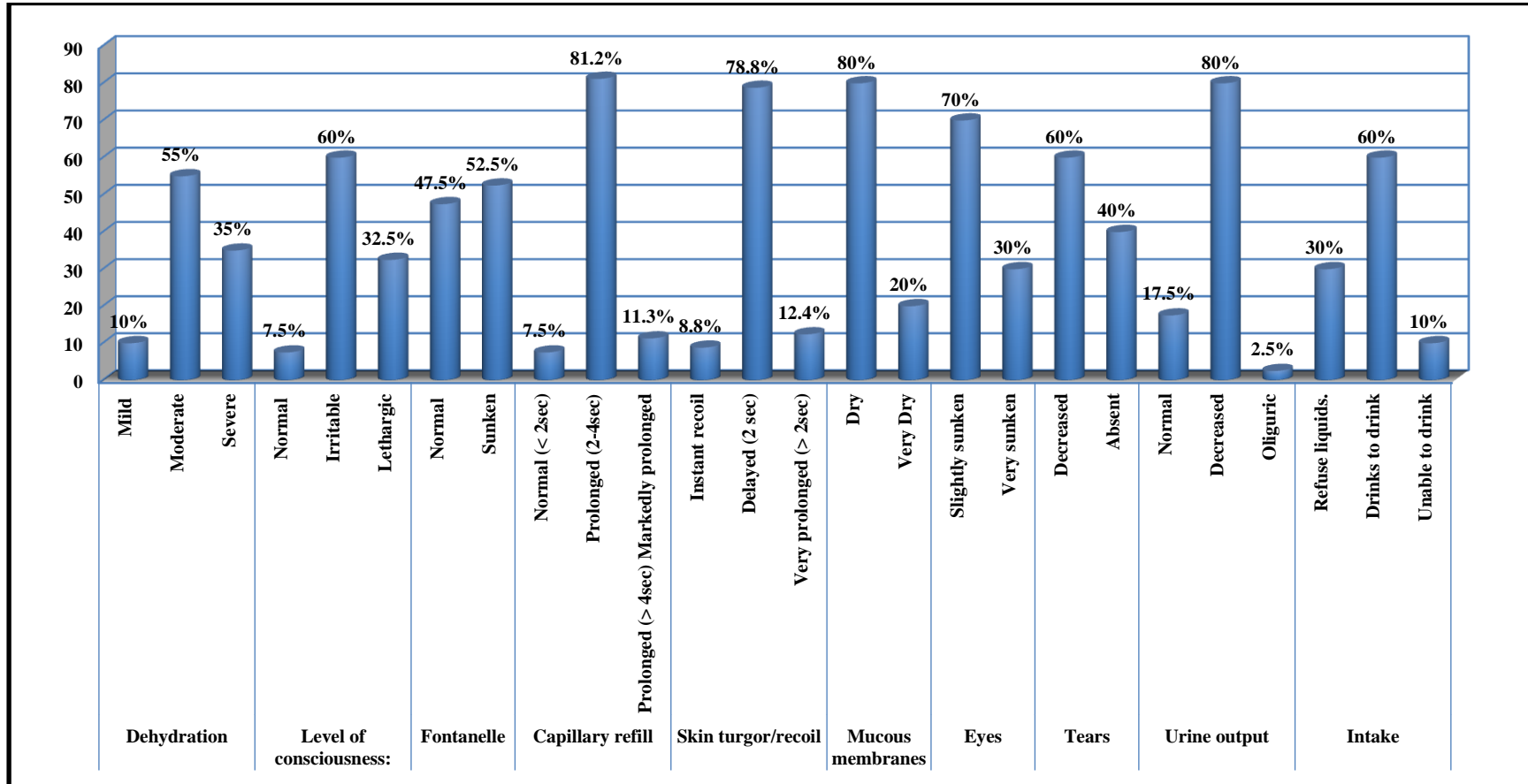


Figure (2): Health Assessment related to Nursing Management of Dehydration for Children under Five Years

Table (3): Percentage Distribution of the Studied Children related to Anthropometric Measurements

