Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 22s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

A Population-Based Assessment of Awareness and Understanding of Clubfoot in the Aseer Region, Saudi Arabia

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Cite this paper as: Dr. Turki Ahmed Alqahtani, Dr. Abdulla Fahad Riazah, Mohammed Yahya Althwabi, Mohanad Qasem Alshabab, Ghadeer Redha Alnakhli, Majdoleen Ali Abdulrahman, Faris Mohammed Alasmari, Saud Abdullah Alqahtani, Ali Mushabib Alnuwayhidh, Hamad Khalid Faya, (2025) A Population-Based Assessment of Awareness and Understanding of Clubfoot in the Aseer Region, Saudi Arabia. *Journal of Neonatal Surgery*, 14 (22s), 1052-1058.

ABSTRACT

Background: When recognized early, clubfoot is a treatable condition. The lack of public awareness about clubfoot, however, can cause treatment to be delayed. The purpose of this study was to evaluate public awareness about clubfoot in the Aseer region, Saudi Arabia.

Methods: We performed a cross-sectional survey that included Saudi Arabian residents of the Aseer regions from July to December 2022. An online survey was devised by orthopedic experts to gather information on public knowledge of clubfoot risk factors, treatment options, surgical complications, and prognosis. Regardless of whether they were familiar with someone who had clubfoot, the target sample consisted of 476 individuals from all age groups and both sexes in the general population.

Results: A total of 476 participants completed the online survey; 58.6% were male and their ages ranged from 18 years to more than 50 years. A total of 245 (51.5%) have never heard about club foot. The analysis showed 365 (76.7%) of our participants had a poor level of awareness about clubfoot (Achieving less than 60% on the awareness questionnaire). The most common source of awareness about clubfoot was relatives and friends (26.1%), followed by social media (22.1%), websites (12.6%), and books and magazines (10.9%) whereas 43.9% did not have a source of their information about clubfoot. Citing books and magazines as the source of information about clubfoot was associated with good awareness level ($X^2 = 43.800$, $p < .01$).

Conclusion: The study found that the majority of people in the Aseer region were unaware of clubfoot. It was found that up to 76.7% of people had a low level of awareness about the illness. The only important variable linked to good clubfoot awareness was the source of knowledge.

Keywords: *Clubfoot, awareness, knowledge, general population, public, Saudi Arabia.*

1. INTRODUCTION

Clubfoot (congenital talipes equinovarus) is one of the most common musculoskeletal congenital anomalies that cause impairment in mobility. A clubfoot is characterized by hindfoot equinus, midfoot cavus, and forefoot adduction. This condition can either be idiopathic (80% of cases) with a 25% familial occurrence or associated with other conditions (termed syndromic clubfoot), including myelomeningocele, amniotic band syndrome, and arthrogryposis [1,2]. Nearly half of the cases of clubfoot are affected in both feet [3]. In cases of identical twins, the affection of one of them is associated with a 33% chance the other one will be as well [4]. Clubfoot is mainly detected clinically, and radiography is not essential for diagnosis. In addition, ultrasound can be used for antenatal diagnosis [5]. Several treatment methods are available for managing clubfoot, and these can be classified into non-operative and operative techniques. Serial manipulation and casting are non-operative treatments of clubfoot, and several methods have been described. One of these is the Ponseti method, which is considered the gold standard used in most countries and is reported to have a high success rate. Operative methods are used in cases of late detection or after the failure of non-operative methods [6]. In a study done in ALQassim in 2020 and included 7085 individuals, the level of public awareness was as follows: 15.6% had poor knowledge, 43.8% had fair

knowledge, and 40.6% had high knowledge [7]. Alsiddiky et al. reported that 520 of the respondents (69.7%) had never heard about clubfoot syndrome. Among the participants, 5.4% had a child with clubfoot syndrome and 4.6% were aware of clubfoot because they had an affected child. They also found that the most common sources of knowledge about clubfoot was relatives and friends (42.55%) [1]. Upon that we surveyed the general population in the Aseer region to evaluate public awareness about clubfoot.

