

Assessment of Mothers' Knowledge regarding Care of their Children Undergoing Congenital Club-Foot Surgery

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Abstract

Background: Congenital talipes equinovarus is a birth anomaly impacting the musculoskeletal system, leading to the misalignment of a child's feet. This condition significantly impacts a child's physical capabilities and overall health, resulting in a diminished quality of life. **Aim of study** was to assess mothers' knowledge regarding care of their children undergoing congenital club-foot surgery. **Research design:** A descriptive design was utilized to conduct this study. **Setting:** The study was conducted in the outpatient clinic in orthopedic pediatric departments at Benha university hospital and Benha Specialized Pediatric Hospital. **Sample:** A convenient sample of 50 children accompanied their mothers were selected. **Tools of data collection:** A structured interviewing questionnaire sheet to assess personal characteristic of mothers', children and their knowledge regarding clubfoot. **Results:** Less than half of the studied mothers were in the age group 25 -< 30 years with mean age (27.52 ± 5.67) years old, half of the studied mothers had secondary education & more than two thirds of them were working, more than half of the studied children are in the age group 1 -< 3 years with mean age is 3.18 ± 1.07 years and first ranked, the majority of them are male. The majority of studied mothers have inadequate knowledge level regarding club foot. **Conclusion:** There is a statistical significant relation between total mothers' knowledge and their age, educational level and consanguinity. **Recommendations:** Mothers of children undergoing clubfoot should attend educational program and workshop to increase their knowledge.

Keywords: Care, Children, Clubfoot surgery, Knowledge, Mothers.

1. Introduction

Talipes equinovarus, also known as clubfoot, is a congenital disorder that affects a large number of children globally, leading to reduced quality of life, disability, and mobility limitations. Talipes equinovarus (TEV) is distinguished by foot abnormalities such as a high arch in the middle of the foot (cavus midfoot arch), inward deviation of the front part of the foot (forefoot adduction), inward deviation of the hindfoot (hindfoot varus), and

restricted upward movement. Untreated, TEV can remain throughout adulthood, resulting in impaired mobility and quality of life [1].

The incidence is 1 or 2 cases per 1000 children born. It is approximately three times more frequent in males than in females. In 50% of cases, clubfoot manifests bilaterally or unilaterally. Changes in bone structures may occur if a clubfoot is left malformed for an extended period of time or if the proper therapy is not received. The degree of the soft tissue contracture and how it affects walking will determine these modifications [2].

There is no precise cause for CTEV. Several explanations have been suggested, including those related to the circulatory system, viruses, genetics, anatomy, compartment syndrome, environmental influences, and the position of the fetus in the womb. The existence of a neuromuscular foundation for this illness is still disputable [3].

Risk factors also include maternal smoking, maternal obesity, family history, amniocentesis, oligohydramnios, bicornuate uterus, some selective serotonin reuptake inhibitor exposures, use of antiviral drugs, seasonal viral infections, and elevated maternal homocysteine. Family history represents the greatest risk, with 25% of all cases being familial [4].

The symptoms are visible in both congenital and acquired clubfoot conditions. The child walks on the outside edge of the foot or, in extreme circumstances, on the back of the foot. One or both feet may be affected. The clubfoot typically has four characteristics: bony malformations (mostly affecting the heel bone), joint misalignments or dislocations (the ankle is frequently affected), weakened or shortened muscles (for example, the calf muscles), and limitations in the capsule-ligament apparatus (when tendons or ligaments are short or damaged) [5].

Talipes equinovarus, often known as clubfoot, is a condition that can occur alone (idiopathic) or in conjunction with other conditions [6]. Although its etiology may be linked to numerous congenital abnormalities, arthrogyposis, or myelodysplasia, the most typical manifestation is isolation, which is classified as the idiopathic variety because its cause is unknown. However, about 20% of cases have underlying medical conditions that are categorized as "teratological" [7].

Prenatal diagnosis is possible with an ultrasound routine check at around 20 weeks, which can recognize the different forms of clubfoot. For isolated clubfoot, prenatal ultrasonography has an accuracy of 86% and typically shows a higher Pirani score, indicating postnatal severity. Prenatal diagnosis can assist and psychologically ready parents for the condition and its management [8].

