كلية معتمدة

Effect of Designed Guideline for Mothers having Infants Suffering from Congenital Nasolacrimal Duct Obstruction

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Abstract: Congenital obstruction of the nasolacrimal duct is a condition frequently occurs among young infants. So, proper early management is urgently required. **This study aimed to** evaluate the effect of designed guideline for mothers having infants suffering from congenital nasolacrimal duct obstruction. **Settings:** This study was conducted at out-patient clinic of ophthalmology at Benha University Hospital & Ophthalmology Hospital at Benha City. **Design:** A quasi experimental design was used. **Sampling:** All infants who attended to outpatient clinic and confirmed diagnosis with congenital nasolacrimal duct obstruction during the period of data collection and their mothers. **Tools of data collection: Tool I:** A structured interviewing sheet was used; it included three parts; **Part 1:** Personal characteristics of mothers; **Part 2:** Personal characteristics and medical data of the studied infants; **Part 3:** Mothers' knowledge about congenital nasolacrimal duct obstruction. **Tool II:** It consisted of two parts; **Part 1:** Reported practices of mothers related to congenital nasolacrimal duct obstruction, **Part 2:** Observational checklist for massage technique, **Tool III:** Follow up sheet for infant's to assess the improvement of infants' status after implementing the designed guideline for mothers . **The results of this study revealed that:** The designed guideline for mothers having infants suffering from congenital nasolacrimal duct obstruction lead to high rates of improvement of total knowledge score from 8.8%(pre) to 87.8%(post) regarding good knowledge and satisfactory practice from7.5% (pre) to 73.8% (post) that reflect on high improvement rates of nasolacrimal duct obstruction reached to (85%) infants who cured and didn't need surgical intervention. **It was concluded that:** the designed guideline for mothers about congenital nasolacrimal duct obstruction were effective method for improvement of mothers' knowledge and practice about the proper care for their infants. This improvement in knowledge and practices subsequently lead to high rates of resolution of congenital nasolacrimal duct obstruction. **So it recommended that:** educating mothers about proper care for infants with congenital nasolacrimal duct obstruction. Emphasizing the importance of the nasolacrimal massage to the infants can reduce the risk of unnecessary surgical intervention and its subsequent complications.

Key words: Designed guidelines, Mothers, Infants, Congenital nasolacrimal duct obstruction.

• Introduction

Congenital nasolacrimal duct obstruction (CNLDO) is a common condition affecting infants in their 1st year of life and occurs due to the failure of canalization of nasolacrimal duct. Canalization of the NLD usually takes place at the end of six months of intrauterine life. However, it may be delayed for several weeks or months after birth. Epiphora is a common manifestation in clinical ophthalmology which is usually the result of a congenital abnormality of the lacrimal drainage system. It occurs in majority of the cases; it is due to a membranous obstruction at the lower end of the nasolacrimal duct (NLD) **(Panwar et al., 2016).**

Tears normally drain through small openings in the corners of the upper and lower eyelids called puncta and enter the nose through the nasolacrimal duct (**American Association for Pediatric Ophthalmology and Strabismus, 2016).** The nasolacrimal duct or the tear duct carries tears from the lacrimal sac of the eye into the nasal cavity. The duct begins in the eye

socket between the maxillary and lacrimal bones. Excess tears flow through nasolacrimal duct which drains into the inferior nasal meatus. This is the reason the nose starts to run when a person is crying or has watery eyes from an allergy, and why one can sometimes taste eye drops. Obstruction of nasolacrimal duct may occur. This leads to the excess overflow of tears called epiphora **(Wikipedia, 2018).**

It's believed that respiratory effort, crying and sucking create negative pressure within nose which helps to break the membrane present at nasolacrimal duct opening. These spontaneous perforations usually occur by 3-4 weeks of age, but if it fails manifestations of congenital nasolacrimal duct obstruction are seen. Nasolacrimal duct obstruction is a blockage of the lacrimal drainage system. In children the majority of nasolacrimal duct obstruction is congenital, the blockage occurs most commonly at the valve of Hasner at the distal end of the duct, there is no sex predilection and no genetic predisposition. The blockage can be unilateral or bilateral. The rate of spontaneous resolution is estimated to be 90% within the first year of life (**Katherine, 2017*).***

Different types of treatment can be followed to overcome this problem range from conservative approaches such as lacrimal sac massage with or without antibiotic eye drops, to more intrusive methods such as probing, balloon catheterization, silicon tube intubation, and dacryo-cysto-rhinostomy (DCR). Affected infants are typically treated with non-surgical management (sac massage) which has been reported to have a high success rate (77-95%). It is advisable in children less than one year old to "wait and see" while applying conservative treatment (**Luerder, 2014).**

