Original Article :

Insight into clubfoot awareness: A cross- sectional survey in Al-Baha Region, Saudi Arabia

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Abstract

Background and Aims:
Clubfoot in Saudi Arabia is considered a public health issue. Early diagnosis and treatment of clubfoot can prevent complex reconstructive surgical treatment. Lack of general knowledge on clubfoot may be a barrier to early intervention and successful management of this condition. We aim to assess public awareness and knowledge level of clubfoot within Al-Baha region.

Methods:
A cross-sectional study was conducted to assess awareness and knowledge regarding clubfoot and its management among parents living in the Al-Baha region. Data collection involved the distribution of a previously validated questionnaire from November 1, 2023, to April 1, 2024. The questionnaire covered awareness and knowledge regarding clubfoot and its management.

Result:
A total of 474 individuals were included in the analysis. The largest age group was 40-49 years old (34.0%). The participants were primarily female, accounting for 74.9% (n=355). Females had a higher level of knowledge than males (p=0.037). Overall, the results indicated a relatively low level of knowledge about clubfoot, with 58.2% of the participants classified as having inadequate knowledge. 74.5% of participants were not familiar with the condition. 77% of participants would like to get more information regarding clubfoot.

Conclusion:
The study reveals a significant lack of awareness about clubfoot and its management in the Al-Baha region, hindering early diagnosis and treatment. Targeted awareness campaigns, leveraging social media, and collaboration with healthcare professionals are essential for educating the community and correcting misconceptions. Improving public knowledge can ensure timely care for affected children.

Keywords:
Clubfoot, Awareness, Foot deformity, Talipes equinovarus, Al-Baha Region, Saudi Arabia

Introduction:

Congenital talipes equinovarus (CTEV) is a congenital disability characterized by leg deformities in the cavus, adducts, varus, and equinus [1]. Clubfoot is one of the most prevalent congenital deformities in the pediatric population, estimated to affect 0.5 to 2.0 cases per 1,000 live births [2]. However, recent study in Saudi Arabia showed a prevalence of 5.3 per 1,000 live births [3]. Clubfoot occurs bilaterally in 50% of cases and is twice as common in males as in females. In unilateral cases, the right side is most frequently impacted [4].

Several environmental risk factors have been linked to the incidence of congenital clubfoot, most notably maternal smoking and family history [5]. Ultrasound imaging can detect clubfoot between the 18th and the 24th week of pregnancy [6.7]. However, the primary method of detection is usually clinical [8]. Clubfoot can be managed using a variety of techniques, which can be classified into surgical and non-surgical approaches [9]. A child with an early diagnosis of clubfoot can usually be managed with the Ponseti method along with achilles tendon tenotomy, which is considered the gold standard and reported to have a high success rate[10]. Another nonsurgical approach to treating clubfoot is the French method, often known as the functional therapy [11]. In some cases, tibialis tendon transfer may be needed to correct residual deformity [12.13]. Management of cases with late detection may be challenging as it may include more complex surgical intervention including posteromedial release, corrective osteotomy, and arthrodesis [14]. Parental awareness plays a crucial role in the early diagnosis and treatment, as neglected clubfoot can result in foot deformity, abnormal gait, painful feet, difficulty wearing shoes, and reduced mobility, often significantly restricting daily activities and negatively impacting the quality of life [15.16]. Despite the high incidence rate of clubfoot, there is a notable deficiency in public knowledge and awareness, particularly among parents and caregivers [17]. Understanding parental awareness and knowledge regarding clubfoot is essential for early recognition and appropriate management.

A study conducted in several cities in Saudi Arabia found that 69.7% of participants had never heard about clubfoot [8]. Another study found that only 38.9% of rural city population had recognized this condition [18], while about 43.8% had fair knowledge about the disorder in Al-Qassim region[19]. A recent study in the Makkah region revealed that a significant portion of the population lacks sufficient knowledge about clubfoot, with only 41.8% of participants having prior awareness of the condition. For instance, more than half of the

respondents were unaware of clubfoot, and many were unfamiliar with the available treatment options[17].

To our knowledge, no previous study has evaluated the level of awareness among parents in Al-Baha region. Therefore, the objective of this study is to evaluate their level of knowledge about clubfoot.