The best time to begin nonsurgical clubfoot management is shortly after birth. The Ponseti method involves casting first, followed by a series of manipulations and, if necessary, surgery. After the child is born, management is immediately assigned. Weekly stretching and manipulation of the foot's ligaments and tendons is combined with the use of a soft-fiber glass

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cast to help the ligament return to its normal position. Usually, the infant's surgical correction is not performed until the child is between six and nine months old. To realign the clubbed foot in its proper position, surgery is utilized [9].

Early treatment for CTEV deformity is necessary to prevent any impairments from extending into adulthood. If carried out as soon as possible, very good outcomes will be obtained. Clubfoot is managed by both operational and non-operational managements. Clubfoot deformity results in pain and difficulties walking, which can lead permanent impairment if left untreated. The purpose of clubfoot medical rehabilitation is to lessen the deformity with the success criterion that the foot can be functional, pain-free, have adequate mobility, and not require corrective shoes so that the child can engage in typical activities during childhood and as they get older [10].

Nurses have an important role in the prevention of cast complications since they are the ones who identify the indicators of cast complications early on and take the necessary precautions [11]. Provide families with information on how to take care of their children's casts, how to spot potential issues, and how to utilize orthotics as directed [12].

Mothers are essential to the treatment of CTEV since the affected children frequently require physiotherapy, recurrent surgeries, and long-term usage of orthopaedic braces, all of which require a high level of adherence to treatment and follow-up. The awareness, knowledge, and habits of these mothers on the disease under consideration are closely linked to their compliance [13].

Significance of the study:

Congenital disorders ranked as the tenth leading cause of death worldwide. Congenital clubfoot is the most frequent musculoskeletal abnormalities and the seventh most common congenital birth defect in 2019 [14]. Congenital clubfoot is a fairly common and severe congenital malformation, most often of idiopathic origin. It is estimated that 0.5/1000 children are affected worldwide, with a male to female ratio of 2:1 and greater distribution in developing countries (80%). If left untreated, severe disability and deformities are expected [15].

Furthermore, the overall number of children who admitted "from 2020 to 2021" to the orthopedic pediatric surgery department in Benha University Hospital & Benha Specialized Pediatric Hospital hospitals were 410 and 34.9 percent (75) of those children had congenital clubfoot surgery [16, 17].

Children's lives are negatively impacted by congenital clubfoot; untreated cases can result in lifelong handicap, ambulation difficulty, and dependence on others for daily activities. It has a significant financial impact not just on the family but also on the country [18]. Therefore, the present study aims to assess mothers' knowledge regarding care of their children undergoing congenital club-foot surgery.

Aim of the Study:

This study aimed to assess mothers' knowledge regarding care of their children undergoing congenital club-foot surgery.

Research question:

1- What is the level of mothers' knowledge regarding care of their children undergoing congenital club-foot surgery?

2. Subjects & Methods

2.1. Research design:

A descriptive research design was used to conduct the study.

2.2. Setting:

The study was conducted in outpatient orthopedic pediatric clinic at Benha university hospital and Benha Specialized Pediatric Hospital in Benha city.

2.3. Sampling:

A convenient sample of 50 children accompanied their mothers was selected from the above mentioned setting who willing to participate in the study regardless their characteristics during the period of the study.

2.4. Tools of data collection:

The following tool were used in this study:

Tool (I): Structured interviewing questionnaire sheet:

This tool was designed by the researchers in an Arabic language after reviewing the recent and relevant literature. It was divided into four main parts:

Part 1: Characteristics of the studied mothers which included; age, level of education, occupation, consanguinity between parents, degree of consanguinity and source of information about congenital club foot (6 items).

Part 2: Characteristics of the studied children which included; the age, gender, ranking of child in family, educational level, affected foot and sibling history (6 items).