All other types of treatment are surgical methods that require general anesthesia and performed after a child is more than one year of age and is generally quit effective with success rates ranging from 77-97%; but the presence of general anesthesia makes it accompanied with risks, false passage formation and canalicular fibrosis. The technique of the massage generally advised to the mother. Failure for successful resolution of symptoms could be due to mothers' faulty application and results in high rate of probing and surgical intervention subsequently. The correct technique of hydrostatic nasolacrimal sac massage advisable to the mother lead to rupture of membranous obstruction and results in high rates of resolution **(Panwar et al., 2016).**

Resolution after conservative management has a very high rate during the first year of life. The nurse has a vital role in conservative management of CNLDO; includes health education for mothers about benefits, frequency and proper technique of nasolacrimal sac massage. Also education about benefits, frequency and proper technique of eye care will lead to high rates of resolution. It will save the infant from complications following nasolacrimal duct surgery include dangerous of anesthesia, nasal bleeding, and restenosis of the duct and creation of a false passage of the duct (**College of optometrists, 2018)**.

- **Significance of the study:**

Congenital Nasolacrimal duct obstruction (CNLDO) is a common condition causing excessive tearing or mucoid discharge from the eyes, due to blockage of the nasolacrimal duct system in infants, it is prevalent in up to 70% of infants worldwide but only 6% of these infants become symptomatic. There is no sex or race predilection or genetic predisposition. Bilateral symptoms are present in 14-33.8% of infants with CNLDO (**Pediatric Eye Disease Investigator Group, 2018)**. The reported rate of NLDO resolution without surgery ranges from 32% to 95% by age 13 months (**Kumar, et al., 2017).**

Congenital nasolacrimal duct obstruction causes a lot of symptoms to the infant that cause a lot of worries to the mothers and result in persistent tearing that lead to infections, such as dacryocystitis, orbital cellulitis, and bacterial conjunctivitis. Recent studies suggest that infants with

CNLDO are at higher risk of having amblyopia than the general population (**Leurder, 2014).** Surgical procedure may accompanied with risk hazards especially during the first year of life, so a designed guideline to mothers considered as a director to the mothers and can be followed at home for helping resolution of CNLDO. Therefore, this study was done to assess the effect of the designed guideline on mothers having infants with CNLD.

- **Aim of the study**

The aim of the proposed study is to evaluate the effect of designed guideline for mothers having infants suffering from congenital nasolacrimal duct obstruction through**:**

1. Assess mothers' knowledge and practice about care of their infants with congenital nasolacrimal duct obstruction.
2. Design and implement guideline for mothers about care of their infants suffering from congenital nasolacrimal duct obstruction.
3. Evaluate the effect of the designed guideline on mothers' knowledge and practice after guideline implementation.
4. Evaluate the effect of improved mothers' knowledge and practice on their infants with congenital nasolacrimal duct obstruction.

1.3. Research Hypothesis

1-Mothers' knowledge and practice will be improved significantly after guideline implementation.

2- There will be a statistically significant correlation between mothers' knowledge and practice scores pre and post guideline implementation.

3- Infants with congenital nasolacrimal duct obstruction will experience resolution of their nasolacrimal obstruction and lower signs and symptoms.

2. Subjects and Method

2.1. Research design

A quasi-experimental design was utilized in carrying out the study.

2.2. Settings

The study was conducted at out-patient clinic of ophthalmology at Benha University Hospital & Ophthalmology Hospital at Benha City.

2.3. Research Subjects:

A purposive sample of infants suffering from congenital nasolacrimal duct obstruction and their mothers were included in the study during six months from beginning of the study.

Inclusion criteria:

- All infants during the first year of age.
- Confirmed diagnosis of congenital nasolacrimal duct obstruction by a physician.
- Did not receive any surgical interference concerning nasolacrimal obstruction.

Exclusion criteria:

- Infants who were medically diagnosed with acute conjunctivitis, glaucoma, congenital anomalies of the upper lacrimal drainage system (Punctal or canalicular atresia or agenesis) to avoid any pathological changes.

2.4. Tools of data collection:

Tool (1): A structured interview sheet

It was developed by the researcher in Arabic language after reviewing the related literature and consists of three parts**:**

Part (1): Personal characteristics of mothers such as; age, level of education, occupation and place of residence.
Part (2): Personal characteristics and medical data of the studied infants such as; age, gender, period of pregnancy, weight of infant, type of labor, family history, laterality of the obstruction, age of the infant at the appearance of symptoms and what symptoms appear on the infant.
Part (3): Mothers' knowledge about congenital nasolacrimal duct obstruction such as definition, causes, signs and symptoms, treatment, complication, complication with surgical interference, importance of care of the eye in the prognosis of the obstruction and frequency of nasolacrimal massage….etc. It includes 12 multiple choice questions. Mothers' knowledge were evaluated upon completion of the interview as the studied mothers' knowledge was checked with a model key answer and accordingly, the complete correct answer was given (2) scores, the incomplete correct answer was given (1) score and (0) for incorrect or don't know answers. The total score was 24 marks which represents 100%.
The total score of each mother was categorized arbitrary into:

-Poor knowledge: (0-> 50%) of the total knowledge score.

