



E-ISSN: 2664-1305
P-ISSN: 2664-1291
IJRPN 2021; 3(1): 01-08
Received: 02-01-2021
Accepted: 05-02-2021

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Effect of nursing instructions for mother's on selected cast outcomes among their infants having congenital clubfoot

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Abstract

Congenital clubfoot is a complex deformity and affect on the infant mobility. The current study aimed to evaluate the effect of nursing instructions for mothers on selected cast outcomes among their infants having congenital clubfoot. Quasi-experimental research design was utilized. The study was conducted in the orthopedic out-patient clinic in the Cairo University Specialized Pediatric Hospital. 60 mothers of infants with clubfoot were participated in the study. Data were collected by using structured interview questionnaire, mother's knowledge and practices assessment questionnaire, recording cast complications sheet and selected cast outcomes assessment sheet. The study resulted that, statistically significant differences between total mean score of mother's knowledge and practices in the study group rather than the control group and infants in the study group exposed to less cast complications. The study concluded that, statistically significant positive correlation between the total mean score of mothers and their age and level of education.

Keywords: Congenital clubfoot, mothers, infants, nursing instructions, cast complications

1. Introduction

Clubfoot is a common type of birth defect that affects muscles and bones in the feet. Newborn can be born with the defect in one or both feet. The incidence of congenital clubfoot worldwide is estimated to be 1 to 4.5 per 1,000 live births and male to female ratio of 2:1 with about 50% of the cases being bilateral. There are about 200,000 infants born with clubfoot every year worldwide, where 80% of them are in the low and middle income countries ^[1].

The causes of clubfoot are still unknown but found factors that lead to clubfoot are environmental, genetic, abnormal position in the utero, and anatomical factors. This is twisting which causes the toes to point toward the opposite leg ^[2]. If it is left untreated clubfoot deformity causes pain, difficulty in walking and inability to wear normal shoes ^[3]. The majority of clubfeet can be corrected in infancy stage in about six to eight weeks with the proper gentle manipulations and casting ^[4].

The treatment is based on a sound understanding of the functional anatomy of the foot to correct feet position and change occurs gradually by obtained manipulation and casting ^[5]. Club foot is highly treatable by the Ponseti method that has been described as highly suitable for use in resource-limited settings ^[6]. The casting and Ponseti method had the greatest impact on the treatment of clubfoot, markedly reducing the need for extensive surgery ^[7].

The nurse roles are very crucial and it includes health teaching for the mothers to keep the cast clean and dry. Provide sponge bath, change diapers often to keep the clean cast. If the cast gets dirty, wipe it with a damp cloth. Check the circulation in foot every hour for the first 6–8 hours after a new cast and then a few times each day and check toes should be warm and pink. Put small towel under the knee. Also go to the hospital when cast cracks, skin inflammation and toes appear cyanosis ^[8]. Caregivers of children with clubfoot play a very large and essential role in their treatment. First they must take responsibility for seeking care for the child. Monitor site of impaired tissue integrity at least once daily for color changes, redness, swelling, warmth, pain, or other signs of infection; monitor infant skin care practices. Provide health education which includes the parents in creating the teaching plan, beginning with establishing objectives and goals for learning at the beginning of the session; provide clear and understandable explanations and demonstrations ^[9].

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1.1 Significance of the study

Clubfoot affects around 174000 children born each year, with 91% born in low-income and middle-income countries (LIMIC) [10]. Recent based on medical records and statistical affairs department in Cairo University Specialized Pediatric Hospital (CUSPH), the total number of infant admitted to the orthopedic pediatric surgery department “in the year 2018 to 2019” was 1200 and 14.2% (170) of those infant were having club foot. Through empirical experience in surgical unit at CUSPH, the researchers observed that children with clubfoot who undergoing orthopedic correction dramatically increased and they considered as high risk for occurrence of cast complications which occur from long period of cast. Those complications occurred due to lack of nursing instructions regarding care of cast for those infant and their families.

Scars research studies were conducted nationally to help mothers caring for their infants with congenital clubfoot. Hence, the current study is undertaken to evaluate the effect of nursing instructions for mothers on selected cast outcomes among their infants having congenital clubfoot. Eventually, the results of the current study might generate an attention and motivation for further researches in the field of pedia-orthopedic. As well as providing guidance and recommendations that should be reflected in pediatric nursing education, practice and research.