Part 3: Mother's knowledge assessment:

This tool was adapted from [12, 19, 20, 21]; to assess mothers' knowledge regarding club foot. It involved (26) multiple choice questions about definition (1question), etiology (1question), signs & symptoms (1question), forms (1question), types (1question), idiopathic clubfoot (1question), secondary clubfoot (1question), risk factors (1question), investigation (1question), complications (1question), prevention (1question), difficulties (1question), methods of treatment (1question), nonsurgical treatment (1question), Ponsti method (1question), French method (1question), surgical treatment (1question), indication for performing surgery (1question), nursing care before, after and on discharge (3questions). Also, role of mother after surgery (1question) and, role of mother on discharge in cast care (2questions), hygiene care (1question) and range of movement (1question).

Knowledge scoring system:

According to the answers collected from the mothers; a scoring system was applied to interpret mothers' knowledge assessment. The studied mothers' answers were checked and compared with the predesigned model answer that was given a score (1) for

correct answer, while a score (0) for wrong answer or don't know.

The total mothers' knowledge scores were ranged from (0 - 26) grades which classified into two categories as the following: Inadequate knowledge: < 60% (< 16 marks) of total knowledge score. Adequate knowledge: $\geq 60\%$ (≥ 16 marks) of total knowledge score.

2.5. Content validity:

Tools of data collection were investigated for their content validity by panel of three experts (two professor and one assistant professor in pediatric nursing specialty from the faculty of nursing, Benha University) to test content validity of the tools and to judge its clarity, relevance, comprehensiveness, understanding and applicability. The opinion was elicited regarding the layout, format and sequence of the questions and all of their remarks were taken into consideration and the tools were regarded as a valid from the experts' point of view.

2.6. Reliability:

A statistician used Cronbach's alpha coefficient test in SPSS program, version 24 to examine the produced tools for dependability. The results were as the following: Internal consistency reliability Cronbach's alpha for Mother's knowledge regarding congenital club foot is good reliable emerged as (0.827).

2.7. Ethical Consideration:

An approval was obtained from the Scientific Research Ethical Committee at the faculty of Nursing Benha University. After explaining the study's aim, advantages, risks, and procedure, each child/participant gave his verbal oral agreement to participate. The data was kept private and anonymous, and it was only used for research purposes. Participants were informed that participation in the study was entirely optional and that they had the right to withdraw at any time without incurring any consequences.

2.8. Administrative approval:

Official letters was taken from the Dean of Faculty of Nursing, Benha university contains the title, objectives, tools and the study technique was directed to the directors of the previously mentioned settings to obtain the official agreement to conduct study.

2.9. Pilot study:

A pilot study was conducted on five children accompanied their mothers from the entire sample size who were randomly selected from the same setting to examine the clarity, feasibility, and applicability of the study tools. In the light of pilot study analysis, no modification was done, and mothers were included to total sample of the study.

Pilot Study took approximately one month from the beginning to the end of June.

2.10. Field work:

The mothers were interviewed interviewing individually to collect the personal data. The study was carried out from the beginning of July 2022 to the beginning of December 2022, covering six months. The researcher was available in study settings two days weekly (Saturday & Wednesday) from 12 P.M to 2 P. M. The researcher introduced herself to the mothers and explained the purpose of study and took their oral

approval to participate in the study prior to data collection. A structured interviewing questionnaire sheet (Tool I) was administered to all mothers individually in order to collect personal data and to assess their knowledge regarding congenital club-foot surgery. Explanation of the questionnaire sheet was done. The average number of interviewed mothers was 1-2 mothers/ day depending on their responses to fill the sheets. The average time required to complete questionnaire was 20-30 minutes.

2.11. Statistical analysis:

Statistical analysis was done by using Statistical Package for Social Sciences (SPSS) version 20. Data were collected, revised, organized, coded, tabulated, and analyzed using frequencies, number, percentage, mean scores, & standard deviation. Data were presented in the form of tables and figures. Quantitative data was presented by mean (\bar{X}) and Standard Deviation (SD). Qualitative data was presented in the form of frequency distribution tables, numbers and percentages. Qualitative variables were analyzed by Chi-Square test (χ^2) to detect the relation between the variables of the study (P- value). A highly statistical significant level value was considered when ($p < 0.001$). A statistical significant level value was considered when ($p < 0.05$) and no statistical significance difference was considered when ($p > 0.05$).