-Average knowledge: (50 %-> 75%) of the total knowledge score.

- Good knowledge: (75-≤100%) of the total knowledge score.

Tool (II): It consisted of two parts:

Part (1): Mothers' reported practice: regarding care of their infants such as time for performing the nasolacrimal sac massage and the mechanism of this massage, steps for eye care, how to make eye compression and using of eye drops….etc. It includes 11 questions; the total score was 22 marks which represents 100%.

Part (2): Observational check list: it was adapted from ***Durrani, (2017)*** which includes technique of the massage steps. It was used to measure how the mothers performing technique of the massage.

Scoring system for mothers' practice:

A score (2) was given if the action was completely done, a score (1) was given if the action was incompletely done and a score (0) if the mother not done the action.

The total level of Mothers' practice was categorized as:

-Unsatisfactory practice: (0-> 50%) of the total practical knowledge score.

-To some extent: (50 -> 75%) of the total practical knowledge score.

-Satisfactory practice :(75-≤100%) of the total practical knowledge score.

Tool (III): Follow up sheet: it was adapted from (***Okby & Younis, 2016*****), (*****Youssef, 2015*****)** and developed by the researcher after reviewing the related literature to determine the effects of the designed guideline given for mothers on their infants to assess the improvement of infants' status, relieving symptoms such as (eyelid redness, eye secretion, inflammation of eyelid, eyelid swollen and epiphora) and finally if the infants 'condition improved or need surgical interference.

2.5. Tools validity and reliability:

Tools validity was tested through a jury of three experts in pediatric nursing field to test the tool clarity, relevance, comprehensiveness, simplicity and applicability. Modifications of the tools were done according to the expert's judgment on the clarity of sentences, appropriateness of content and sequence of items. The experts agreed on the content, according to their review and minor modifications were done in the contents. Testing reliability of all items of the tools was done by using Cronbach's alpha test. It was 0.81 for knowledge and 0.76 for practice and reliability for massage technique equal 0.94.

2.6. Ethical consideration:

A permission to carry out the study was obtained from the hospital manager in the previously mentioned study setting through submission of an official letter issued from the Dean of Faculty of Nursing, Benha University. The researcher Followed research ethics as the mothers had the freedom to be involved in the study or to go out at any time. Oral consent to participate in the current study was taken after the purpose of the study was explained to each mother. Confidentiality and anonymity of each subject was assured through coding of all data and all information has taken was protected and used only for the research purpose.

2.7. Pilot study:

It was conducted on sample of 10% of the studied subjects (8) mothers and their infants with CNLDO over a period of one month (May 2017). The purpose was to ascertain the feasibility of the study, the clarity, and applicability of the tools. It also helped to estimate the time needed for filling out the forms. Based on the results of the pilot, the necessary modifications on the study tools were done and pilot study subjects excluded from the sample.

2.8. Field work:

The actual data collection was started from the beginning of June 2017 to the end of November 2017. The researcher was available at each study setting two days /week from 9 a.m. to 2 p.m. to collect data using the previous tools. The current study was carried out through the following phases:-

2.8.1. Assessment phase

The researcher interviewed with the mothers individually, explained the aim of the study and their approval has taken to participate in the study prior data collection. The interview took about 25-35 minutes to fill the interview sheet, while their practice was assessed by using observational checklist during their actual practice to measure how the mothers performing

technique of the massage also, mothers' reported practice regarding care of their infants (This took nearly 30-35 minutes for each mother). The researcher provided simple rewards for their infants to motivate them during gathering stage. Each infant with CNLDO was observed by the researcher and data was collected from the medical record (This took nearly 15 minutes for each infant), ensuring complete privacy and total confidentiality.

2.8.2. Planning phase

The guideline was designed by the researcher after an extensive review of related literatures and the needs identified in the assessment phase. An Arabic booklet concerning congenital nasolacrimal duct obstruction guideline was prepared and given to mothers.

2.8.3. Implementation phase

The researcher administered the designed guideline to the mothers that based on mothers' knowledge and practices need after the pre-test. They were asked to feel free to ask any question. The guideline was given to the mothers to follow it as needed. Mothers were divided into groups, each group contains 4-5 mothers to acquire the related information, and the researcher continued to reinforce the gained information, answered any raised questions and gave feedback. A schedule for educational sessions was developed, and each participant selected the suitable time.