Anthropometric measurements	The studied children (n=80)	
	N	%
Weight (Kg)		
Normal	15	18.25
Subnormal	65	81.75
Range	2.5 – 16	
Mean ± SD	8.207 ± 3.32	
Height (cm)		
Normal	34	42.5
Subnormal	46	57.5
Range	40 – 92	
Mean ± SD	69.743 ± 11.20	
Mid Arm Circumference (cm)		
Normal	3	3.75
Subnormal	77	96.5
Range	11 – 13.7	
Mean ± SD	12.310 ± 0.583	
Skin Fold Thickness (mm)		
Normal	6	7.5
Subnormal	74	92.5
Range	8.4 – 14.6	
Mean ± SD	12.273 ± 1.45	

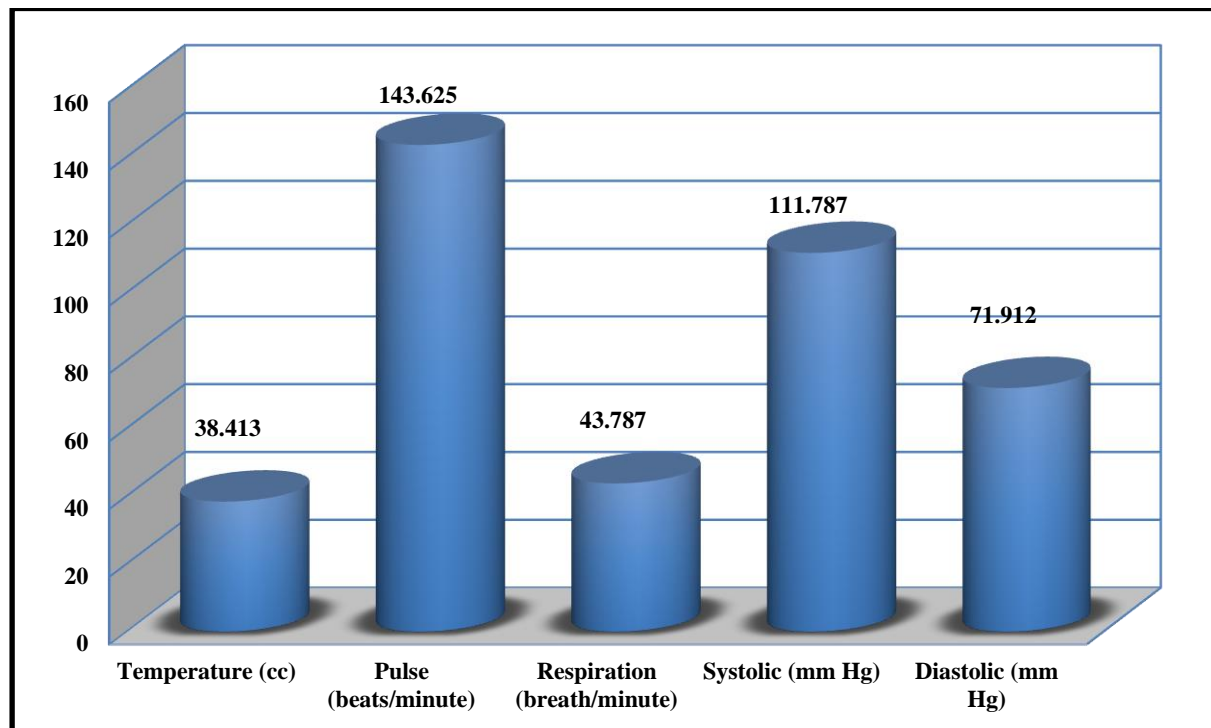


Figure (3): Mean Scores of Physiological Measurements of the Studied Children

Table (4): Nurses Practice related to Management and Administration of Oral Rehydration Solution.