3. Results:

Table (1): Shows that, less than half of the studied mothers (46.0%) are in the age group 25 -< 30 years with mean age is 27.52 ± 5.67 years, half of them (50.0%) have secondary education. As regards to occupation, more than two thirds of them (70.0%) are working. Also, more than half of the studied mothers (52.0%) have positive consanguinity and more than half of them (61.5%) who have positive consanguinity are first degree.

Table (2): Illustrates that, more than half of the studied children (56.0%) are in the age group 1 -< 3 years with mean age is 3.18 ± 1.07 years, the majority of them (86.0%) are male. Also, more than half of them (60.0%) have first ranking between their siblings and KG education. Moreover, more than two-thirds of them (68.0%) have bilateral clubfoot and more than three quarter of them (78.0%) don't have medical history of their siblings regarding clubfoot.

Table (3): Reveals that, there is a highly statistical significant relation between total mothers' knowledge and their age, educational level and consanguinity at ($X^2=10.39$ & $P= 0.016$), ($X^2=8.657$ & $P= 0,034$) & ($X^2=6.294$ & $P=0.012$).

Figure (1): Shows that, the majority of studied mothers (88.0%) have inadequate knowledge level regarding club foot. On the other hand (12%) have adequate knowledge level regarding club foot.

Figure (2): Displays that, more than half of the studied mothers (64.0%) have information about clubfoot from doctor, while (4%) of them have information from printed media.

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Table (1) Distribution of the studied mothers regarding their characteristics(n=50).

Characteristics of the studied mothers		No.	%
Age (years)			
	20 < 25	13	26.0
	25 < 30	23	46.0
	30 < 35	6	12.0
	≥ 35	8	16.0
	Mean ± SD	(27.52± 5.67)	
Educational level			
	Illiterate	3	6.0
	Read and write	4	8.0
	Primary education	7	14.0
	Preparatory education	8	16.0
	Secondary education	25	50.0
	High education	3	6.0
Occupation			
	Working	35	70.0
	Don't work	15	30.0
Consanguinity			
	Yes	26	52.0
	No	24	48.0
If yes, what is the degree of consanguinity? (n=26)			
	First degree	16	61.5
	Second degree	7	26.9
	Third degree	3	11.6

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

Characteristics of the studied children		No.	%
Age (years)			
	1 < 3	28	56.0
	3 < 5	13	26.0
	5 - 8	9	18.0
	Mean ± SD	(3.18 ± 1.07)	
Gender			
	Male	43	86.0
	Female	7	14.0
Child ranking			
	First	30	60.0
	Second	13	26.0
	Third and more	7	14.0
Educational level			
	KG education	30	60.0
	Preschool	17	34.0
	Primary school	3	6.0
Affected foot			
	Right foot	7	14.0
	Left foot	9	18.0
	Bilateral foot	34	68.0
Medical history of the siblings			
	Yes	11	22.0
	No	39	78.0

Table (3) Statistical relation between characteristics of the studied mothers and their total knowledge score (n=50).

Items	Level of total knowledge				X ²	P-Value	
	Adequate (n=6)		Inadequate (n=44)				
	No.	%	No.	%			
Age (year)	20 <- 25	3	50.0	10	22.7	10.39	0.016*
	25 <- 30	0	0.0	23	52.3		
	30 <- 35	0	0.0	6	13.6		
	≥ 35	3	50.0	5	11.4		
Educational level	Illiterate	0	0.0	3	6.8	8.657	0.034*
	Read and write	0	0.0	4	9.1		
	Primary education	1	16.7	6	13.6		
	Preparatory education	0	0.0	8	18.2		
	Secondary education	3	50.0	22	50.0		
	High education	2	33.3	1	2.3		
Occupation	Working	6	100.0	29	65.9	2.922	0.087^{NS}
	Don't work	0	0.0	15	34.1		
consanguinity	Yes	6	100.0	20	45.5	6.294	0.012*
	No	0	0.0	24	54.5		

X²: Chi-square test. P= p-value NS No significant at p > 0.05. *Significant at p < 0.05.