Sessions was achieved and divided as follows: two session for knowledge and three for practice. The duration of each theoretical session was 30-45 minutes and the duration of each practical session was 45-60 minutes; each session started with a summary of the previous session and objectives of the new topics. Taking into consideration the use of simple language that suits the mothers' educational level. The researcher used group discussion, role playing, demonstration and re-demonstration as well as reinforcement during intervention sessions were used to enhance learning. Direct reinforcement in the form of a copy of intervention booklet was given as a gift for each mother. At the end of each session, 10-15 minutes were allowed for discussion to correct any misunderstanding. Also they were informed about the time of next session.

2.8.4. Follow up phase:

Infants were followed up by phone with their mothers and in the out-patient clinic after three months and after six months from the beginning of intervention. In the follow up phase, Assessment of correct demonstration of prober nasolacrimal massage technique was done. Assessment of improvement in infants' clinical signs and symptoms also was done.

2.8.5. Evaluation phase:

After the completion of the guideline contents; the mothers' knowledge and their practice were evaluated immediately after implementing guideline, the post tests were administered by using same pretest tools. Additionally, the researcher evaluated the final condition of the infants to assess the effect of guideline implementation on their status prognosis and determination whose infants have cured and whose need surgical intervention based on the clinical signs and symptoms.

2.9. Statistical design:

The collected data were categorized, analyzed and tabulated using the computer statistical package for social science (SPSS) software version 20.0. Numerical data were expressed as the mean and standard deviation. Qualitative data were expressed as frequency and percentage. A comparison between qualitative variables carried out by using a parametric Chi-square test. Correlation among variables was done using Pearson correlation coefficient. P- Value was used to estimate the statistically significant differences between mothers' knowledge and practices pre and post guideline, in addition to the association between their knowledge and practices. A highly statistically significant difference was considered at p-value ≤ 0.001.

- **Results:**

Table (1): showed that more than half 56.3% of the studied mothers of the affected infant were between 25 and 35 years old and more than two thirds 70% were from urban areas. Concerning the level of mother's education more than one quarter of the studied mothers 26.2% had highly education. It was also found that, more than two thirds 70% of the studied mothers were unemployed.

Table (2): illustrated that three quarters 75% of the studied infants were aged from birth<6 months. Regarding to pregnancy duration less than two thirds 61.2% of the studied infants have completed pregnancy period. Also, less than three quarters 72.5% of the studied infants born with normal birth weight. All infants 100% have all symptoms of CNLDO and less than two thirds 63.8% of the studied infants have less than 6 months when symptoms appear. The majority of the studied infants 93.8% have no family history of CNLDO. Also the majority 93.8% of the studied infants have no fever with the symptoms of CNLDO.

Table (3): revealed that there was a highly statistically significance improvement (P <0.001) in steps of eye massage practices post implementing the guideline compared to pre-implementing it. The most satisfactory done practice in post -test is step (no.5) related to lacrimal duct massage should be done 5 times/day, that improved from (7.5%) pre to (75.0%) post following the guideline.

Table (4): reported that there was a high significant improvement of infant's signs and symptoms of CNLDO (after 3 months and after 6 months) following the designed guideline.

Table (5): showed that there was a significant relation (P>0.005) between total practices score post intervention and improvement of infants condition among studied infants. As regards, mothers whose practice was unsatisfactory were (8) mothers and their (8) infants cured. Mothers whose practice is to what extent were (13) mother and (11) infants from them cures the rest of them (2) need surgery. Finally, mothers who have satisfactory practice are (59) mother (49) infant from them cured.

Table (6): revealed that there was a highly statistically significant positive correlation coefficient between total knowledge of the studied mothers and their total practice at pre and post intervention (P>0.001).

Figure (1): displayed that more than half of the studied infants were girls while less than half of infants were boys.

Figure (2): showed that three quarters (75%) of the studied infants had unilateral obstruction while one quarter of them had obstruction on both sides.

Figure (3): portrayed that total mothers' knowledge about CNLDO pre the intervention was (8.8%) that had good knowledge compared to 87.8% post intervention.

Figure (4): revealed that total mother's practice about care of their infants with CNLDO pre the intervention was 7.5% compared to 73.8% post intervention is satisfactory practice.

Figure (5): showed that the designed guideline revealed higher significant percentage of improvement of infants' eye condition reached to 85% of the total number of infants and only 15% need surgical intervention.