Practice items of management and administration of oral rehydration solution	Practice sub items' level among the studied nurses (n=80)						χ^2	P
	Before		Immediate after		One month after			
	No	%	No	%	No	%		
Administration and preparation of ORS								
Unsatisfactory (0-10)	6	7.5	0	0.0	0	0.0	12.308	0.002*
Satisfactory (11-16)	74	92.5	80	100.0	80	100.0		
Range	9 - 16		16 - 16		14 - 16		F value = 287.2	P = 0.0001*
Mean±SD	12.65±1.61		16.00±0.00		15.76±0.55			
Insertion and rehydration of nasogastric tube								
Unsatisfactory (0-15)	24	30.0	0	0.0	0	0.0	53.333	0.0001*
Satisfactory (16-24)	56	70.0	80	100.0	80	100.0		
Range	10 - 22		23 - 24		22 - 24		F value = 531.4	P = 0.0001*
Mean±SD	16.81±2.65		23.93±0.42		23.71±0.53			
Intravenous therapy								
Unsatisfactory (0-14)	18	22.5	0	0.0	0	0.0	38.919	0.0001*
Satisfactory (15-22)	62	77.5	80	100.0	80	100.0		
Range	8 - 22		20 - 22		19 - 22		F value = 190.3	P = 0.0001*
Mean±SD	16.71±3.13		21.87±0.36		21.55±0.74			
Management of dehydration in children								
Unsatisfactory (0-15)	5	6.3	0	0.0	0	0.0	10.213	0.006*
Satisfactory (16-24)	75	93.7	80	100.0	80	100.0		
Range	13 - 23		24 - 24		23 - 24		F value = 399.5	P = 0.0001*
Mean±SD	18.86±2.23		24.00±0.00		23.85±0.35			
Total practice scores								
Unsatisfactory (0-15)	4	5.0	0	0.0	0	0.0	8.136	0.017*
Satisfactory (16 - 24)	76	95.0	80	100.0	80	100.0		
Range	53 - 77		84 - 86		81 - 86		F value = 1092.2	P = 0.0001*
Mean±SD	65.03±5.34		85.81±0.42		84.87±1.21			

*Statistically significant difference at (P<0.05)

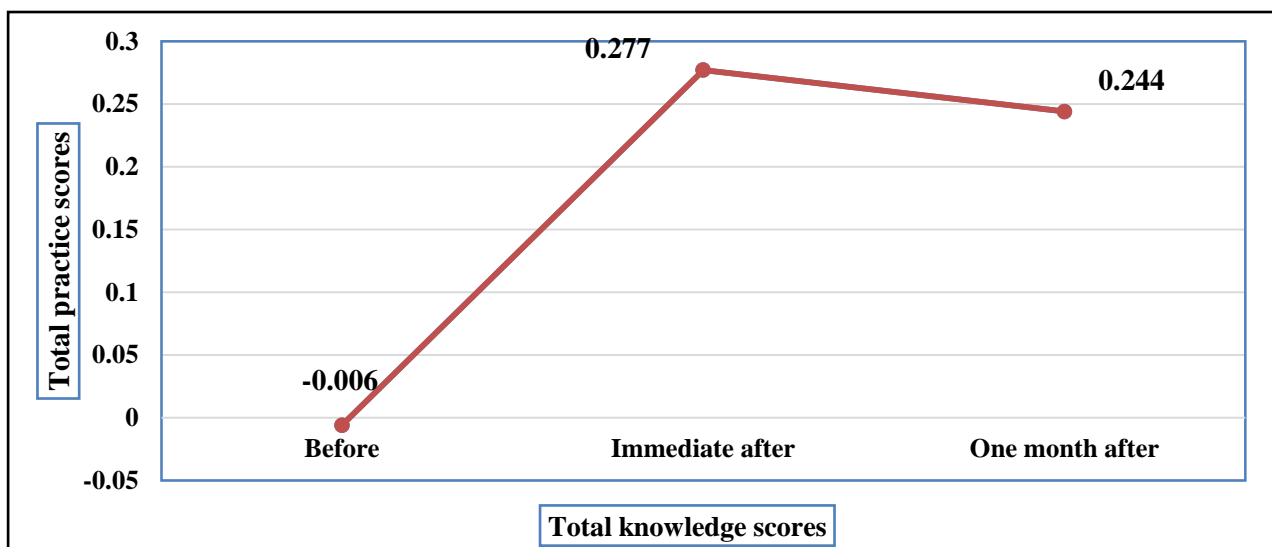


Figure (4): Correlation between Total Nurses' Knowledge and Practice Scores related to Management and Administration of Oral Rehydration Solution before, immediately and after one month of Program Implementing.