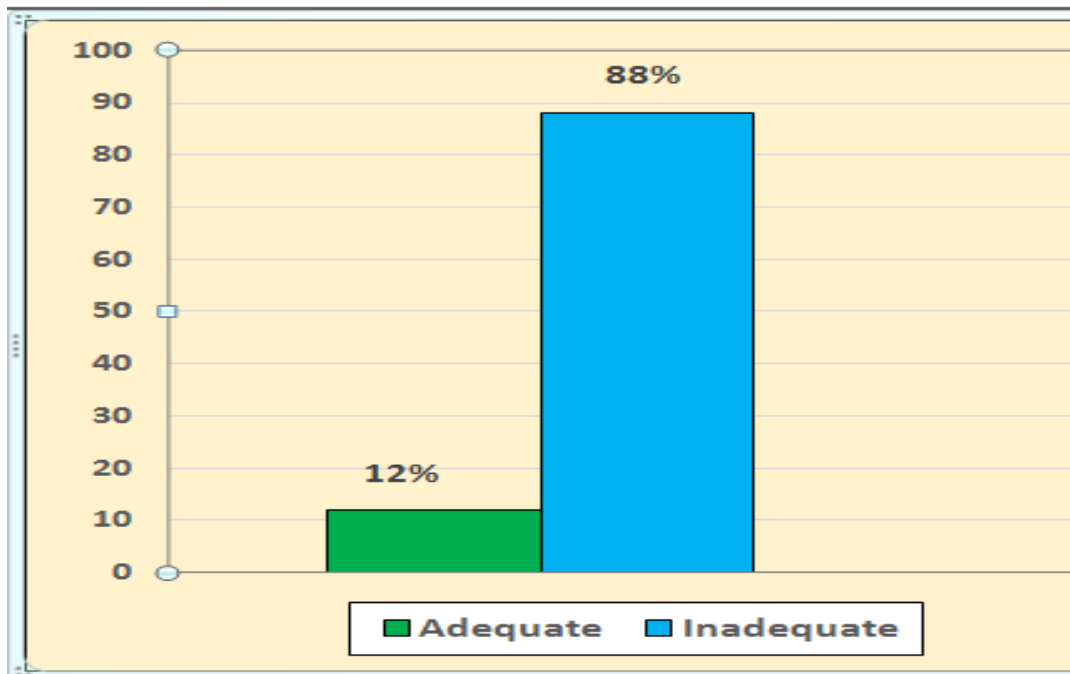


Fig. (1) Distribution of the studied mothers' regarding their total knowledge level about club foot (n=50).

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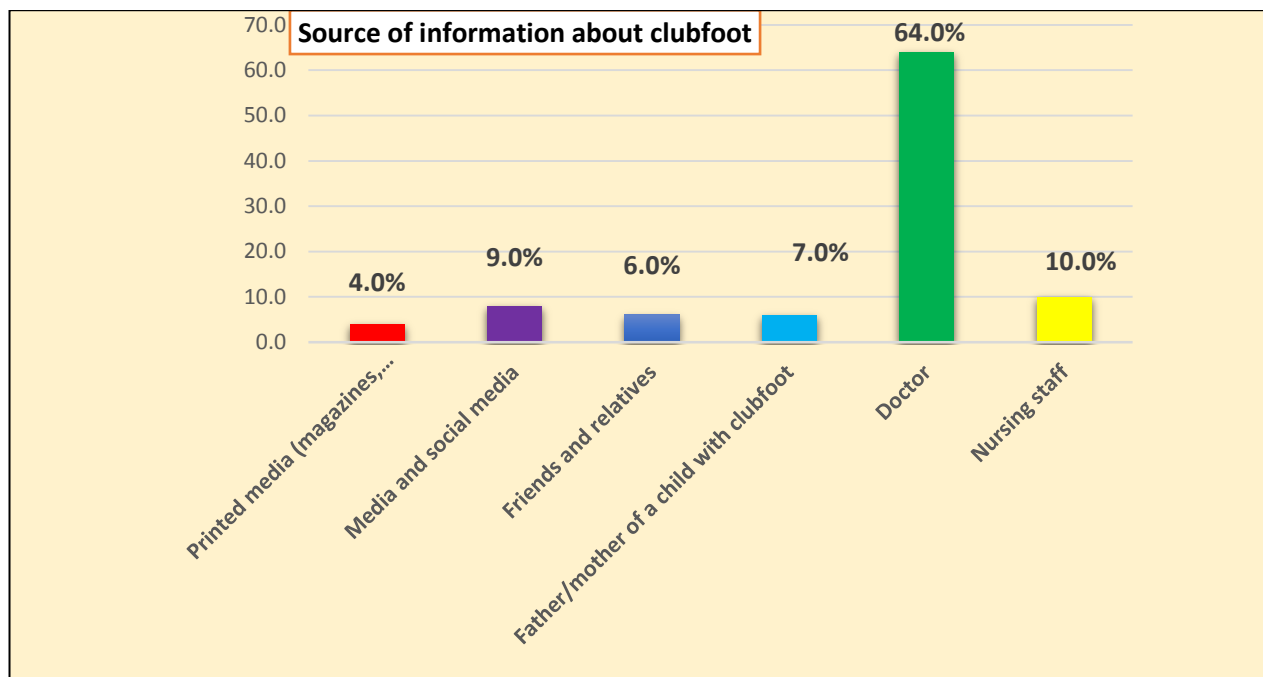


