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## **The Extent of Awareness of Asser Region Community About the Developmental Dysplasia of the Hip in Children**

**Saleh Moteb S. Kardm<sup>1\*</sup>**

**Mosab Abdulaziz Saad Deajim<sup>2</sup>, Abdulaziz Saleh AlQahtani<sup>2</sup>, Omar Awdah Saeed  
Alshahrani<sup>2</sup>, Kheder Mabrook Kheder ALGhamdi<sup>2</sup>, Mohammed Ali Abdullah  
Alkhurais<sup>2</sup>**

**Khadijah Abdullah ALGhanmy<sup>3</sup>**

<sup>1</sup> Assistant professor of orthopedic surgery, faculty of medicine, Najran University, Saudi Arabia

<sup>2</sup> Medical students, King Khalid University, Saudi Arabia

<sup>3</sup> Orthopedic consultant, Abha Maternity and Children's Hospital, Abha, Saudi Arabia

\*Corresponding author E-mail: [smkardm@nu.edu.sa](mailto:smkardm@nu.edu.sa)

## Abstract

**Background:** Developmental dysplasia of the hip involves a range of deformities that range from subluxation to complete dislocation. Dislocation leads to several malformations such as dystrophic dwarfism, multiplex congenital, and Spina Bifida. The early diagnosed hip dislocation can be managed by non-surgical interventions, whereas late diagnosis is associated with surgical management. So, awareness among the population regarding hip dislocation is necessary; however, there is a scarcity of studies assessing this subject. **Aim:** To assess the awareness of the community about developmental dysplasia of the hip in the Aseer region. **Methods:** The current study is a descriptive cross-sectional study conducted on community individuals in the Aseer region, Saudi Arabia. The study was conducted using an online self-reported validated questionnaire that investigated the demographics of respondents and their awareness. The collected data from the retrieved questionnaire was analyzed using SPSS program version 22; *P*-value was considered significant at  $<0.05$ . **Results:** This study included 1348 participants; 99.2% were Saudi individuals, and 66.6% had a university education. 56% reported hearing of hip dislocation, and the patients' major source of information was 44.9%. Awareness was high among 26.3% only; age was the only determinant for the level of awareness ( $P=0.0001$ ). **Conclusion:** There was a low level of awareness regarding developmental dislocation of the hip among the population in the Asser region.

**Keywords:** *DDH, Awareness, Community, Children*

## Introduction

Developmental dysplasia of the hip (DDH) is a spectrum of disorders that range from subluxation to complete dislocation of the hip. The former refers to a partial displacement of the femoral head outside the acetabulum, whereas dislocation is a complete displacement (Agarwal and Gupta, 2012; Alhunaishel et al., 2018).

Previously DDH was known as congenital dysplasia of the hip. Still, it was replaced by the term DDH as congenital dysplasia, meaning that the pathology is birth-related and only develops if there is an abnormal neonatal screening, although it was revealed that DDH might develop with a normal neonatal screening (Alhussainan, 2018; Almahdi et al., 2017).

DDH is one of the most common presentations in pediatric orthopedic globally (Al-Mohrej et al. 2017). The incidence of DDH varies and ranges between 1.5 and 20/per 1000 births based on various factors, including diagnostic criteria, gender, genetic and racial factors (Alqarni et al., 2021).

The risk factors of DDH include primiparous, advanced maternal age, congenital torticollis, family history, breech presentation, oligohydramnios, and female gender (Alshahrani et al., 2018; Aronson et al., 1994). The clinical presentation of DDH usually depends on age (Alshahrani et al., 2018); infants are presented with restricted hip abduction and limping, whereas neonates are presented with unstable hip joints (Alqarni et al., 2021).