2. MATERIALS AND METHODS

Study design: This study was a community-based, cross-sectional, descriptive study conducted in the region of Aseer, southwest the Kingdom of Saudi Arabia. The study was conducted in a six-month period between July to December 2022.

Study population and sampling: Participants in the study were randomly selected from the general population who lived in the Saudi Arabian province of Aseer and gave their consent. All participants who had refused to participate or who did not reside in the Aseer region were also disqualified. Data were gathered using an online questionnaire that has previously been validated [1,8,9]. The questionnaire was designed and reviewed by independent experts in orthopedics, then it was translated into simple Arabic and distributed electronically on Google Forms through social media. it consisted of multiple-choice questions on the sociodemographic details of the participants, such as gender, age, marital status, and level of education. A separate section of the questionnaire consisted of nine questions assessing the participants' level of clubfoot awareness and source of knowledge. The Cronbach's alpha (reliability test) for the questionnaire was 82.8, indicating good reliability.

Statistical analysis

Data were tabulated and processed using Statistical Package of Social Sciences (SPSS) Version 25 (SPSS Inc., Chicago, IL). All eligible questionnaires will be double checked before coding. Frequencies of categorical variables were determined using descriptive analyses. Each correct answer to the awareness questions (i.e., eight questions) was scored one point. Awareness level was categorized into good (a total score of 5 or more) and poor (a total score of less than 5). Chi-square or Fisher's exact test was employed to identify the associations between the awareness level and the studied independent variables. Associations will be considered statistically significant p-value < 0.05.

Ethical consideration

The institutional review board (IRB) of the Directorate of Health Affairs in Aseer provided the ethical approval for this study. All participants provided electronic consent after being informed of the study's objectives.

3. RESULTS

The study enrolled 543 participants; 63 were excluded as they lived outside the Aseer region. The analysis showed that 58.6% of the participants were male and 45.8% were 20 to 30 years old. Half (50.0%) were married. The majority of participants (67.2%) had at least a Bachelor's/diploma degree. The baseline characteristics of the study sample are shown in Table 1.

Table 1. Baseline characteristics of the study sample (n = 476).

Variables	Frequency	Percent
Sex		
Male	279	58.6
Female	197	41.4
Age group (years)		
< 20	52	10.9
20-30	218	45.8
31-40	68	14.3
41-50	82	17.2
> 50	56	11.8
Education		
Elementary school	6	1.3

Secondary school	18	3.8
High school or below	92	19.3
Bachelor's or diploma	320	67.2
Master or doctorate	40	8.4

Table 2 shows that slightly more than half of the respondents (51.5%) did not hear about club foot, and 43.9% did not have a source for their information about club foot (Fig. 1). A total of 43.9% correctly identified hereditary and genetics as risk factors for club foot. While half of the were not aware of the percentage of children with club foot, 26.7% thought it was 0-20%. All available treatment modalities were known to 41.2%, but only 27.9% reported a correct timing of club foot treatment. A total of 41.0% thought that surgical treatment of club foot is indicated when patients have no response to cast therapy, while only 17.4% identified nerve and vascular injuries as a common complication of surgical correction of club foot. A total of 30.9% reported that follow-up should take place after two years of age in children with clubfoot (Table 2).

Table 2. Awareness about club foot among the study population (n = 476).

Variables	Frequency	Percent
Have you heard About club foot?		
No	245	51.5
Yes	231	48.5
What do you think are the risk factors of club foot?		
Don’t know	191	40.1
Sex of the newborn	11	2.3
Hereditary and genetic reasons*	209	43.9
Walking style or leg injury	65	13.7
What do you think is the actual percentage of children having club foot?		
Don’t know	238	50.0
0-20%*	127	26.7
20-40%	76	16.0
40-60%	30	6.3
60-80%	4	.8
80-100%	1	.2
What do you think is the treatment of club foot?		
Don’t know	154	32.4
Cast	33	6.9
Surgery	39	8.2
Physiotherapy	54	11.3
All above*	196	41.2
What do you think is the appropriate age to treat club foot?		
Don’t know	218	45.8
1-12 months*	133	27.9