1.2 Operational Definition

Selected cast outcomes

There are include early cast complications as (toes cyanosis, foot stiffens, pain, fever, foot swelling, skin breakdown, and skin inflammation it can be judged by measurement time of capillary refill, range of motion, pain scale, body temperature, assess foot swelling, assess skin condition and selected cast outcomes as (appearance of foot, straight of foot, gross motor mobility, range of motion and play activity).

1.3 Aim of the study

The aim of the current study was to evaluate the effect of nursing instructions for mothers on selected cast outcomes among their infants having congenital clubfoot.

1.4 Research Hypotheses

H1: Mothers who receive the nursing instructions will have higher mean score of knowledge and practices than mothers in the control group.

H2: Infant of mothers who receive the nursing instructions will have less cast complications than infant of mothers in the control group.

H3: Infant of the mothers who receive the nursing instructions will have better outcomes than infant of mothers in the control group.

2. Methodology

2.1 Research design

A pre-posttest quasi-experimental research design was utilized to achieve the aim of the current study. A quasi experimental design is one type of experimental design that is very similar to the true experimental design except there is lose one criteria as randomization [11].

2.2 Setting

The study was conducted in the orthopedic out-patient clinic

in the Cairo University Specialized Pediatric Hospital (CUSPH). Orthopedic clinic located at the second floor and received infant and children with orthopedic problem and postoperative follow up.

2.3 Subjects

Purposive sample of 60 mothers of infants with clubfoot was participated in the study. The first 30 mothers and their infant were considered as a control group and received routine care from nurses in orthopedic clinic. The second 30 mothers and their infant were considered as a study group after give nursing instructions for mothers about cast care [12].

$$N = T^2 \times P(1-P) / M^2$$

Description: N= required sample size.

T= confidence level at 95% (standard value of 1.96).

P= estimated prevalence of children in outpatient clinic diagnosed with clubfoot and performed cast (2019) is (0.59).

M= margin of error at 5% (standard value of 0.05).

2.3.1 Inclusion criteria

- Infants up to one year.
- -Infants diagnosed with unilateral or bilateral clubfoot.
- The mother is commitment with clinic's follow up schedule.

2.3.2 Exclusion criteria

- Infants have other congenital anomalies, or chronic illness

2.4 Data collection tools

The required tools developed and collected by researchers after reviewing the related literature through the following tools:

2.4.1 Structured Interview Questionnaire

It included personal data for the mother and infant: it involved nine (9) questions. Four (4) questions about mothers as: age, level of education, occupation, consanguinity. Also includes five (5) questions about characteristics of infant such as age, gender, residence, affected foot and affected gross motor.

2.4.2 Mother's Knowledge and Practices Assessment Questionnaire (pre/posttest)

It included the following two parts to assess mother's knowledge and practice which involved fifty-four questions.

Part I: fifteen questions about knowledge as: clubfoot itself eight questions, feeding pattern five questions and two question for follow up.

Part II: thirty-five questions about practice as: twenty-one questions of cast care, nine questions for hygienic care, five questions for range of motion, and play activity.

2.4.3 Recording Cast Complications Sheet

It includes seven elements to assess cast complications as: toes cyanosis, foot stiffens, foot swelling, skin breakdown, skin inflammation, pain, fever.

2.4.4 Selected Cast Outcomes Assessment Sheet

It will include five elements to assess foot correction as appearance of foot, straight of foot, gross motor mobility, range of motion, and play activity.

2.5 Scoring system

For mothers' knowledge and practice; each correct response took "2" scores, the incomplete response took one "1" score and the wrong response or the don't known took "zero" score. The total score was 100 for fifty (50) questions and score was converted to 100%, and then categorized as following: the total score less than 50% (less than 50 score) was considered as unsatisfactory while score of 50% and more (50 score and more) was considered as satisfactory level.

2.6 Validity and reliability

The tools reviewing by 5 experts in pediatric nursing and pediatric orthopedic to test the content validity of tools. Cronbach's alpha for reliability testing internal consistency was performed and the results was 0.82.

2.7 Pilot study

Pilot study was conducted on 6 mothers and their infants with clubfoot to ensure the clarity of content of tools and to assess the time needed to fill the tools. Minor modifications were done such as restate some wards. Based on the results of the pilot study, mothers of infants who participated in the pilot study were excluded in the total study sample.