Table (1): Distribution of the studied mothers regarding their personal characteristics. (n=80)

Personal characteristics	No.	%
Age		
18>25	27	33.7
25-35	45	56.3
<35	8	10.0
Mean ± SD	**27.15 ± 5.56**	
Residence		
Urban	56	70.0
Rural	24	30.0
Education		
Basic education	29	36.2
Secondary education	30	37.5
Highly education	21	26.2
Occupation		
Employed	24	30.0
Unemployed	56	70.0

Table (2): Distribution of the studied infants regarding their characteristics and medical data. (n=80)

Personal characteristics	No.	%
Infant age		
From birth to> 6 months	60	75.0
6≤12 months	20	25.0
Mean ± SD	**2.33 ± 0.88**	
Pregnancy duration		
Complete	49	61.2
Incomplete	31	38.8
Infant's birth weight		
Low Birth Weight (LBW)	6	7.5
High Birth Weight (HBW)	16	20
Normal birth weight	58	72.5
Symptoms appear on the infant		
Eye redness, eyelid inflammation, eye secretion, eye lid swelling and epiphora.	80	100
Infant age when symptoms appear		
From birth to<6months	51	63.8
6 ≥12months	29	36.2
Family history of CNLDO		
Yes	5	6.2
No	75	93.8
Was temperature increase with symptoms?		
Yes	5	6.2
No	75	93.8

Figure (1): Distribution of the studied infants regarding their gender. (n=80)

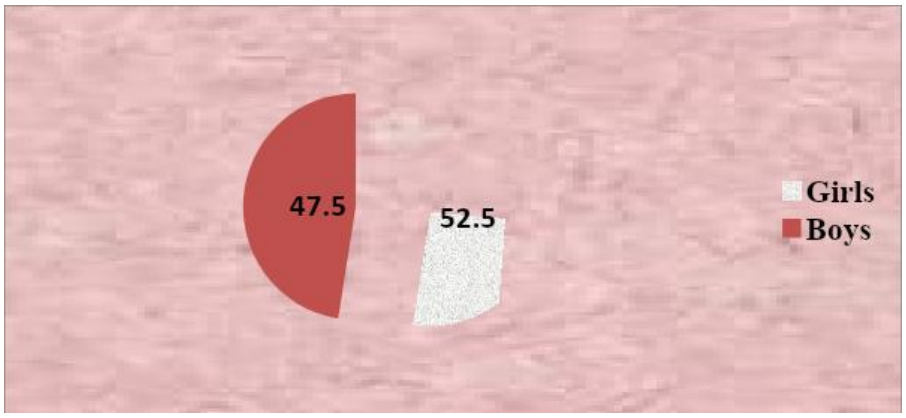

Figure (2): Distribution of the studied infants regarding obstruction side. (n=80)

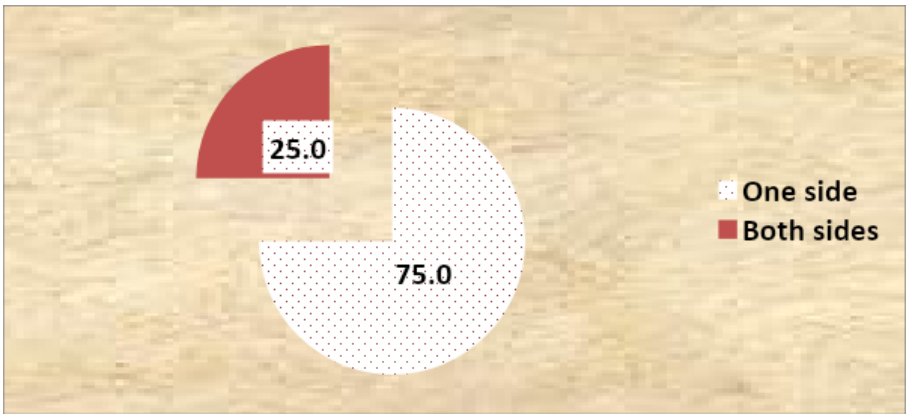

Figure (3): Distribution of the studied mothers regarding total knowledge pre and post the intervention. (n=80)

