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What Does Aseer Region Community Know About Club Foot, Its Related Risk Factors, And Management Options?

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Abstract

Background: Clubfoot is a congenital foot defect in which the heel is in the equines position, and the foot is adducted and supinated. Its etiology isn't clear; however, genetic and environmental factors may be involved. Early treatment results in improvements, and the patient needs no surgical interventions, whereas late treatment may be restricted to surgical options. Moreover, neglecting the condition leads to lifelong disability. So, awareness about this disease and its management is necessary among the population. **Aim:** To assess the awareness of Aseer region community about clubfoot and its related risk factors as well as management options. **Methods:** A descriptive cross-sectional survey-based study was conducted on the general Saudi population by sending the survey used in the study to the participants through e-mail or online. SPSS program version 22 was used to analyze the collected data from retrieved surveys. **Results:** The study included 1052 individuals; 69.9% were females, and 93.7% were Saudi Arabian. About 33.5% heard about clubfoot, and 9.6% reported that healthcare workers were the source of information. Only 6.8% reported having a child with clubfoot. There were 47.5% who said a high level of awareness about clubfoot risk factors and management. The level of awareness was significantly affected by several factors, including gender ($P=0.012$), education ($P=0.0001$), and family history ($P=0.0001$). **Conclusion:** There was a low level of awareness among the population in the Aseer community about clubfoot and its related risk factors, as well as management options that require improvements.

Keywords: *Awareness, Knowledge, Clubfoot, Risk factors, Congenital, Risk factors, management*

Introduction

Clubfoot or congenital talipes equinovarus (CTEV) is a congenital deformity of the foot (Ghanem *et al.*, 2021). The term "talipes" is derived from the Latin word "talus," which means ankle, and "pes," which means foot, whereas "equino" means horse-like (Nordin *et al.*, 2022). Clubfoot is a complex tridimensional deformity concerning the forefoot, midfoot, and hindfoot (Ghanem *et al.*, 2021); it is a fixation of the foot in adduction, supination, and varus. There is a medial rotation in the calcaneus, navicular and cuboid bones concerning the talus, and are held in adduction and inversion by tendons and ligaments (Miedzybrodka, 2003).

Clubfoot consists of four components; equines, hindfoot varus, midfoot cavus, and forefoot adducts (Ghanem *et al.*, 2021). It can affect either one foot or both feet (Ansar *et al.*, 2018); almost one-half of the affected infants have bilateral involvement and unilateral deformity occurs more often on the right side (Chung *et al.*, 1969; DeValentine, 1992). The exact etiology is still debated, and consensus favors the contribution of multiple genetic and environmental factors (Ghanem *et al.*, 2021).

The global prevalence of clubfoot was estimated to be 0.6% to 1.5/ 1000 live birth (Ansar *et al.*, 2018). In Sweden, the prevalence in 2014 was 1.4/per 1000 live birth (Wallander *et al.*, 2006). A study conducted at Mysore Medical College & Research Institute and included 12753 newborn babies showed that the incidence of clubfoot was 1.9/1000 birth, and 45.9% of cases were born to mothers in an age group of 21-25 years old. Clubfoot was more common among males than females and singletons than twins. The risk factors determined included oligohydramnios (8.3%) and spina bifida (4.16%) (Shylaja *et al.*, 2016). Other risk factors include family history, twin pregnancy, first baby, and male baby (Ahmed *et al.*, 2020).

Early treatment of clubfoot can correct the position of the foot without the need for surgery. In contrast, the delay in treating this condition makes it difficult to offer a non-surgical option for treatment (Brufat *et al.*, 2013).

Clubfoot may lead to lifelong disability if not treated; the affected individual may not be able to wear shoes and may experience severe pain during walking (Rasheed *et al.*, 2017). Public knowledge and awareness about clubfoot is the key to the early management of that condition (Brufat *et al.*, 2013); on the other hand, lacking awareness is a barrier to treatment of this disease (Rasheed *et al.*, 2017). In a study, it was stated that illiteracy and poverty are involved reasons for affected children to be neglected and stay without treatment which may worsen the condition and makes it difficult to treat the deformity (Evans *et al.*, 2016).

A lack of studies evaluated the public awareness regarding clubfoot (Alsiddiky *et al.*, 2019), and the available studies reported a low level of awareness [Brufat *et al.*, 2013; Rasheed *et al.*, 2017; Alam *et al.*, 2015). Therefore, this study was performed to assess the awareness of Aseer region community about clubfoot and its related risk factors, as well as management options.