Methodology:

This cross-sectional study was conducted among Al-Baha region population, Saudi Arabia. The inclusion criteria involved individuals living in Al-Baha region, who are older than 18 years and willing to participate. The exclusion criteria include those who are not willing to participate, residing outside Al-Baha region, and healthcare professionals (HCPs). Data collected with a previously validated questionnaire in Arabic language [18]. Ethical approval was obtained from the Institutional Research Board of Al-Baha University under the approval number REC/SUR/BUFM/204/2. Consent was obtained from all participants prior to the distribution of the questionnaire, and they were assured of the confidentiality of their information.

The questionnaire was distributed via Google Forms to the participants through social media platforms. The consent was obtained from the participants at the beginning of the questionnaire, and they were assured of the confidentiality of the information provided. The questionnaire consists two sections, the first section included sociodemographic questions, the second section contained questions to assess population's knowledge and awareness about clubfoot and its management.

The scoring system was used for evaluating awareness and knowledge regarding clubfoot is binary scoring method (0 or 1) for most questions allows for a straightforward assessment of correct and incorrect responses while assigning different weights (3 points and 4 points) to questions 3, 5, and 6 appropriately reflects their relative importance. By summing the scores obtained for each question, we calculated the knowledge score, which provides a quantitative measure of participants› knowledge level. Categorizing participants as having adequate or inadequate knowledge based on their scores above or below the mean score.

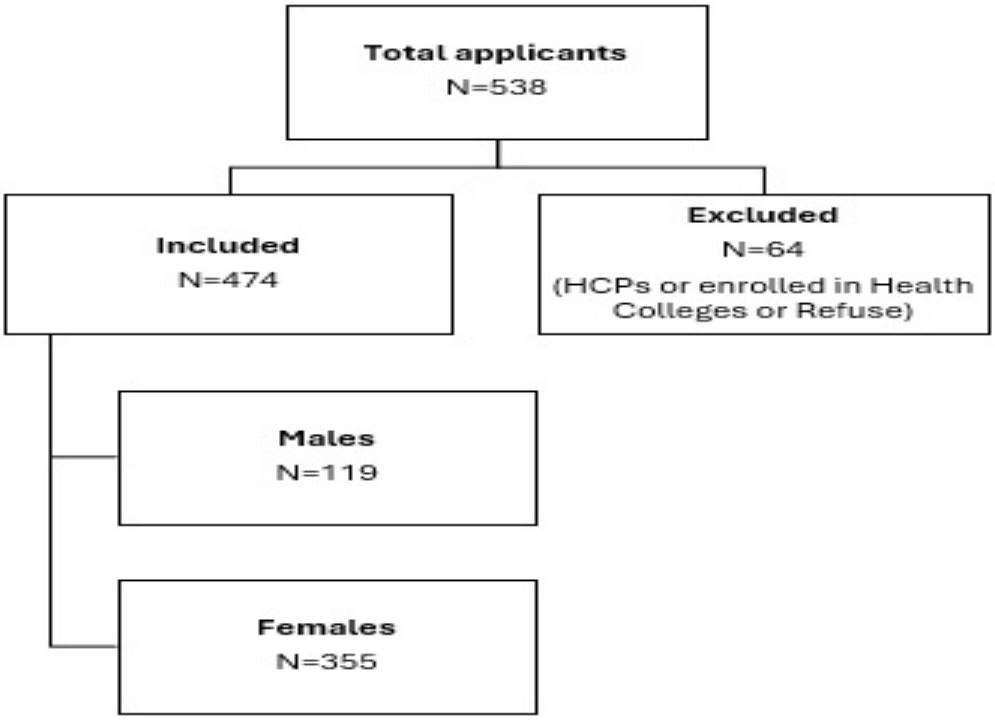
The research study employed descriptive statistics to summarize the data, including counts, proportions (%), median, and mean values with standard deviations, as appropriate. To examine the relationship between knowledge, awareness, and attitude and participants› socio-demographic characteristics, statistical analyses were conducted using the Mann-Whitney U test and Kruskal-Wallis test. These non-parametric tests were chosen to assess potential

differences between groups, considering the nature of the variables and the sample size. A significance level of less than 0.05 ($p < 0.05$) was considered statistically significant, indicating a meaningful association between the variables. Additionally, statistical collinearity was assessed using the Shapiro-Wilk test and Kolmogorov-Smirnov test. All statistical analyses were performed using the Statistical Package for Social Sciences (SPSS), version 28.

Results:

A total of 538 individuals included in our study. However, 64 individuals were excluded from the study, resulting in a final sample size of 474 participants. The main reasons for exclusion were that 60 individuals were identified as HCPs or already enrolled in health colleges, four participants chose not to participate and were thus excluded from the study (Figure 1).