2.8 Procedure

Official permissions were obtained from the directors of Cairo University Specialized Pediatric Hospital (CUSPH) and permission from the head of orthopedic out-patient clinic was obtained. Mothers and their infants who meet the inclusion criteria were invited to participate in the study. The purpose and the nature of study explained to each mother individually. An individual interview with each mother to take personal data for her and her infant and pretest obtained by the researchers for both study and control group to assess mother's knowledge in waiting room before gave nursing instructions within 15 minute. Then, the researchers gave nursing instructions for mothers in study group at two sessions (each one have 30 minute) individual basis and sometimes for a group of mothers ranged from 3 to 5 mothers. The first session included information about clubfoot as congenital anomalies, including: definition, types, and symptoms, line of treatment, complications and follow up. The second one had nursing instructions regarding to practice of cast care for infant with clubfoot including cast care (position, handling, skin care, assess circulation) hygiene care (bathing and diaper care), range of motion and play activity. Aided by the using of instructional illustrated Arabic booklet about appropriate cast care was prepared by the researchers and re-demonstration of practice on a doll and pictures also utilized and distributed to each mother and after two weeks for both study and control group; the researchers filled posttest for study group to assess mothers' knowledge and practice after receiving nursing instructions. As regarding to control group the researchers filled posttest after received routine care from nurses in orthopedic clinic. Each infant in both study and control group was assessed through using recording cast complications sheet for assess cast complications by the

researchers immediate cast, after three weeks and after six weeks of cast and takes 30 minutes to assess each child in the three times. In last time during assess of the cast complication at six weeks the researchers observed and recorded progress of infant's outcomes by using selected cast outcomes assessment sheet and recorded for each child in both study and control group and takes 30 minutes to assess each infant. Data collection was conducted over fourteen month's period extending from January 2019 till February 2020.

2.9 Ethical Considerations

Written consent obtained from the mothers of infants after complete description of the purpose and the nature of the study. Mothers and their infants were informed that participation in the study is voluntary. The researchers informed the mothers about their rights to withdraw from the study at any time without giving any reason and without any effect on the care of their infants and confidentiality assured to each infant and their mothers.

2.10 Statistical Analysis

A compatible personal computer (PC) was used to store and analyze data. The Statistical Package for Social Studies (SPSS), version 20 was used. The collected data tabulated, and summarized. Data was computerized and analyzed using appropriate descriptive and inferential statistical tests. Qualitative data were expressed as frequency and percentage. A comparison between qualitative variables carried out by using parametric Chi square test. Comparison of means was performed using paired-sample t-test. Correlation among variables was done using Pearson correlation coefficient. Level of significance at $p < 0.05$ was used as the cut of value for statistical significance.

3. Result

Table 1: Percentage Distribution of Mothers Characteristics in the Study and Control Group.

Items	Study group (n=30)		Control group (n=30)	
	N	%	N	%
Mother's age/years				
> 20	3	10	3	10
20: >30	17	56.7	16	53.3
30: > 40	10	33.3	11	36.7
Mean \pm SD	29.10 \pm 6.81		27.63 \pm 6.09	
Level of education				
Not read and write	3	10	4	13.3
Primary school education	9	30	11	36.7
Diploma	18	60	15	50
Mother's job				
Housewife	21	70	26	86.7
Working mother	9	30	4	13.3
Consanguinity				
Yes	15	50	17	56.7
No	15	50	13	43.3

Table (1) clarified that more than half of mothers in both study and control groups their age ranged from 20 to less than 30 years. The mean age was 29.10 \pm 6.81 years for mothers in the study group and 27.63 \pm 6.09 of them in the control group. Regarding mothers' level of education, it was found that (60% & 50% respectively) in the both study and control group had diploma education. In relation to their

occupation, it was found that, (70% & 86.7% respectively) of mothers in both groups were housewives and (50%

&56.7%, respectively) of them had a consanguineous marriage in both groups as stated by mothers.

Table 2: Percentage Distribution of Personal Characteristics of Infants with Clubfoot in the Study and Control Group.