Fig. (2) Distribution of the studied mothers regarding their source of information about clubfoot(n=50).

4. Discussion

Clubfoot, also known as congenital talipes equinovarus (CTEV), is one of the frequent congenital disorders that prevents youngsters from moving freely. It is a 3-dimensional deformity of the foot characterized by equines, hindfoot varus, forefoot adductus, and forefoot cavus. In children, it is a quite common orthopedic condition, and in adults, it frequently results in handicaps. This malformation can cause significant impairment and serious consequences if left untreated. This can result in limitations in participating in activities and an overall disability [22]. Therefore, constant efforts by the surgeon and the parents are needed to correct it [23].

Regarding characteristics of studied mothers the finding of present study showed that, less than half of the studied mothers were in the age group 25 < 30 years with mean age

(27.52 ± 5.67) years old. This result is paralleled with **Al Siddiky** [24] who conduct study in Saudi Arabia about “assessing public awareness of clubfoot and knowledge about the importance of early childhood treatment: a cross-sectional survey” and stated that one third were in the age group 25 < 30 years.

Maternal characteristics including low mother education and young maternal age at conception were revealed to be substantially linked with higher risk of clubfoot [25]. This matches with the present study which showed that, half of the studied mothers had secondary education & more than two thirds of the studied mothers were working. This result is agreed with **Muinde** [26] who conduct study in Kenya about “factors associated with clubfoot bracing among mothers of children under five years attending cure

international hospital in Kijabe” and found that less than half of the studied mothers have secondary education & more than two fifths of the studied mothers were working.

Also agree with **Ndukwu** [27] who conduct study about “A etiology and Management of Congenital Club Foot: Evaluation of Perception of Mothers in Nnewi Mother’s Perception on club foot” and found that less than half of the studied mothers have secondary education.

Consanguinity (when parents are related by blood), raises the likelihood of rare genetic congenital anomalies and almost doubles the risk of mortality in infancy and early childhood, intellectual disability, and other abnormalities. Clubfoot is therefore a polygenic condition that is heterogeneous in nature [25]. This matches with the present study which showed that, more than half of the studied mothers have positive consanguinity with the father. This result matches with [28] who conduct study about “Outcome of prenatal diagnosis of clubfoot” and found that more than three quarters of them have positive consanguinity.

Regarding characteristics of the studied children the present study revealed that, more than half of the studied children are in the age group 1 < 3 years with mean age (3.18 ± 1.07) years old. This finding agrees with **Ugorji** [29] who conduct study in South-East Nigeria about “Epidemiology and Pattern of Clubfoot in Enugu” and found that more than half of the children were in the age group 1 < 3 years.

Also agree with **Kumari** [30] who conduct study about “Assess perception, practice, and lived experiences on use of corrective braces among parents of children diagnosed with clubfoot: A mixed method

study.” and found that more than half of the children were are in the age group 1 –< 3 years.