Figure 1: Flowchart of the participants:



The participants were mainly female %74.9 (n=355) and they showed better level of knowledge than male with statistical significance ($p = .037$). The largest age group being 49-40 years old (%34.0). The majority of participants had a bachelor›s degree (%63.1), and approximately half of them were employed (%50.8). Most participants were married (%76.8) and had children (%74.9). The income distribution showed that the majority earned between 10,001 and 20,000 S.R (%41.8), without any statistically significant difference across these demographical data (Table 1).

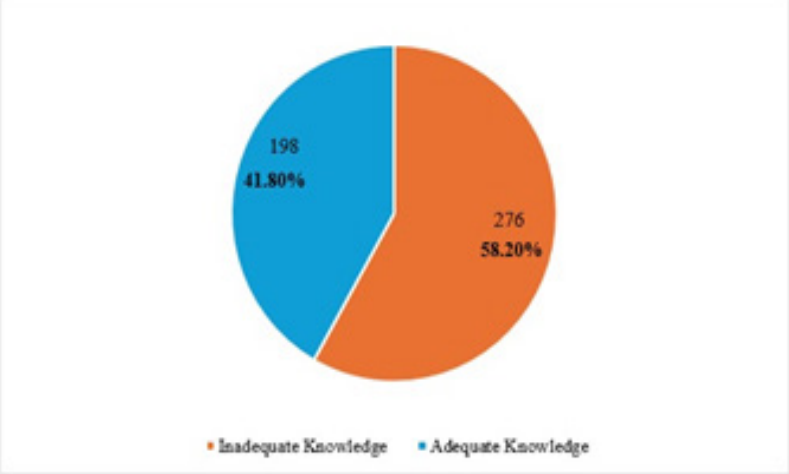
Table 1: Sociodemographic Characteristics of Study Participants and the level of knowledge:

Sociodemographic Data				Level of Knowledge				P-Value
				Inadequate Knowledge		Adequate Knowledge		
		n	%	n	%	n	%	
Gender	Male	119	25.1%	79	66.4%	40	33.6%	.037
	Female	355	74.9%	197	55.5%	158	44.5%	
Age	18-29 Years old	97	20.5%	52	53.6%	45	46.4%	.566
	30-39 Years old	71	15.0%	41	57.7%	30	42.3%	
	40-49 Years old	161	34.0%	108	67.1%	53	32.9%	
	50-59 Years old	133	28.1%	73	54.9%	60	45.1%	
	60-69 Years old	12	2.5%	2	16.7%	10	83.3%	
Educational level	I don`t have an educational qualification	4	0.8%	2	50.0%	2	50.0%	.142
	High school or less	72	15.2%	44	61.1%	28	38.9%	
	Diploma	71	15.0%	47	66.2%	24	33.8%	
	Bachelor	299	63.1%	169	56.5%	130	43.5%	
	Postgraduate degree (Master, PhD)	28	5.9%	14	50.0%	14	50.0%	
Current employment status	Employed	241	50.8%	153	63.5%	88	36.5%	.014
	Unemployed	87	18.4%	51	58.6%	36	41.4%	
	Student	68	14.3%	30	44.1%	38	55.9%	
	Retired	78	16.5%	42	53.8%	36	46.2%	
Marital status	Single	89	18.8%	46	51.7%	43	48.3%	.513
	Married	364	76.8%	221	60.7%	143	39.3%	
	Divorced	14	3.0%	5	35.7%	9	64.3%	
	Widow	7	1.5%	4	57.1%	3	42.9%	
Do you have children?	No	119	25.1%	64	53.8%	55	46.2%	.256
	Yes	355	74.9%	212	59.7%	143	40.3%	

number of children	None	119	25.1%	64	53.8%	55	46.2%	.982
	One	30	6.3%	21	70.0%	9	30.0%	
	Two	40	8.4%	26	65.0%	14	35.0%	
	Three	72	15.2%	41	56.9%	31	43.1%	
	Four	76	16.0%	48	63.2%	28	36.8%	
	Five	86	18.1%	47	54.7%	39	45.3%	
	Six	34	7.2%	20	58.8%	14	41.2%	
	Seven	14	3.0%	7	50.0%	7	50.0%	
	eight	2	0.4%	2	100.0%	0	0.0%	
	Nine	1	0.2%	0	0.0%	1	100.0%	
Monthly income	Less than or equal 5,000 SR.	76	16.0%	48	63.2%	28	36.8%	.357
	From 5,001-10,000 thousand SR.	150	31.6%	87	58.0%	63	42.0%	
	From 10,001 – 20,000 SR.	198	41.8%	114	57.6%	84	42.4%	
	More than 20,000 SR.	50	10.5%	27	54.0%	23	46.0%	