Methods

Study design, settings, and population of the study

It was a descriptive cross-sectional survey-based study; the study was conducted online and by e-mail by sending the survey to participants through these two methods. The study included the general population in Saudi Arabia; the surveys were distributed randomly to the

Saudi population via online or e-mail. The survey sent to participants included questions about demographics and questions about their awareness.

Statistical analysis

SPSS program version 22 was used to analyze the collected data from retrieved surveys. Qualitative data were represented as numbers and percentages, whereas quantitative data were expressed as mean and standard deviation. A P-value of less than 0.05 was considered significant.

Results

This study included 1052 participants; more than one-half were females, 735(69.9%). Saudi individuals represented most participants, 986(93.7%), and the major age group included those with age 36-45 years old, 260 (24.7%). More than one-half of the participants had a university education, 689(65.5%) and 290 (27.6%) reported an education less than university. A few percent reported that they heard about clubfoot 352(33.5%), and healthcare workers 101(9.6%) were major sources of information. 72(6.8%) reported having a child with clubfoot, and 99(9.4%) reported a family history of clubfoot. The demographics of the participants are shown in table1.

Table1: Description of basic characteristics

| Variables | Description (n=1052) |
|--|---------------------------------|
| Gender | |
| Male | 317 (30.1) |
| Female | 735 (69.9) |
| Nationality | |
| Saudi | 986 (93.7) |
| Non-Saudi | 66 (6.3) |
| Age | |
| 15-25 | 359 (34.1) |
| 26-35 | 217 (20.6) |
| 36-45 | 260 (24.7) |
| 46-55 | 160 (15.2) |
| 55+ | 56 (5.3) |
| Educational level | |
| Not educated | 15 (1.4) |
| Primary | 33 (3.1) |
| Intermediate | 51 (4.8) |
| Secondary | 191 (18.2) |
| University | 689 (65.5) |
| Postgraduate | 73 (6.9) |
| Educational level | |
| Less than University | 290 (27.6) |
| University | 689 (65.5) |
| Postgraduate | 73 (6.9) |
| Have you ever read/heard about clubfoot in children? | |
| Yes | 352 (33.5) |
| No | 700 (66.5) |
| What is the source of your information about club feet? | |
| Social media | 100 (9.5) |
| Former patients | 70 (6.7) |
| Health care workers | 101 (9.6) |
| Readings | 81 (7.7) |
| Nothing | 700 (66.5) |
| Do you have a child with clubfoot? | |
| Yes | 72 (6.8) |
| No | 980 (93.2) |
| Does your family have a history of clubfoot? | |
| Yes | 99 (9.4) |
| No | 953 (90.6) |

There were eleven questions involved in the survey to investigate the awareness of participants about clubfoot; the questions and answers of participants are shown in table 2. Regarding the risk factors, the major risk factors reported by participants were genetic or hereditary causes 550(52.3%), followed by unknown causes 481(45.7%). The major complications reported were the need for complex surgeries in the future 518 (49.2%) and persistent deformities in the affected foot 497(47.2%).

Table2: Description of awareness questions

| Questions and answers about awareness | Description (n=1052) |
|---|-----------------------------|
| What's meant by Club foot? | |
| Differences in the length of the lower limbs and the shortness of one foot | 196 (18.6) |
| Deformities and impairments in the anatomical structure of the foot | 265 (25.2) |
| Arch and inclination in the foot from the normal shape | 576 (54.8) |
| Chronic tendonitis of the foot | 102 (9.7) |
| Nothing correct | 71 (6.7) |
| Which of these pictures represents clubfoot? | |
| Option 1 | 320 (30.4) |
| Option 2 | 609 (57.9) |
| Option 3 | 55 (5.2) |
| Option 4 | 68 (6.5) |
| When can the disease be detected and diagnosed? | |
| During pregnancy | 139 (13.2) |
| Immediately after delivery | 506 (48.1) |
| After one year | 407 (38.7) |
| What is the best way to diagnose clubfoot? | |
| History only | 71 (6.7) |
| Examination only | 190 (18.1) |
| Radiological only | 72 (6.8) |
| All of them | 719 (68.3) |
| In your opinion, when does the treatment of a child with clubfoot begin? | |
| Immediately after delivery | 227 (21.6) |
| 1st few months in the life | 311 (29.6) |
| after six months | 248 (23.6) |
| 1-5 years | 266 (25.3) |
| | |