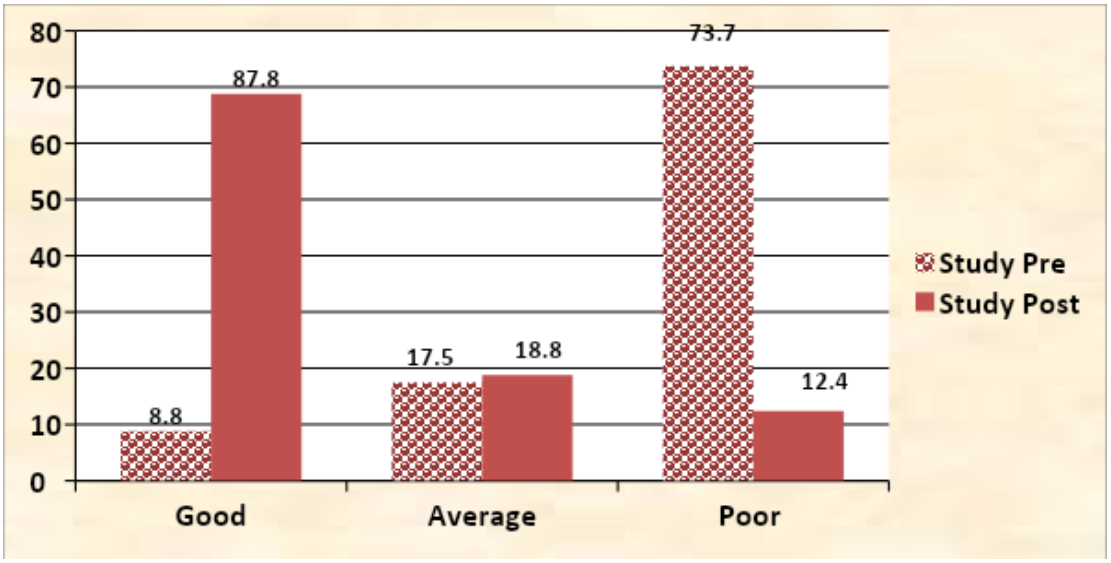

Figure (4): Distribution of mother's reported practice regarding care of their infants with CNLDO pre and post the intervention. (n=80)

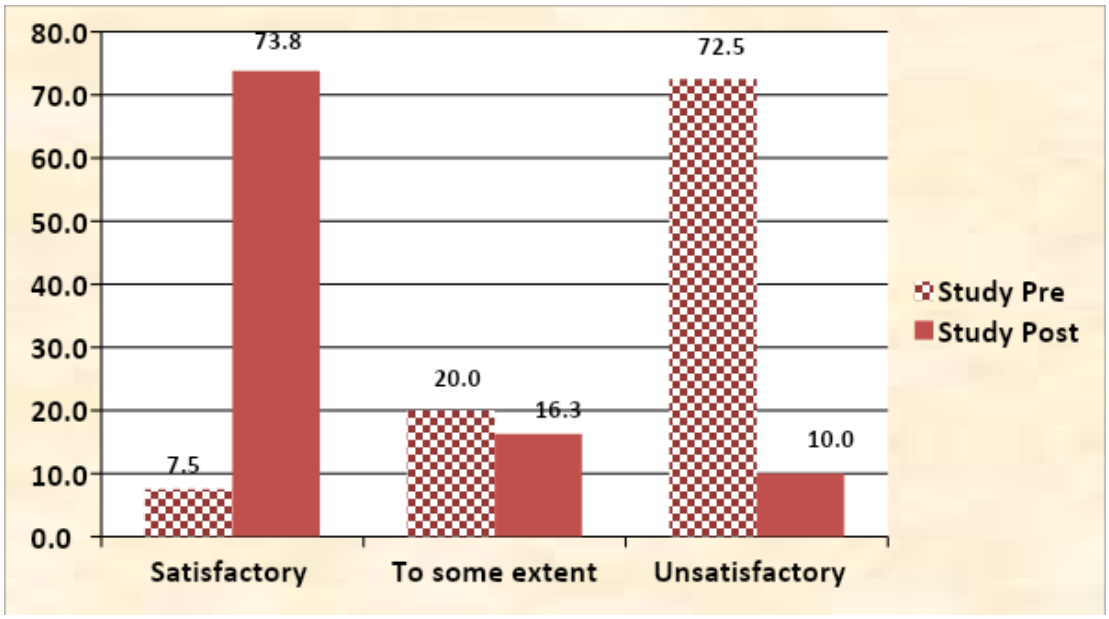

Table (3): Distribution of studied mothers regarding the eye massage practices toward their infants (n=80).

Items	Pre intervention						Post intervention						X^2	p-value
	Completely done		Incompletely done		Not done		Completely done		Incompletely done		Not done			
	No	%	No	%	No	%	No	%	No	%	No	%		
• Cutting Nails if needed.	18	22.5	28	35.0	34	42.5	64	80.0	10	12.5	6	7.5	53.9	0.000
• Hand Washing before starting.	20	25.0	20	25.0	40	50.0	64	80.0	8	10.0	8	10.0	49.5	0.000
• Put Ointment as a lubricant on the hand.	6	7.5	10	12.5	64	80.0	58	72.5	16	20.0	6	7.5	91.6	0.000
• Place the index finger over the inner canthus of the affected eye and exert gentle pressure inward.	8	10.0	8	10.0	64	80.0	60	75.0	14	17.5	6	7.5	89.4	0.000
• Lacrimal duct Massage should be 5times/day.	6	7.5	10	12.5	64	80.0	60	75.0	14	17.5	6	7.5	92.9	0.000

**** A highly statistically significant at P>0.001**

Table (4): Signs and symptoms for the studied infants after 3 and 6 months (follow up phase). (n=80)