Table (5): Relation between Total knowledge of Nurses before and after Implementing of Health Education and Demographic data

Socio-demographic characteristics.	Change of total knowledge scores among the studied nurses after than before health education (n=80)					
	Change immediate after than before health education	t-test or χ^2 value	P value	Change one month after than before health education	t-test or χ^2 value	P value
Age years:						
≤ 25	15.39 ±2.57	3.664	0.0001*	15.21±2.57	2.490	0.013*
> 25 - ≤ 35	17.06 ±4.50			15.93±4.23		
> 35 - 45	19.00 ±2.23			17.76 ±3.29		
Marital status:						
Single	13.90 ±1.85	2.207	0.027*	13.70 ±2.00	2.228	0.026*
Married	17.12 ±3.95			16.12 ±3.82		
Divorced	20.66 ±2.08			20.00 ±3.00		
Widowed	19.00 ±1.41			18.50 ±.70		
Educational level:						
Nursing School (3years)	12.33±2.08	2.348	0.019*	11.33±2.08	1.986	0.047*
Technical Institute of Nursing	12.70±4.11			12.20±3.85		
Bachelor of Nursing Science	17.55±3.73			16.81±3.39		
Diploma in Nursing (1 year)	17.65±2.99			16.34±3.47		
Years of experience						
1 - <5	15.38 ±2.45	1.116	0.265	15.23 ±2.45	0.133	0.894
5 - < 10	20.94 ±2.83			19.35 ±3.21		
10 - 15	16.10 ±3.91			15.05 ±3.90		
Residence						
Rural	17.51±3.90	0.904	0.366	16.76±3.49	1.484	0.138
Urban	16.31±3.81			15.31±3.86		
Previously in-service training program						
yes	18.33±3.56	2.773	0.006*	17.44±3.31	.2.988	0.003*
No	15.72±3.76			14.86±3.69		

* Statistically Significant difference at (P<0.05).

Table (6): Relation between total Practice of Nurses before and after Implementing of Health Education and Demographic data.

Sociodemographic characteristics.	Change of total practice scores among the studied nurses after than before health education (n=80)					
	Change immediate after than before health education	t-test or χ^2 value	P value	Change one month after than before health education	t-test or χ^2 value	P value
Age years: ≤ 25 > 25 - ≤ 35 > 35 - 45	19.95 ±5.96 23.26 ±4.75 19.15 ±3.02	2.617	0.009*	18.90±6.28 23.00 ±4.90 17.38 ±3.17	3.424	0.001*
Marital status: Single Married Divorced Widowed	25.40 ±5.68 20.26 ±5.21 19.00 ±4.35 17.00 ±2.82	1.836	0.066	25.20 ±5.73 19.29 ±5.52 17.33 ±5.50 14.50 ±0.70	2.052	0.040*
Educational level: Nursing School (3years) Technical Institute of Nursing Bachelor of Nursing Science Diploma in Nursing (1 year)	17.82±3.53 19.10±6.38 22.84±5.38 21.00±1.73	1.616	0.106	16.00±3.77 18.10±6.34 22.40±5.50 20.00±3.46	2.255	0.024*
Years of experience 1 - <5 5 - < 10 10 - 15	23.07 ±4.68 22.82 ±6.43 18.21 ±4.34	3.649	0.0001*	22.84 ±4.81 22.17 ±6.44 16.64 ±4.55	4.422	0.0001*
Residence Rural Urban	23.23±5.26 18.43±4.55	3.937	0.0001*	22.89±5.27 16.92±4.80	4.662	0.0001*
Previously in-service training program. yes No	22.00±5.01 19.77±5.63	2.036	0.042*	21.44±5.17 18.52±6.07	2.529	0.011*

* Statistically Significant difference at (P<0.05).

Discussion:

Pediatric patients, especially those younger than five years, tend to be more susceptible to volume depletion as a result of vomiting, diarrhea, or increases in insensible water losses. Significant fluid losses may occur rapidly. The turnover of fluids and solute in infants and young children can be as much as 3 times that of adults⁽¹⁷⁾.

Dehydration is a common complication of illness observed in children presenting to the emergency department. Early recognition and early intervention are important to prevent progression to shock and cardiovascular collapse. Pediatric dehydration is frequently the result of gastroenteritis, characterized by vomiting and diarrhea. However, other causes of dehydration may include poor oral intake due to diseases such as stomatitis, insensible losses due to fever, or osmotic diuresis from uncontrolled diabetes mellitus⁽¹⁸⁾.

The current study revealed that more half of studied nurses hadn't previous training on care of dehydrated child. This may be due to absence of in-service training program in the hospital and increased work load. This result was disagreement with **Padmavathi et al. (2016)** who found that most of the subjects have received

previous information from mass media. Also this result was in an agreement with **El-Sayed et al. (2018)** who revealed that more than three quarters of the studied nurses did not attend training programs about pediatric shock^(19, 20).