| | |
|--|------------|
| What are the first steps in treating a child with clubfoot? | |
| Splints | 429 (40.8) |
| Physiotherapy | 361 (34.3) |
| Surgery | 262 (24.9) |
| Used splints | |
| Option 1 | 182 (17.3) |
| Option 2 | 0 (0) |
| Option 3 | 0 (0) |
| Option 4 | 255 (24.2) |
| Option 5 | 88 (8.4) |
| Option 6 | 58 (5.5) |
| Nothing | 623 (59.2) |
| How long is the treatment of the child by gypsum and splints? | |
| 1-2 months | 154 (14.6) |
| 3-4 months | 192 (18.3) |
| 5-6 months | 240 (22.8) |
| > 6 months | 466 (44.3) |
| Risk factors | |
| twin pregnancy | 76 (7.2) |
| Maternal diabetes | 101 (9.6) |
| Genetic or hereditary cause | 550 (52.3) |
| Unknown | 481 (45.7) |
| Mother's exposure to cigarette smoke | 70 (6.7) |
| Neurosis | 146 (13.9) |
| Cesarean delivery | 43 (4.1) |
| In your opinion, what is the rate of recovery by splints and physical therapy only? | |
| 0-20% | 52 (4.9) |
| 21-40% | 114 (10.8) |
| 41-60% | 184 (17.5) |
| 61-80% | 255 (24.2) |
| 81-100% | 142 (13.5) |
| I don't know | 305 (29) |
| complications | |
| No major complications affecting walking and movement | 147 (14) |
| Shortness of the affected limb and limping while walking | 350 (33.3) |
| Persistent deformities in the affected foot | 497 (47.2) |
| Friction and roughness in the joints of the feet | 312 (29.7) |
| The psychological and emotional impact on the patient after walking | 473 (45) |
| The need for complex surgeries in the future | 518 (49.2) |

The overall awareness of participants was assessed (figure1). There were 500 (47.5%) who had a high level of awareness, whereas 552(52.5%) had a low level of awareness.

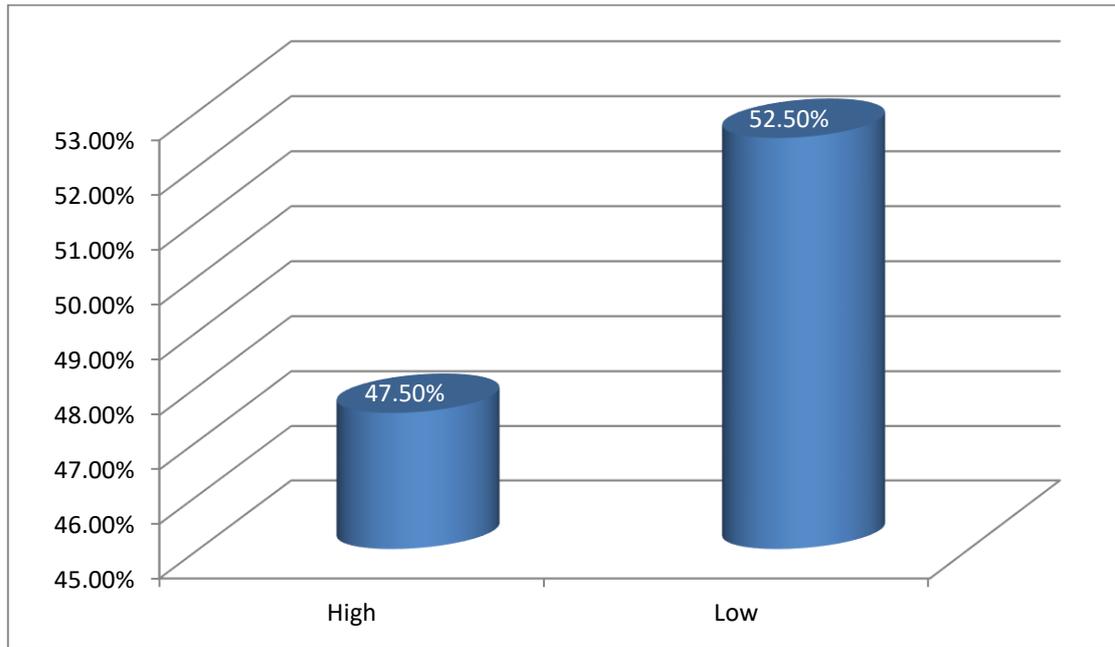


Figure 1: The overall level of awareness

The correlations between the level of awareness and the demographics of participants are shown in table3. The level of awareness was shown to be affected by all investigated factors, including gender ($P=0.012$), nationality ($P=0.0001$), age groups ($P=0.0001$), educational level ($P=0.0001$), the state of having a child with clubfoot ($P=0.0001$), and family history ($P=0.0001$).