Males are approximately twice as likely as females to acquire idiopathic clubfoot [31]. This agrees with the present study which indicated that, the majority of the studied children were male. This matches with **Udemezue** [32] who also suggested that females require a greater number of predisposing factors than males to produce a clubfoot deformity. Gender differences also play a role in increasing incidence rate in male than female. for this male preponderance may be due to social bias and increased attention towards males, as also suggested by [33].

This finding agreed with **Ikechukwu** [34] who conduct study in Nigeria about “comparison of blade and needle tenotomy for treatment of residual equinus in idiopathic clubfoot” and found that more than half were male. Also supported with **Pandey** [9] who conduct study in India about “clinical presentation of congenital talipes equinovarus via detailed case scenarios” and found that more than two thirds of the studied children were male.

Congenital clubfoot was more common in first born children than other rankings [35]. This consistent with the present study which indicated that, less than two thirds of the studied children were first ranking. This finding agree with **Saini** [23] who conduct study about “a prospective study on functional outcomes of serial cast correction in congenital talipes equinovarus (CTEV) by ponseti method” and found that more than two thirds of the studied children were of first born.

A bilateral presentation of clubfoot occurs in 50% of cases, although in the case of unilateral disease, the right foot is predominantly afflicted [35]. This agrees with the present study that revealed that, more than two-thirds of the studied children had bilateral clubfoot. This finding congruent with **Rudraprasad** [36] who conduct study in India about “analysis of clubfoot clinic at a pediatric tertiary care government hospital in Karnataka” and found that more than half of the studied children had bilateral clubfoot.

Concerning medical history of the siblings the present study showed that, more than three quarter of the studied children had no siblings history. This may be due to less than two thirds of studied children were first ranking and there is a 10% chance of a subsequent child being affected if the parents already have a child with a clubfoot [25]. This finding matches with [37] who conduct study about “The level of public awareness about clubfoot in the al-qassim region and importance of early childhood intervention: a cross-sectional study” and found that majority of the studied children had no medical history of the siblings.

Regarding relation between characteristics of the studied mothers and their total knowledge score the present study revealed that, there is a statistical significant relation between total mothers' knowledge and their age, educational level and consanguinity at ($P = < 0.001$). While, there is no statistical significant

relation between total mothers' knowledge their occupation at ($P = > 0.05$).

This finding agree with **Alasbali** [38] who found that age was significantly associated with the knowledge level of clubfoot ($P < 0.001$), and it was noted that the higher the age, the higher the knowledge level. Similarly, occupation was associated with knowledge level.

Concerning mothers' total knowledge regarding club foot the present study revealed that, the minority of the studied mothers had adequate knowledge. This result supported with [39] who found that the vast majority of the studied mothers had inadequate knowledge score at pretest.

This finding also agree with **Alasbali** [38] who conduct study in Saudi Arabia about “Assessing awareness and knowledge level of clubfoot among a rural city population in Saudi Arabia ” and found that more than half of the studied mothers have low level of knowledge. This necessitates authorities working together to increase the mothers' education and carrying out surveys to monitor their progress.

Regarding source of information about clubfoot the present study revealed that, less than two thirds of the studied mothers obtained information about clubfoot from doctor. This reflects that nurse not participate in increasing the awareness of mothers about the condition, and instead of having role, the doctor became the major source of information. This finding agrees with **Butt** [40] who conduct study about “Outcomes of the Ponseti Technique in Different Types of Clubfoot—A Single Center Retrospective Analysis” and found that less than half of the studied mothers had information about clubfoot from doctor.

5. Conclusion

The current study concluded that the majority of studied mothers have inadequate knowledge level regarding club foot. It was clear that, there is a statistical significant relation between total mothers' knowledge regarding care of their children undergoing clubfoot surgery and their age, educational level and consanguinity.

6. Recommendations

- Mothers should update their knowledge through continuing training, educational programs and workshops concern the care of their children undergoing clubfoot surgery in pediatric orthopedic health care setting.
- Further researches: Conduct educational program based on continuous care model to update mothers' knowledge and improve their practices.

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