The assessment of the level of knowledge among the Al-Baha population regarding clubfoot revealed that the participants had a mean score of 7.06 out of 16 points, with a median of 7 ± 2.19. The results indicated a relatively low overall knowledge level, with 58.2% of the participants classified as having inadequate knowledge, (Figure 2).

Figure 2: Distribution of knowledge levels regarding clubfoot among the Al-Baha population:



In our study we found that 74.5% of participants were not familiar with the condition, while only 13.3% correctly identified the condition as «Clubfoot.» Regarding the consequences of leaving clubfoot untreated, 65% recognized the development of an abnormal gait, and smaller proportions identified skin issues and ulcers (14.8%), and shoe-fitting issues (39.7%).

Concerning risk factors, 27.8% believed that having a family member with clubfoot increased the likelihood of developing the condition. Also, maternal smoking during pregnancy (13.1%) was recognized as a potential risk factor, while factors like gender (2.1%) and the evil eye (5.7%) were less commonly acknowledged. A majority of participants (75.1%) considered that clubfoot is treatable. However, when asked about the appropriate age to start treatment, 42.8% recognized birth to six months as the optimal time (Table 2).

Table 2: Evaluation of the awareness, knowledge, and attitudes of Al-Baha population regarding Club Foot:

		n	%
Do you recognize this condition? (Clubfoot)	No	353	74.5%
	Yes	121	25.5%
What is this condition called?	Foot deviation	35	7.4%
	Clubfoot	63	13.3%
	Cavus foot (Pes cavus)	7	1.5%
	Equinovarus foot	4	0.8%
	Cavus foot (Pes cavus)	12	2.5%
	I don`t know	353	74.5%
How do you think early medical intervention will affect the outcome?	Improve the outcome	355	74.9%
	Worsen the outcome	11	2.3%
	I don't know	108	22.8%
If left untreated, this condition can lead to which of the following conditions? #	Normal foot	16	3.4%
	Loss of motor function	145	30.6%
	Painful foot	158	33.3%
	Abnormal gait	308	65.0%
	Skin issues and ulcers	70	14.8%
	Shoe-fitting issues	188	39.7%
	I don`t know	87	18.4%

Does the incidence rate increase if a family member suffers from the same condition?	No	37	7.8%
	Yes	132	27.8%
	I don`t know	305	64.3%
In your opinion, which of the following factors increases the risk of clubfoot? #	Pregnancy with twins	55	11.6%
	Medical error during childbirth	120	25.3%
	The evil eye	27	5.7%
	Family medical history	199	42.0%
	Gender (male or female)	10	2.1%
	Maternal smoking during pregnancy	62	13.1%
	I don't know	243	51.3%
Do you think this condition is treatable?	No	5	1.1%
	Yes	356	75.1%
What is the first treatment for clubfoot?	Cast	52	11.0%
	Physical therapy	72	15.2%
	Surgery	122	25.7%
	Splint	39	8.2%
	Medical shoes	32	6.8%
	I don't know	157	33.1%
What is the proper age to start treatment for clubfoot?	Birth-6 months	203	42.8%
	6-12 months	75	15.8%
	1-4 years	42	8.9%
	>4 years	8	1.7%
	I don`t know	146	30.8%

#: Multiple Responses

Our data shows that most of the participants (%82.5) have not heard or read about clubfoot. Among those who have received information (n=83), internet sites were the most common source (%50.6), followed by printed media (%29.1), and relatives and friends (%36.7). Furthermore, %14.3 reported knowing someone with Clubfoot. A significant number (%77) expressed a desire to know more about clubfoot (Table 3).