Table3: Comparison of awareness level regarding basic characteristics

| Variables | Awareness level | | P-value |
|---|-----------------|------------|--------------|
| | High | Low | |
| Gender | | | |
| Male | 132 (26.4) | 185 (33.5) | 0.012 |
| Female | 368 (73.6) | 367 (66.5) | |
| Nationality | | | |
| Saudi | 495 (99) | 491 (88.9) | 0.000 |
| Non-Saudi | 5 (1) | 61 (11.1) | |
| Age | | | |
| 15-25 | 203 (40.6) | 156 (28.3) | 0.000 |
| 26-35 | 93 (18.6) | 124 (22.5) | |
| 36-45 | 111 (22.2) | 149 (27) | |
| 46-55 | 72 (14.4) | 88 (15.9) | |
| 55+ | 21 (4.2) | 35 (6.3) | |
| Educational level | | | |
| Not educated | 0 (0) | 15 (2.7) | 0.000 |
| Primary | 3 (0.6) | 30 (5.4) | |
| Intermediate | 7 (1.4) | 44 (8) | |
| Secondary | 81 (16.2) | 110 (19.9) | |
| University | 372 (74.4) | 317 (57.4) | |
| Postgraduate | 37 (7.4) | 36 (6.5) | |
| Educational level | | | |
| Less than University | 91 (18.2) | 199 (36.1) | 0.000 |
| University | 372 (74.4) | 317 (57.4) | |
| Postgraduate | 37 (7.4) | 36 (6.5) | |
| Do you have a child with clubfoot? | | | |
| Yes | 12 (2.4) | 60 (10.9) | 0.000 |
| No | 488 (97.6) | 492 (89.1) | |
| Does your family have a history of clubfoot? | | | |
| Yes | 19 (3.8) | 80 (14.5) | 0.000 |
| No | 481 (96.2) | 472 (85.5) | |

Regarding the association between the awareness level of participants and their previous knowledge, the level of awareness was significantly associated with the state of hearing previously about clubfoot in children ($P=0.0001$) and the source of information ($P=0.0001$) table4.

Table4: Comparison of awareness levels regarding their previous knowledge

| Variables | Awareness level | | P-value |
|--|-----------------|------------|--------------|
| | High | Low | |
| Have you ever read/heard about clubfoot in children? | | | |
| Yes | 204 (40.8) | 148 (26.8) | 0.000 |
| No | 296 (59.2) | 404 (73.2) | |
| What is the source of your information about club feet? | | | |
| Social media | 59 (11.8) | 41 (7.4) | 0.000 |
| Former patients | 26 (5.2) | 44 (8) | |
| Health care workers | 77 (15.4) | 24 (4.3) | |
| Readings | 42 (8.4) | 39 (7.1) | |
| Nothing | 296 (59.2) | 404 (73.2) | |

Discussion

The management of clubfoot is mainly based on public knowledge and awareness regarding clubfoot (Brufat *et al.*, 2013). In this study, we investigated the awareness of the population in the Aseer community about the condition.

In the current study, a few participants reported hearing about clubfoot (33.5%), and the major source of information was healthcare workers, followed by social media, readings, and former patients. Also, a few proportions reported having a child with clubfoot (6.8%), whereas the rate of that reported family history of clubfoot was higher (9.4%).

In a previous Saudi study, participants of similar proportions to ours reported hearing about clubfoot (30.3%) and having a child with clubfoot (5.4%). The Saudi study was published in 2018; however, the rate of those who heard about clubfoot wasn't improved as the study reported that only 30.3% heard about it, and in our study, the percentage increased to 33.5% (Alsiddiky *et al.*, 2019). This stable low knowledge about clubfoot requires more effort that can be done through gynecologists during pregnancy visits. The previous study reported that social media was the main source of information, followed by relatives and friends (Alsiddiky *et al.*, 2019), whereas in our study, social media was in the second rank, and healthcare worker was in the first rank; this reflects that healthcare workers began to participate in increasing the awareness of individuals about the condition, and instead of having no role, they became the major source of information.