Items	Study group (n=30)		Control group (n=30)	
	N	%	N	%
Infants age				
> 6months	18	60	16	53.3
6 months to 1year	12	40	14	46.7
Mean +SD	.586 +.589		.507 +.591	
Gender				
Male	18	60	24	80
Female	12	20	6	20
Place of residence				
Urban	7	23.3	16	53.3
Rural	23	76.7	14	46.7
Affected foot				
Bilateral	22	73.3	17	56.7
Unilateral	8	26.7	13	43.3
affected gross motor				
Setting	9	30	13	43.3
Creeping	15	50	14	46.7
Standing	2	6.7	1	3.3
Walking with support	4	23.3	2	6.7

Table (2) revealed that less than two thirds (60%) of infants in the study group having clubfoot and 53.3% of infants in the control group their age were less than 6months. Their mean age was .586± .589 months in the study group and .507± .591 of them in the control group. Less than two thirds (60%) of the studied infants and the majority (80%) of the control group were males. It was found that, 76.7% of

infants in the study live in rural areas. While, 53.3% of them in the control groups live in urban areas. Regarding to gross motor defect, (50%, 46.7% respectively) of infants in the both groups was unable to creeping and (30%, 43.3% respectively) in both groups unable to setting. Although, it was found that (73.3%, 56.7%, respectively) in the both study and control group had bilateral clubfoot.

Table 3: Comparison between Total Mean Score of Mothers Knowledge and Practices before and after Nursing Instructions.

Items	Study group (n=30)		t	P	Control group (n=30)		t	P
	Before	After			Before	After		
	Mean ± SD	Mean ± SD			Mean ± SD	Mean ± SD		
Mothers Knowledge								
Club foot (16 marks)	4.70±1.87	12.26±2.66	-13.07	.000	5.73±2.63	5.83±1.36	-.223	.825
feeding (10 marks)	3.40± 1.22	8.03± 1.56	-12.85	.000	3.46± 1.16	3.26±1.20	.711	.483
Follow up (4 marks)	1.83±.592	3.46± .730	-11.06	.000	2.56± .858	2.10± .844	3.29	.003
Mothers Practices								
Care of cast(42 marks)	16.83±4.39	33.76±4.06	-15.29	.000	15.03±3.29	15.96±2.63	-2.19	.037
hygienic care (18 marks)	8.50± 2.84	15.20± 1.56	-12.44	.000	8.73±1.72	9.13±1.54	-1.02	.315
Range of motion & Play activity (10 marks)	2.93± .944	7.73±1.74	-13.83	.000	3.13± 1.16	2.83±1.11	1.10	.279

*** Significant at P<0.01

Table (3) highlighted that, the total mean scores of mother's knowledge and practices in study group before receiving the nursing instructions were 4.70±1.87, 3.40± 1.22, 1.83±.592 16.83±4.39, 8.50± 2.84 and 2.93± .944 respectively. While, total mean scores of mothers knowledge and practices increased after receiving the nursing instructions to 12.26± 2.66, 8.03± 1.56, 3.46± .730, 33.76±4.06, 15.20± 1.56 and 7.73±1.74 respectively. Although, there were statistically significant differences were detected between total mean

score of mother's knowledge and practices in the study group before and after receiving the nursing instructions at (p< 0.01). On the other hand, the total mean scores of mother's knowledge and practices in the control group before and after receiving routine of care were nearly scored to each other. There were no statistically significant differences were detected between the total mean score of mother's knowledge and practices in the control group.

Table 4: Comparison between Mothers Level of Knowledge before and after Nursing Instructions.

Level of knowledge	Study group (n=30)				X ²	P	Control group (n=30)				X ²	P
	Before		After				Before		After			
	No	%	No	%			No	%	No	%		
Satisfactory	9	30	24	80	19.20	.000*	6	20	7	23.3	8.53	3.23
Unsatisfactory	21	70	6	20			24	80	23	76.7		

*** Significant at P<0.01

Table (4) indicated that, 70% of mothers had unsatisfactory level of knowledge in the study group before receiving the nursing instructions compared to majority of mothers had satisfactory level of knowledge after receiving the nursing instructions. On the same line, (80%, 76.7 respectively) of

mothers had unsatisfactory level of knowledge in the control group before and after receiving routine of care. There were statistically significant difference was detected in the study group between mothers' level of knowledge before and after receiving nursing instructions at ($p < 0.01$).

Table 5: Comparison of Total Mean Score for Mothers Knowledge and Practice in the Study and Control Groups after Nursing Instructions.

Item	Study Group (n=30)	t	P	Control group (n=30)	t	P
Mean ± SD	1.10 ± .305	19.74	.000	1.76 ± 1.76	3.03	1.34

*** Statistical significant at $P \leq 0.01$

Table (5) illustrated that There were statistically significant difference was detected between total mean score of knowledge and practices for mothers in the study group after receiving nursing instructions at ($t = 19.74$, $p = < 0.01$) and mean ± SD was 1.10+.305. On the other hand, there

were no statistically significant difference was detected between total mean score of knowledge and practices for mothers in the control group at ($t = 3.03$, $p = 1.34$) and mean ± SD was 1.76+1.76.