Table 3: Exploring Clubfoot: Familiarity, Sources, Personal Connections, and Curiosity:

		n	%
Have you ever heard or read about clubfoot?	No	391	82.5%
	Yes	83	17.5%
From your personal experience, which of the following sources provided you with information about club feet? # (n=83)	Printed media (magazines, newspapers, books)	23	29.1%
	Internet sites	40	50.6%
	Radio and television	11	13.9%
	Relatives and friends	29	36.7%
	Social media	25	31.6%
	Previously diagnosed person	16	20.3%
Do you know a person diagnosed with clubfoot deformity?	No	406	85.7%
	Yes	68	14.3%
Would you like to know more about Clubfoot?	No	109	23.0%
	Yes	365	77.0%

#: Multiple Responses

Discussion:

Early diagnosis and treatment of clubfoot in infancy can significantly improve long-term outcomes and reduce the need for more invasive surgeries[21.22]. Therefore, community awareness is crucial to ensure these children receive proper early treatment. In our study, we found that 58.2% of the population in Al-Baha region had an inadequate level of knowledge about clubfoot. Our results are consistent with previous studies conducted locally in Saudi Arabia, such as in Makkah (58%) [17] and Al-Qassim (60%) [19], as well as internationally, with Pakistan (69.7%) [24] and India (57%) [24] reporting similar findings. The low level of knowledge can be attributed to several factors, including limited public health education initiatives focused on clubfoot, lack of awareness campaigns, and possibly cultural beliefs that may hinder seeking early medical advice.

When participants were shown a photograph of clubfoot, only 25% were able to correctly identify the condition. Additionally, only 18% of participants reported having heard about clubfoot. This low level of awareness aligns with a study conducted in rural communities of Saudi Arabia, where 38.9% of participants were able to recognize the condition from a photograph. When asked if they had heard or read about clubfoot, only 41.6% of participants responded affirmatively. The low level of knowledge

may be attributed to the rarity of the condition and the specific characteristics of the pathology, which can make it difficult for the general population to recognize and understand.

In our study, we found that females were more knowledgeable about clubfoot than their male counterparts, with statistical significance (p = 0.037). These results are consistent with findings from previous studies conducted in Makkah and Al-Qassim[17,19]. This disparity may be attributed to the active roles often played by females in family health education. However, it is important to consider the possibility of self-selection bias, meaning that males may not be well-represented in this study. To address this, we recommend developing targeted educational programs to increase clubfoot knowledge among males, using inclusive sampling methods in future studies to ensure balanced representation, engaging community leaders in outreach efforts to promote awareness of clubfoot among males, and conducting further research to explore the underlying reasons for gender differences in knowledge about clubfoot.

Regarding the source of information in Saudi Arabia, social media has become an important part of the everyday lifestyle. Around 92% of individuals use the internet, and approximately 25 million individuals are actively using social media[25]. It was predicted that 50% of participants would use social media to learn about clubfoot and 37% heard about it from Relative or friend. In contrast AL-Qassim study found that Relative and friends 43% is more commonly used then Internet used by 30% of participants [19]. While a Study involved multiple Saudi Arabia cities concluded that Social media source used by 38% Relative and friend in 20%[6]. Moreover, a study, conducted in Makkah Region found that 27% of the participants reported using websites and the internet as their sources of information about club foot. Social media were reported by 23% of the participants as their source of information [17].

Concerning treatment The best initial treatment of clubfoot is non-surgical[11]. The most common method worldwide for correcting clubfoot is the Ponseti method [10]. In our study a majority of participants 75% believed that clubfoot is treatable. This result is in line with study conducted in Middle East where All respondents prefer to start treatment soon after birth when this is possible[26]. While in the study conducted in Nigeria 54% mothers felt that this problem could be treated [24]. Moreover, 43% of participant in our study recognized birth to six months as the optimal time to start treatment which is concordant with a study conducted in several cities in Saudi Arabia found 42% of the participants believe the

proper age for treatment is from birth - 6 months [8]. While in Al-Qassim study 52% recognized optimal time correctly [19]. However, in study conducted in India only 25% of the participants believed that any kind of treatment should be started immediately after birth [24].

The study has some limitations, firstly, our study's design cannot demonstrate cause-and-effect relationship. Secondly, the focus on a single region in Saudi Arabia limits the generalizability of the results. Finally, the study had a higher response rate from female participants, which may lead to self-selection bias. Future research perspective could be considered in order to understand the global awareness of clubfoot among Saudi population.

Conclusion:

There was low awareness among Al-Baha region population regarding clubfoot and its management; this low awareness may be a barrier to early intervention and successful management of this condition. Public awareness campaigns, particularly through social media and in collaboration with reliable sources, could effectively educate the community on risk factors, the benefits of early intervention, and available treatment options. Enhancing public knowledge could facilitate timely care for affected children, improving their prognosis.

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