A previous study from the Aseer region published in 2020 showed that the main source of information about clubfoot was cases (16.3%), followed by friends and family; no one reported the role of healthcare providers (Alfaya *et al.*, 2020). Therefore, our study showed that healthcare workers now have a prominent role in increasing the knowledge of individuals about clubfoot.

Nowadays, clubfoot can be identified during a routine intrauterine ultrasound, mainly in the second trimester of the antenatal period (Dobbs and Gurnett, 2009; Bakalis *et al.*, 2002). However, the diagnosis is confirmed at birth through clinical examination as radiograph is of little benefit (Dobbs and Gurnett, 2009; Barrie and Varacallo, 1992). The largest proportion of our participants (48.1%) reported that clubfoot could be diagnosed immediately after delivery. In contrast, a lower proportion reported that it could be done after one year, and the lowest proportion reported that it could be diagnosed during pregnancy. The best way to diagnose clubfoot and majorly reported was history, examination and radiological examination.

Clubfoot can be managed in several ways, either non-operative or operative strategies; non-operative strategies include casting and repeated manipulation (Ponseti, 1992). The knowledge of our participants about treatment was investigated through four questions; the immense proportions reported that treatment of a child with clubfoot could begin in the first few months of life, and the splint was selected as the main and first step in the treatment process. Less than one-half of participants reported that both persistent deformities and the need for complex surgeries are complications of clubfoot.

A previous Saudi study conducted on the population showed that the largest proportion of participants reported that a foot cast is the first method of treatment (36.4%), and treatment can be started in the first six months (34%) (Alfaya *et al.*, 2020). The previous findings were close to ours.

It was reported that genetic and environmental factors are the main risk factors for clubfoot (Dodwell *et al.*, 2015; Honein *et al.*, 2000). Genetic hereditary causes and unknown causes were the main risk factors reported by participants in this study. Also, the previous Saudi survey reported that the largest proportions of participants reported that hereditary and genetic reasons are the major causes of clubfoot (Alsiddiky *et al.*, 2019). Another Saudi study found that 42.2% of participants reported that genetic factors are risk factors for clubfoot (Alfaya *et al.*, 2020), which was close to our percentage; however, our percentage was higher.

The overall awareness of our participants was high among less than half of the participants (47.5%). The factors that affect the awareness level of participants were investigated, and it was found that all the factors significantly affected the level of awareness. These factors included gender, nationality, age, education level, hearing about clubfoot, family history, state of having a child with clubfoot, and the source of information. A high level of awareness was significantly reported by females, Saudi individuals, younger individuals, highly educated participants with university education, having no child with clubfoot, having no family history, hearing about clubfoot, and healthcare workers as the source of information.

A previous Saudi study included a smaller sample size than ours in the current study to assess public awareness of clubfoot and knowledge about the importance of treatment during childhood. The study didn't vary from ours, showing low public awareness about clubfoot and

its management, and it was attributed to a lack of awareness campaign. The study didn't report any factors related to such low awareness and knowledge (Alsiddiky *et al.*, 2019).

The overall awareness among the Aseer population regarding clubfoot, as reported in a previous study published in 2020, was good among only 4.4% (Alfaya *et al.*, 2020). In contrast, in our study, 47.5% had high awareness. The comparison between our study and the previous study by Aseer *et al.* (2020) showed that awareness significantly increased from 4.4% to 47.5%. However, we should note that the participants of the previous study may weren't included in our study, but there are still promising findings compared to the previous study (Alsiddiky *et al.*, 2019).

The factors affecting the overall awareness of the population in the previous Saudi study included gender, educational level, and source of information, which was in agreement with our findings.

Conclusion

There was low awareness among the population in the Asser community regarding clubfoot risk factors and management. However, it was better than what was previously reported in Saudi Arabia. The study showed that healthcare workers have a role in increasing awareness of the population about clubfoot; however, healthcare workers should exert more effort, and awareness campaigns should be established. Also, pregnant women should be informed about clubfoot during their visits to gynecologists. There was a lack of studies conducted on this subject, so further studies are required and recommended.

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