1-4 years	125	26.3
What do you think are the indications of surgical treatment of club foot?		
Don't know	211	44.3
No response to cast therapy*	195	41.0
Being older than 1 year	41	8.6
Frequent disability	29	6.1
What do you think are the most common complications of surgical treatment of club foot?		
Don't know	250	52.5
Injury to the nerves or vessels*	83	17.4
Permanent leg disability	75	15.8
Ankle stiffness	68	14.3
What do you think is the appropriate follow-up time for a child with a club foot?		
Don't know	211	44.3
< 2 years	118	24.8
> 2 years*	147	30.9
* Correct answers.		

Fig. 1 illustrates the sources of knowledge about clubfoot as cited by the study subjects. The most commonly cited source of information was relatives and friends (26.1%), followed by social media (22.1%), and websites (12.6%), with books and magazines cited by only 10.9% of the respondents (Fig. 1).

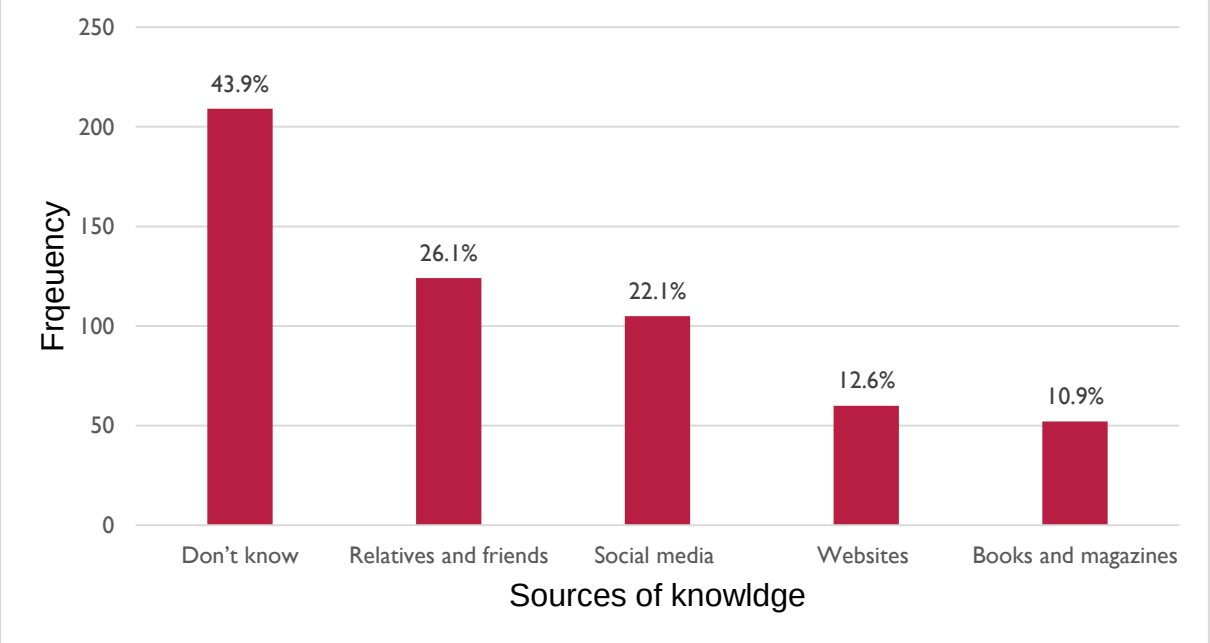

Figure 1 Sources of knowledge about clubfoot

As shown in Table 3, 76.7% of the respondents had poor awareness about club foot. There was a significant difference in awareness level in relation to the source of information about club foot. Respondents who took their information about club foot from books and magazines (60.0%) were more likely to score higher on the study questionnaire than did those who cited

other, unreliable sources of information ($X^2 = 43.800$, $p < .01$). In terms of sex, age, and education, there was no significant difference in awareness level (all p values > 0.05) (Table 3).