Table 6: Comparison for Cast Complications between Infant with Clubfoot in the Study and Control Group.

Items	Study group (n=30)						Control group (n=30)						X ²	P
	Immediate		3 weeks		6 weeks		Immediate		3 weeks		6 weeks			
	N	%	N	%	N	%	N	%	N	%	N	%		
Toes cyanosis														
P	5	16.7	2	6.7	0	0	17	56.7	13	43.3	10	46.7	.749	.042*
N.P	25	83.3	28	93.3	30	100	13	43.3	17	56.7	20	53.3		
Foot stiffens														
P	4	13.3	3	10	1	3.3	12	40	10	33.3	10	33.3	.517	.015*
N.P	26	86.7	27	90	29	96.7	18	60	20	66.7	20	66.7		
Foot Swelling.														
P	0	0	7	23.3	2	6.7	0	0	19	63.3	26	86.7	3.33	.046*
N.P	30	100	23	76.7	28	93.3	30	100	11	36.7	4	13.3		
Skin breakdown.														
P	0	0	4	13.3	3	10	0	0	13	43.3	23	76.7	4.53	.054*
N.P	30	100	26	86.7	27	90	30	100	17	56.7	7	23.3		
Skin inflammation.														
P	0	0	8	26.7	4	13.3	0	0	14	46.7	27	90	6.67	.013*
N.P	30	100	22	73.3	26	86.7	30	100	16	53.3	3	10		
Pain														
P	16	53.3	12	40	5	16.7	30	100	19	63.3	19	63.3	3.47	.032*
N.P	14	46.7	18	60	25	83.3	0	0	11	36.7	11	36.7		
Fever														
P	18	60	4	13.3	2	6.7	22	73.3	15	50	12	40	1.63	.201
N.P	12	40	26	86.7	28	93.3	8	26.7	15	50	18	60		

* Significant at $P < 0.05$

(P= Present, N.P= Not Present)

It is clear from table (6) that all (100) of infant in study group were didn't have change toes color, compared to (46.7%) of the control group had it. Vast majority (96.7%) of infant in study group didn't had foot stiffens, while it was found one third (33.3%) among infant in the control group had it. It was evident from table that majority of infant in study group didn't suffer from foot swelling, skin breakdown and skin inflammation compared to (86.7%, 76.7%, & 90% respectively) in the control group had it. Regarding to pain, it was found that only (16.7%) of infant

in study group had pain and 63.3% among infant in the control group. 40%, 86.7% and 93.3% respectively of infant in study group didn't have fever, neither immediate, after three weeks nor after six weeks these percentage increase (73.3%, 50%, and 40%, in order) in the control group The same table demonstrated that there was statistically significant difference regarding to toes cyanosis, foot stiffens, foot swelling, skin breakdown, skin inflammation and pain at $P \leq 0.05$.

Table 7: Percentage Distribution of Infant Outcomes in Study and Control Group.

Outcomes	Study group (n=30)		Control group (n=30)		X ²	P
	N	%	N	%		
Appearance of foot						
Normal	22	73.3	13	43.3	5.11	.031*
Abnormal	8	26.7	17	56.7		
Straight of foot						
Not corrected	1	3.3	5	16.7	2.75	.041*
Mild correction	12	40	18	60		

correction	17	56.7	7	23.3		
Gross motor mobility						
Achieved	27	90	16	53.3	.563	.448
Not achieved	3	10	14	46.7		
Range of motion						
Passive	9	30	26	86.7	5.19	0.03*
Active	21	70	4	13.3		
play activity						
Active	26	86.7	3	10	9.23	.003*
Limited	4	13.3	27	90		

*Significant at $P < 0.5$

It was clear from table (7) that more than two thirds of infant had normal appearance of foot. While, it was found among 43.3% of infant in the control group and (56.7%, 16.7% respectively) of infant in both groups had straight foot. Regarding to gross motor mobility 90% and 53.3% of infant in both groups achieved it. 70% of infant in the study group was active range of motion. Although, majority of infant in the control group was passive range of motion and majority of infant in study group were active play activity compare to 90% of infant in the control group had limited play activity. The same table showed that there were statistically significant differences between infants in both study and control groups regarding to appearance and straight of foot, range of motion, and play activity at $P \leq 0.05$.