It was evident from the present study's results that nearly half of studied children aged from 3 – 5 years while the least of them were aged less than-one year and most of them were female. The possible explanation for this could be that, children are more likely than adults to die from diarrhea because they become dehydrated more quickly. About 2.2 million People in developing countries, most of them children, die every year from diseases associated with lack of access to safe drinking water, inadequate sanitation, and poor hygiene and overcrowding, in that the majority of them are children under five years of age^(5, 21). This result was in an agreement with **Osonwa (2016)** who assess the utilizing of oral rehydration therapy in the management of diarrhea in children among nursing mothers in Odukpani. The study revealed that most children were aged 25-60 months, where the least were aged 0-12 months, and more than half of the children were females⁽²²⁾.

The present study clarified that, most of the studied nurses had poor knowledge scores about dehydration, oral rehydration solution and management plan of dehydration, before the program intervention while, this percentage improved to good knowledge scores immediately and one month after the program implementation and there was a statistically significant difference this may be due to more half of studied nurses had no training courses and lack of orientation program prior to work as well lack of nursing care conference during work, invariability of procedure, and books especially in this area, lack of supervision during the work.

This justification goes in line with **Babiker et al. (2016)** who revealed that most the nurses answered were not good and only one third of them who had correct knowledge regarding definition, types, causes, vulnerable age, signs and symptoms, degree of dehydration, evaluation of dehydration and complication of diarrhea.⁽²³⁾ Also, this result goes in line with **Sadasiba et al. (2017)** who concluded a study on Mother's knowledge, attitude and practice regarding prevention and management of diarrhea in children in Southern Odisha. He found that , Regarding assessment of

dehydration, preparation of ORS, and treatment of dehydration, more one third of mothers were having poor knowledge, nearly one third of them were having good knowledge, and more one third of them were having average knowledge ⁽²⁴⁾. While this result was in disagreement with **Ibrahim (2016)** who reported that, majority of nurses had accurate knowledge about the definition and causes of dehydration ether majority of them identified the types of dehydration and symptoms of moderate and severe dehydration. This result can assess the nurses to be well aware with his physical mental and knowledge needs to be well profession in his work and practice⁽¹⁵⁾. The current study revealed that, more than half of the studied children had moderate dehydration, majority of them had prolonged capillary refill time ranged between (2-4second), had dried mucous membranes, delayed skin recoil time for (2 second), and children had decreased urine output. This result was in an agreement with **Kelly et al. (2017)** showed the one third of them had some dehydration, twelve percent of them had severe dehydration, and nearly half of them had no dehydration. Among all children enrolled, most of them had no acute malnutrition, one quarter of them had

moderate and acute malnutrition, and five percent of them had severe and acute malnutrition⁽²⁵⁾. Also, this interpretation was supported by **Osonwa (2016) and Othoet al. (2016)** who showed that, about one third of the respondents had sunken eyes dry tongue, dry lips/tongue, body weakness and irritability, where most children mentioned excessive thirst and sunken eyes as danger signs and symptoms of dehydration^(22, 26).

The present study found that three quarters of the studied children had sub normal body weight, mid arm circumference and skin fold thickness while less than one quarter of them had normal body weight mid arm circumference and skin fold .This result goes in line with **Holliday (2017)** and **Boluyt (2016)** who showed that, treatment should be repeated as necessary, with monitoring of the child's pulse strength, capillary refill time, mental status, urine output, weights, heights and, skin fold thickness of infants and children^(27,28).

The current study found that more than half of the studied children had body temperature above normal, had above normal Pulse rate, blood pressure, and majority of them had above normal respiratory rat. Similar to this study results **Akech et al.(2016)** who found that, nearly

one third of the studied children were severely tachycardia (heart rate>160 beats/minute) at baseline, 8 and 24 hours after starting fluid respectively. No incidences of bradycardia (HR<60 beats/minute) were reported⁽²⁹⁾.

The current study result revealed that, there was a statistically significant difference regarding nurses' practice of administration and preparation of oral rehydration solution before, immediately and one month after the program intervention. This may attributed to good supervision of the head nurse, increasing the nurse awareness about the important of oral rehydration. This findings was supported by **Samuele et al. (2018)** who found that, most nurses correctly assessed the hydration status of the children and ensured a prompt introduction of oral rehydration solution and a speedy handling of the dehydrated patient who needs an earlier physician assessment. The prompt administration of oral rehydration solution in case of not clinically detectable dehydration can be configured as a preventive treatment⁽³⁰⁾.