Items	After 3 months		After 6 months		X^2	p-value
	No=80	%	No=80	%		
Eye redness						
Worse	2	2.5	0	0.00	84.6	0.001**
Still present	8	10.0	0	0.00		
Slightly improved	44	55.0	16	20.0		
Improved	26	32.5	64	80.0		
Eye secretion						
Worse	4	5.0	0	0.00	64.6	0.001**
Still present	8	10.0	0	0.00		
Slightly improved	14	17.5	16	20.0		
Improved	54	67.5	64	80.0		
Eyelid inflammation						
Worse	8	10.0	0	0.00	68.3	0.001**
Still present	14	17.5	0	0.00		
Slightly improved	18	22.5	16	20.0		
Improved	40	50	64	80.0		
Epiphora						
Worse	6	7.5	0	0.0	50.2	0.001**
Still present	12	15.0	12	15.0		
Slightly improved	22	27.5	0	0.00		
Improved	40	50	68	85.0		
Eyelid swelling						
Worse	6	7.5	0	0.00	50.9	0.001**
Still present	18	22.5	0	0.00		
Slightly improved	22	27.5	16	20.0		
Improved	34	42.5	64	80.0		

**** A highly statistically significant at P>0.001**

Figure (5): Distribution of the studied infants regarding improvement of their eye condition post intervention. (n=80)

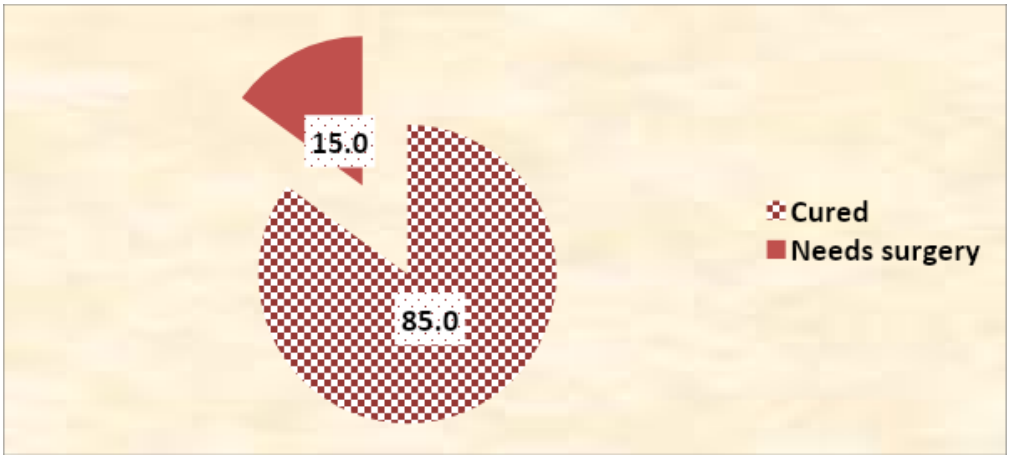

Table (5): Relation between total practices score of the studied mothers post intervention and improvement of their infant's condition.

Items	Total practices						X^2	p-value
	Unsatisfactory		To what extant		Satisfactory			
	No	%	No	%	No	%		
Needs surgery	0	0.0	2	15.4	10	16.9	6.41	>0.05*
Cured	8	100.0	11	84.6	49	83.1		

***A statistically significant at P>0.05**

Table (6): Correlation between total mother's knowledge about CNLDO and their practice.

Variables	Knowledge			
	Pre		Post	
	r	p-value	r	p-value
Practice	**0.404**	**0.010***	**0.88**	**0.000****

**** A highly statistically significant at P>0.001**

- ## Discussion

Nasolacrimal duct obstruction is considered the most common abnormality on the infant's lacrimal apparatus up to 20% of all infants suffering from epiphora. The infant with nasolacrimal duct obstruction usually presents within the first few weeks of life with the complaints of persistent tearing (epiphora) and crusts on the eye lashes, if this obstruction isn't cleared, fibrosis of the duct, mucocele, pericystitis, fistula or even orbital cellulitis can occur **(Youssef, 2015).** Therefore, the present study aimed to evaluate the effectiveness of the designed guideline for mothers having infants with CNLDO. This aim was achieved through designed guideline for mothers to increase their awareness about the nature of the disease and improving their practices about CNLDO.

Regarding personal characteristics of the studied mothers, the present study showed that age of more than half of mothers ranged between (25-35) years, this study was congruent with **Faisal, et al., (2014)** who conducted a study about "risk factors for developing congenital nasolacrimal duct obstruction", which documented that more than three quarters of the mothers aged between 25-40 years.

Concerning of level of mother education, the current study found that about more than one quarter of the studied mothers had a highly education. This finding disagrees with the result of **Faisal, et al. (2014)** who found that more than half of mothers had university degree and above. This disagreement could be due to social differences.