Table 3. The relationship between sociodemographic characteristics and club foot awareness level (n=476).

Variables	Categories	Awareness level					
		Good		Poor		X^2	p
		N	%	N	%		
All participants	Total	111	23.3	365	76.7		
Sex	Male	69	24.7	210	75.3	.751	.441
	Female	42	21.3	155	78.7		
Age	< 20	11	21.2	41	78.8	2.739	.602
	20-30	45	20.6	173	79.4		
	31-40	19	27.9	49	72.1		
	41-50	20	24.4	62	75.6		
	> 50	16	28.6	40	71.4		
Education	Elementary school	2	33.3	4	66.7	6.529	.163
	Secondary school	20	0.0	18	100.0		
	High school or below	78	21.7	72	78.3		
	Bachelor's or diploma	11	24.4	242	75.6		
	Master or doctorate	2	27.5	29	72.5		
Source of information	Don’t know	37	13.5	237	86.5	43.800	.000
	Social media	23	33.3	46	66.7		
	Websites	9	37.5	15	62.5		
	Relatives and friends	27	32.1	57	67.9		
	Books and magazines	15	60.0	10	40.0		

4. DISCUSSION

Clubfoot, also known as congenital talipes equinovarus, is a congenital foot abnormality. It is one of the most prevalent congenital malformations and manifests in different clinical forms with varying degrees of severity. The consensus supports a number of genetic and environmental risk factors that contribute in varied degrees to the clinical presentations of the condition, even though the exact etiology is still up for debate [10]. Clubfoot affects 0.5 and 2 cases per 1000 births with varying trends of incidence in particular ethnicities [11]. Males are twice more likely to have clubfoot than females [3]. The gold standard treatment of clubfoot is serial casting of the foot followed by regular corrections with cast, a method known as the Ponseti technique. Casting can be used up to the age of two, however it is recommended to start during the first two weeks of life. Depending on how stiff the foot is, 5 to 9 casts are normally needed, and they are replaced every 5 to 7 days [12]. When diagnosed and treated properly, clubfoot has good success rates for treatment and overall patient outcomes. Therefore, an optimum long-term outcome is facilitated by early detection and diagnosis in the infant.

The present study aimed at evaluating awareness about clubfoot in the general population in Saudi Arabia. The sample consisted of 476 Saudi participants from Aseer region to examine the level and sources of knowledge about different aspects of clubfoot. The analysis showed that 51.5% did not hear about clubfoot and among those who heard about it 43.9% reported no source of their information. After scoring the participants’ responses on the study questionnaire, the majority (76.7%) of the respondents had poor awareness about clubfoot, which differed according to the source of knowledge.

In the local literature, a few studies have been conducted in Saudis from Aseer, Makkah, and Riyadh. Both the local and

international literature have shown a similar overall lack of awareness about clubfoot in the general population and more importantly among caregivers, highlighting critical knowledge gaps and ignorance about basic facts about the disease. In their study of parents of children with clubfoot, Alam et al. showed that 93.3% of parents were unaware of clubfoot before the birth of a kid with this condition. In another study by Iqbal et al., over half (57.4%) of parents were totally unaware of clubfoot before they had to care for an affected child. The study reported considerably high numbers of parents citing non-scientific explanations and non-medical treatment methods [13]. In Riyadh, et al. showed that 69.7% of Saudi participants have never heard about clubfoot and that social media and friends and relatives were the most common sources of knowledge about the disease [1]. Consequent studies in Saudi Arabia replicated these findings [8,9].

In response to the question about risk factors of club foot, 43.9% agreed with the common theory that genetic factors play an important role in the etiology of clubfoot, however 40.1% did not know which factors influenced the risk of clubfoot. These findings are consistent with those of previous studies. In a study using a sample of general population from Aseer region, Alfaya et al. found that 42.2% believed that genetics are among the important risk factors for clubfoot [9]. As demonstrated by research by Bridgens and Kiely, Clubfoot is inherited as a polygenic multifactorial trait, suggesting that genetic factors do play a significant role, but the route of inheritance is yet to be understood [14].