Table 8: Correlation between Selected Mother's Personal Data and Total Mean Score of Knowledge and Practice after nursing instructions in the Study Group.

Item	Total mean score	
	R	P
Age	25.00	.000**
Level of education	24.13	.000**
Occupation	3.00	.083
Place of residence	2.00	.157

** Significant at $P < 0.01$

Table (8) revealed that there was statistically significant positive correlation between the total mean score of mothers' knowledge and practice and their mother's age and level of education. There were no statistically significant correlations between the total mean score of mothers' knowledge and practice and their occupation and place of residence.

4. Discussion

The results of the current study revealed that less than two thirds of infant in the study group and more than half of infant in the control group their age were less than six months and the mean age in both groups was (.586± .589, 507± .591 respectively). These results were supported by [3] they studied the treatment of congenital clubfoot and found that 45% of infant their age was four months and the mean aged was 1.62± 0.898 months. As well as, [13] they concluded that 64.86% of infant at six and less than six months follow-up of Ponseti's technique gave us excellent results.

Concerning infant gender and place of residence, less than two thirds of the studied infant and majority of them in the control group were males and more than half of infant in the control groups live in urban areas. This result congruent with [14] who found that clubfoot is more common in males than the female with approximately ratio 5:1. On the same

line [3] they reported that more than two thirds were males and 60.3% of them live in urban area.

As regards to infant immobility, highest present of infant in the both study and control group were unable to creeping. This result was confirmed by [15] they studied manipulation and brace fixing for the treatment 465 of congenital clubfoot in newborns and infants and found that untreated clubfoot will suffer in their daily life activity such as difficulties in gait pattern, mobility, daily living skills, social activities and walk. It was evident in the results of the current study that the highest present of infant in the both groups had bilateral clubfoot. These results were supported by [16] they studied congenital clubfoot and found that half of cases are bilateral clubfoot and the right side is more commonly affected than left.

In relation to mothers' age the recent study's results evident that more than half of mothers in both groups their age ranged from 20 to less than 30 years. This result was contradictory with [17] they studied relationship between maternal age at the estimated delivery date and the risk for birth defects based on these findings, in the United States, younger maternal age >20years and < 40 years had incidence of birth defect. Regarding mothers' level of education, it was found that two thirds and half respectively of mothers in the both groups had diploma education. This result contradictory with [18] they found that about 59.8% of mother's educational status ware up to primary level and 21.6% of them had secondary level education.

As regards mothers' occupation, the study results proved that more than two thirds of mothers in study group and majority of them in control group were housewives. As well as [19] they indicated that the majority of mothers were housewives. From the researcher point of view, most of Egyptian mothers preferred to stay at home to provide care for their husband and children specially, if they had chronic ill member in the family. As regards mothers' consanguineous, the study results proved that highest percentage in both study and control group had a consanguineous marriage. According to [20] they reported that mothers in their study had a higher prevalence of maternal risk factors related to consanguinity which lead to congenital anomalies in Beni-Suef city.

In relation to level of knowledge before and after receiving teaching instructions, it was highlighted that majority of mothers of infant with clubfoot in both study and control group had unsatisfactory level of mothers' knowledge before implementation of teaching instructions. The finding went in the same line with [9] they explored that intrapersonal barriers experienced were a lack of income and additional responsibilities and reported that insufficient information about treatments and challenges following treatment included counseling sessions lead to more relapse infant again. On the same line [18], they reported that 52.9%

(n=54) parents have lack of knowledge about how to use the brace and 9.8% (n=10) didn't identify the follow up time.

The current study indicated that, vast majority of mothers of infant with clubfoot in study group had satisfactory level of knowledge after teaching instructions. The finding went in the same line with ^[21] they found that mothers in the treated group reported a protective role for social support. Moreover, they highlighted the importance of implementing protocols in the hospital unit directed to parents of babies with congenital anomalies. The results show only a trend towards higher impact of health teaching during the casting phase.