In the current study the mean ages of infants with CNLDO was 2.33±0.88 months which correlates to the nature of the congenital disease. This finding is congruent with **Yuossef, (2015)** who conducted a study about "effect of early medical management of congenital nasolacrimal duct

obstruction" and found that mean age was 2.1 months and about two third of them were diagnosed in the first two months of life. While this finding is in disagreement with **Okby & Younis (2016)** who conducted a study about" therapeutic hydrostatic nasolacrimal massage versus routine hospital massage: effect on infants with congenital nasolacrimal duct obstruction", who found that more than half of both group their age was less than 6 months with mean age 3.2 months

Regarding to infants gender, the finding of the current study showed that more than half of the studied infant were girls. This result agreed with **Okby& Younis (2016)** who found that the majority of the sample were girls. On the contrary **Prachi, et al., (2014**) who conducted a study about "the use of oil as a lubricant makes lacrimal sac massage efficient in congenital nasolacrimal duct obstruction" and found that boys were more than half while girls were less than half.

Concerning of pregnancy duration the current study revealed that less than two thirds of the studied infants had full term pregnancy period. This finding disagree with **Silvia, et al., (2013)** who conducted a retrospective study about "congenital nasolacrimal duct obstruction in premature", and reported that a higher incidence of CNLDO in preterm infants when compared to full term infants. This might be expected in light of the normal development of the nasolacrimal duct system, the patency of which normally occurs after the preterm infant is born. This disagreement may be due to different sample size.

Concerning knowledge and practices of the mothers about CNLDO pre intervention, the current study reported that less than three quarters of the mothers had poor knowledge and unsatisfactory practices. This result was supported by **Panwar, et al., (2016)** who conducted a prospective study about "role of the office sac massage for congenital nasolacrimal duct obstruction in various age groups", and found that, the correct technique of the massage isn't properly understood by most mothers resulting in a high failure rate and need for probing.

The finding of the current study showed that the designed guideline lead to high significant improvement ($P<0.001$) in knowledge of more than three quarters of the mothers. Also, lead to a high significant improvement ($P<0.0001$) in mothers practices regard nasolacrimal duct obstruction reached to less than three quarters after intervention. This finding was consistent with **Ying & Elias, (2009)** who conducted a study about "lacrimal sac compression not massage", in a randomized prospective trial comparing different massage techniques, and showed that mothers may not perform the massage correctly and were often frustrated with its lack of efficacy, but after educating the mother the effective method of NLD massage he found that the hydrostatic massage group has statistically significance improvement in resolution rates.

Concerning of relieving the signs and symptoms of CNLDO after following the designed guidelines, the current study showed that there is high significant improvement ($P <0.001$) in the different signs and symptoms of studied infants after a period of six months. As "improved condition" in signs and symptoms was more than three quarter and "slightly improved" was one fifth. This could be attributed to the selection of suitable teaching methods e.g. demonstration and re-demonstration for proper technique of massage and written instructions given to the mothers to follow it. This finding was congruent with **Okby & Younis (2016)** who showed high significant improvement of signs and symptoms of NLDO after a period of six months. Where more than half

of the infants who had therapeutic hydrostatic nasolacrimal massage had no symptom and one third had mild symptom.

The present study revealed that the designed guideline for mothers having infants with CNLDO who less than one year of age, was effective leaded to high rates of improvement of the nasolacrimal duct obstruction. So, the majority of the studied infants cured while the minority needed surgery. These guidelines included health education for the mothers to increase their awareness about CNLDO and to improve their practice in caring of their infants, through educating them the proper method of lacrimal massage and eye care. The end result of the current study was in agreement with **Shrestha, (2016)** who conducted a study about "resolution of congenital nasolacrimal duct obstruction with conservative management''**,** who reported in his study that at 6-month examination, the majority of the infants showed resolution with conservative management. The overall success rate with conservative management was high and this form of management can be considered as one of the best options in infants.

The current study provided a possible objective explanation for the efficacy of the nursing guideline in educating the conservative management application on resolution of CNLDO under the first year of age. Emphasizing the importance of lacrimal massage and describing to the mothers in detail it can reduce the risk of unnecessary surgical interventions and its subsequent complications. This finding was supported by **Nair & Kamal, (2016)** who documented that, large proportion of respondents indicated that they advised lacrimal sac compression to their infants.

- **Conclusion**

In the light of the present study finding, it can be concluded that, the designed guidelines for mothers having infants suffering from CNLDO was effective method for improvement of their knowledge and practices, and subsequently lead to high rates of improvement of signs and symptoms of their infants.

- **Recommendations**

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

-Implementing guidelines for the mothers more widely and in detail, because this can reduce the risk of unnecessary surgical interventions and subsequent complications.

-Follow up program of the infants with CNLDO should be applied and organized in the hospitals, for the proper conservative management application, prognosis of CNLDO on the infants, reliving of the signs and symptoms.

-More researches are needed for training mothers about the proper care of their infants with CNLDO and raising the awareness of mothers about the nature of the disease, different forms of management, complications and its prognosis.

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