We found that while 32.4% did not know what are the treatment options for children with clubfoot, 41.2% of the respondents believing that the treatment of clubfoot is a combination of casting, surgery, and physiotherapy. This is in agreement with what was found in a previous study from Saudi Arabia [9]. Alsiddiky et al. in their study of public awareness of clubfoot in the general population in Saudi Arabia noted that previous information of clubfoot was significantly associated with awareness of the best time to begin clubfoot intervention and that there was a statistically significant association between awareness and the proper perception of first-line treatment for clubfoot [1]. Regarding the appropriate time to initiate therapy for clubfoot, only 27.9% of respondents in this study chose a correct interval (birth to 12 months) whereas 26.3% thought it was 1 to 4 years and 45.8% did not know. Similar misinformation about the best time to start clubfoot treatment was reported in the literature [1,9,13].

Consistently with previous studies, the analysis showed that 26.1% learned about clubfoot from relatives and friends. This is in accordance with a study by ALmogbil et al. who found that 42.5% received their knowledge about clubfoot from relatives and friends [7]. This was expected from the current study population as clubfoot is rarely discussed in public media targeting the general population. One could know about clubfoot by having a relative with an affected child. Unfortunately, taking information about clubfoot from non-professional lay people is expected to lead to misinformation about the topic and consequently affect treatment outcomes which is largely dependent on the caregivers awareness about critical aspects of clubfoot management, namely timing and the important role of regular follow up visits. Social media has significantly influenced everyday life in Saudi Arabia as up to 25 million Saudis regularly use social media [15]. In fact, social media was the most common source of information about clubfoot in most of the previous studies [1,8]. Our respondents who used the Internet to learn about clubfoot sum up to 34.7% (22.1% from social media and 12.6% from websites). These findings suggest that social media may be a useful tool for a public awareness campaign. Additional research is required to ascertain the efficacy of various awareness campaign approaches and how they affect patient outcomes.

The level of awareness about clubfoot has been associated with different factors, including gender, age, marital status, educational attainment, place of residence, having heard about clubfoot, and having a kid with clubfoot [7]. In the current study, subjects who cited books and magazines as their source of information about clubfoot were more likely to have a better score on the study questionnaire (60% had good knowledge). The difference was the only statistically significant among sociodemographic factors. Alfaya et al. found a similar difference and reported that the majority of their respondents who had good awareness about clubfoot cited books and newspapers as their primary source of information about the condition [9]. This could be explained by the fact that books and magazines offer accurate, up-to-date information about medical conditions while other cited sources do not necessarily comply with scientific standards. Encouraging the public to choose the best evidence-based sources of information about clubfoot is essential to ensure that they take their information from a scientifically reliable source. The questionnaire did not include questions about having a kid with a clubfoot and this is a limitation to the present study as it is of a statistical value in determining the prevalence of the condition in the current sample as well as it is expected to influence the awareness level.

Although our study addressed awareness about clubfoot in the general population of Saudi Arabia using a sufficient randomized sample, it was a cross-sectional, online survey, which may have influenced the validity of answers if searched on the Internet during participation. In addition, as the study included only participants from Aseer region, our findings can not be generalized to all Saudis. Furthermore, the questionnaire did not include important variables like having a child or a relative with clubfoot. These limitations should be addressed by future researchers in an interview-based studies using a standardized questionnaire designed in light of the current and previous findings of clubfoot awareness studies from Saudi Arabia.

5. CONCLUSION

In conclusion, the study revealed an overall lack of awareness about clubfoot among the general population of Aseer region. As shown, as much as 76.7% were found to have a poor level of awareness about the condition. Source of knowledge was the only significant factor associated with good awareness about clubfoot. Therefore, high-risk groups should attend health education campaigns to help them comprehend the disorder's nature and provide encouragement about the potential benefits of postnatal care. Social media, cited as the second most common source of information in this study, can raise public awareness, but only when it's supplemented with reliable sources like medical practitioners and evidence-based books targeting the public.

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