It was evident in the results of the current study that, a great difference was detected between before and after nursing instruction for mothers in the study group regarding to the total mean of the score of mothers' knowledge and practice (42.86 ± 7.66 & 80.26 ± 16.49 respectively). It found a statistically significant difference among mothers' in the study group at ($t = -11.10$, $p < 0.01$) compared to mothers in the control group (44.23 ± 6.62 & 46.76 ± 5.61 respectively) and no statistically significant difference was detected among mothers in the control group at ($t = -3.03$, $p = 1.34$). This could be related to that mothers in the control group received the routine hospital care which unfortunately weren't informed about the appropriate cast care needed for their infants. These results indicate the effectiveness of the nursing instruction on improving mothers' knowledge and their practices in the study group. Furthermore, ^[22] they studied clubfoot treatment after manipulation and casting using the ponseti method and concluded that majority of infants with clubfoot can achieve a good outcome with the Ponseti manipulation and casting with increase parent education level and mean score for management was 3.80 ± 1.15 and P value < 0.0001 .

Clearly, the study's results indicated that vast majority of infants in study group not complain from foot stiffens, while it was one third among infants in the control group. Regarding to pain, less than one quarter of infant in study group had pain but more than two thirds of infant in control group had pain. The finding contradictory with ^[23] they concluded that serious complications are uncommon and depend on the type of surgery correction performed such as vascular necrosis, infection, pain, stiffness, relapse.

Clearly, the study's results indicated that less than one quarter of infants in the study group had foot swelling and skin inflammation compare to majority of infants in the control group. This result supported with ^[24] they indicated that treatment complications from Ponseti method include ulcers, swellings, abrasions, bleeding and delayed healing after surgical correction.

In relation to skin breakdown, ten percent of infants in study group had skin breakdown compare to more than three quarters among infants in the control group. This supported with ^[25] they found the same phenomenon when they studied complications associated with ponseti serial casting and surgical correction via soft tissue release in congenital idiopathic clubfoot the two most common complications of Ponseti serial casting were cast loosening and cast-associated skin irritation (5.48%) and wound infection (5.26%).

The current study's results illustrated that vast majority of infants in study group not have fever after six weeks from associated cast complications these percentage increase of fever occurrence in the control group to forty percent This

result agreement with ^[26] who reported that infant complain common during cast with had temporary edema of the foot and fever. As regards child's outcomes the study results showed that, more than two thirds of infants in the study group had normal appearance of foot. This result congruent with ^[27] they found that seventy six percent of the infant treated according to the traditional method and Ponseti having normal motor abilities.

As regarding to range of motion, more than two thirds of infants in study group had active range of motion and majority of infants in control group had passive range of motion. Similar to ^[22] they mentioned majority of children have correct and protected cast achieve a good outcome and have active range of motion with Ponseti manipulation and casting method. On the same line, majority of infant in study group had active participant in play activity. This result contrasts with ^[28] they reported that, in Canada, a national study of cases reported to infant welfare services found that, among the substantiated cases of neglect, nineteen percent involved physical neglect, twelve percent abandonment, eleven percent educational neglect, and forty-eight percent physical harm resulting from a parent's failure to provide adequate supervision. From the researchers view these different types of parent neglect for their infant lead to decrease daily activity and lead to decrease curiosity between the environment and child.

It was found that, was statistically significant positive correlation between the total mean score of mothers' knowledge and practice and their age and level of education. This explanation was in the same line with ^[29] they reported that the mothers' role during the time of treatment for provides the care and observation for the cast and mother education has an impact on their knowledge.

5. Conclusion

The current study results concluded that mothers in the study group who received the nursing instructions had higher total mean score of knowledge and practices regarding clubfoot and care of their infants with cast rather than control group. As well infants of the mothers who received the nursing instructions exhibit less cast complication and better outcomes. The study results also concluded that, there was statistically significant positive correlation between the total mean score of mothers' knowledge and practice in the study group and their age and level of education. These results support the proposed study hypotheses.

6. Recommendations

Based on the results of the current study, it was recommended that:

1. Raising the awareness of mothers about caring infant with clubfoot through in health education program about the cast care, hygienic care, nutrition, activity, treatment and child's outcomes.
2. Simple Arabic illustrated booklet about the cast care should be available and distributed to mothers in orthopedic out-patient clinic at Cairo University Specialized Pediatric Hospital (CUSPH).
3. Longitudinal study is necessary to monitor the late cast complication and long term outcomes.

7. Acknowledgement

The researchers acknowledged all mothers and their infants

who participated in this study. As well as working for the team in the pediatric Orthopedic clinic at Cairo University Specialized Pediatric Hospital to facilitates work with the mothers.

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