Regarding nurses' practice of insertion and rehydration of nasogastric tube, it was indicated that more than half of them did not do these practices before the program intervention while this percentage

improved to completely all of them done immediately and one month after the program intervention there was a statistically significant difference. This may attributed to the lack of proper equipment needed to provide and improve nursing care, and shortage of nursing staff. In addition, absence of continuous in-service programs, and lack of supervision during work. This result goes in line with **Babiker et al. (2016)** who showed that, regarding nurses practice about management of dehydrated children most of them have good skills about, administering medication , of nasogastric tube insertion , of nasogastric treated by oral rehydration solution, skills dealing of nasogastric tube and how to applied oral rehydration solution⁽²³⁾.

Regarding nurses' practice of dehydration management in children related to child feeding during gastroenteritis and administration of medication. It was observed that more than half of them did not do these practices, while this percentage improved to all of them had done correctly immediately and one month after the program intervention respectively, there was a statistically significant difference. This is may be related to that they know better about this part and so demonstrated good level practices. This

findings was supported by **Geurts et al. (2017)** who conducted a study about implementation of clinical decision support in young children with acute gastroenteritis aimed to evaluate the impact of a nurse-guided clinical decision support system for rehydration treatment in children with acute gastroenteritis, proved a significant improvement in length of stay at the emergency department, the number of diagnostic tests, treatment, follow-up, and costs of children in the study group compared with usual care group⁽³¹⁾.

The current study result's revealed that , there was a statistically significant difference between nurses practice sub items scores before and after implementation of health education This may be due to increase the nurse awareness about the important child care , and detecting the defects in their practice and identifying their responsibilities. This interpretation was supported by **El-Sayed et al.(2018)** illustrated that there was a marked improvement in the nurses' total practices regarding management of children in hypovolemic shock pre- and post-implementation of the training guidelines. A statistically significant difference was detected because most of the participants' nurses demonstrated all procedures (practical skills) competently

immediately post-implementation of the training on guideline compared to only one third of them pre- implementation of the training guideline⁽²⁰⁾.

It was revealed that, before the program implementation, more than half of the studied nurses had poor knowledge and satisfactory performance. The enhancement in nurses' performance may be related to the educational sessions and the frequent demonstration of the related procedure during the period of the study. This result was in an agreement with **Babiker (2016)** who concluded that the nurses are not knowledgeable than skilled in caring of diarrhea and dehydration patient's⁽²³⁾.

It was revealed that there was a statistically significant difference between the degree of the studied nurses' total score of knowledge and their practice. Similar to this study results **El-Sayed et al. (2018)** who showed that there was a significant positive association between nurses' knowledge and practice regarding hypovolemic shock management in children pre- and post-implementation of the training on guidelines, with highly statistical significant differences⁽²⁰⁾.

The current study results revealed that, there was a positive relation was found between the educational levels, years of experience, previously in-service training

program, and nurses' knowledge and practice before and after implementing of health education. This may be related to that the total number of bachelor degree of nursing was more half of them and regarding years of experience, nearly half of them was between 10 – 15 years. This result was in an agreement with **El-Sayed et al. (2018)** who found that a positive relation between the studied nurses' level of education and their total knowledge score, as well as a significant link between nurses' years of experience, and previous attendance of training programs about pediatric shock and their total knowledge and total practice scores about hypovolemic shock in children, pre- and post-implementation of nurses' training program on guidelines⁽²⁰⁾.

Conclusion

Based on the findings of the present study, it can be concluded that the nurses showed a significant improvement in their knowledge and practices about management of dehydration for children under five years after implementation educational intervention. There was a statistically significant difference between total knowledge and practice scores of studied nurses before and after the educational intervention. A significant correlation was found between the

educational levels, years of experience, previously in-service training program, and nurses' knowledge and practice before and after implementing of health education

Recommendations

Based on the findings of the present study, the following recommendations are suggested:

- 1- Training and education programs should be provided to all pediatric nurses about management of dehydration for children under five years to refresh and update their knowledge and clinical practice.
- 2- Further researches should be conducted to explore the levels of knowledge and practice of pediatric nurses toward of dehydration for children under five years on national level.
- 3- Resources such as articles, journals, computers and internet should be accessible in in the pediatric as a reference to units' staff members.
- 4- Periodic checkup of health status for children under five years for prevention of dehydration.

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