The management of DDH is well known to have high efficacy (Al-Mohrej et al., 2017), and it varies according to the patient's age (Gibbard et al., 2021). There are two general categories of treatment strategies; the first is the non-surgical interventions which are done in

case of early presentation, whereas in late presentation of older than six months, surgical procedures are indicated (Hisalker et al., 2018). The earlier treatment improves the prognosis as delaying the treatment is associated with long-term complications such as gait abnormalities and arthritis (Gibbard et al., 2021). In Saudi Arabia, almost 30% of DDH cases require surgical management due to late presentation and poor awareness (Ibrahim et al., 2021). It was highlighted that awareness and knowledge regarding DDH weren't adequate even among healthcare providers and required fundamental efforts for improvement (Loder and Skopelja, 2011). It was stated that awareness regarding DDH should be increased among pediatricians to reduce the incidence of late DDH diagnosis (Mahan et al., 2009). No previous study assessed the general population's awareness regarding DDH; therefore, we conducted this study as the first study to report the awareness level of the population in the Aseer region regarding DDH.

## **Methods**

### **Study design, settings, and population**

The current study is a descriptive cross-sectional study conducted in the Aseer region, Saudi Arabia. The study was conducted on a convenient sample of individuals from the Aseer region who met the following criteria; willing to participate in the study and adults more than 18 years old. Individuals who didn't complete the questionnaire were excluded. The study was conducted using an online self-reported validated questionnaire. The questionnaire included 17 questions to identify different obstacles faced by DDH and had questions about participants' demographics.

### **Statistical analysis**

The collected data from the retrieved questionnaire was analyzed using SPSS program version 22. Quantitative data was analyzed and represented as mean and standard deviation, whereas qualitative data was represented as numbers and proportions. The comparison was made using either the T-student test or Chi-square based on the type of data; *P*-value was considered significant at  $<0.05$ .

### **Results**

A total of 1348 individuals participated in this study; the majority was Saudi 1337(99.2%), and the major age group represented 31.1% and included those aged 20-30 years old. More than one-half of the participants had a university education, 898 (66.6%), whereas 367(27.2%) had less than a university education. More than one-half of participants reported hearing about DDH 755 (56%), and patients were the major source of information 339(44.9%), followed by social media 168 (22.3%). There were 334(25.5%) who reported having a family member who had DDH, whereas 39(11.3%) reported that this person is their mother. The demographics and characteristics of participants are shown in table1.

**Table1: Description of basic characteristics of the studied group**

| <b>Variables</b>  | <b>Description(n=1348)</b> |
|---|----------------------------|
| <b>Nationality</b>  |                            |
| Saudi   | 1337 (99.2)                |
| Non-Saudi   | 11 (0.8)                   |
| <b>Age</b>  |                            |
| 10-20   | 82 (6.1)                   |
| 20-30   | 419 (31.1)                 |
| 30-40   | 351 (26)                   |
| 40-50   | 354 (26.3)                 |
| 50-60   | 127 (9.4)                  |
| 60+   | 15 (1.1)                   |
| <b>Educational level</b>  |                            |
| Primary   | 19 (1.4)                   |
| Intermediate  | 38 (2.8)                   |
| Secondary   | 310 (23)                   |
| University  | 898 (66.6)                 |
| Postgraduate  | 83 (6.2)                   |
| <b>Educational level</b>  |                            |
| Less than University  | 367 (27.2)                 |
| University  | 898 (66.6)                 |
| Postgraduate  | 83 (6.2)                   |
| <b>5. Have you ever read about the disease "congenital developmental dislocation of the hip in children"?</b> |                            |
| Yes   | 755 (56)                   |
| No  | 593 (44)                   |
| <b>6. What is your information source about congenital hip dislocation in children?</b>                       |                            |
| From patients   | 339 (44.9)                 |
| Health care worker  | 101 (13.4)                 |
| Social media  | 168 (22.3)                 |
| Readings  | 147 (19.5)                 |
| <b>17. Has anyone in your family ever had a congenital hip dislocation?</b>                                   |                            |
| Yes   | 344 (25.5)                 |
| No  | 1004 (74.5)                |
| <b>18. What is your relationship with the patient?</b>  |                            |
| Father  | 15 (4.4)                   |
| Mother  | 39 (11.3)                  |
| Brother   | 15 (4.4)                   |
| Sister  | 21 (6.1)                   |
| Other   | 254 (73.8)                 |

Eleven questions were used to investigate the participants' awareness; the full details are shown in table2. Regarding symptoms of DDH, the most reported symptom deviated gate 1010 (74.9%), and more than one-half reported that DDH patients could move and walk normally after treatment 869(64.5%).

**Table2:Description of awareness questions**

|  | <b>Description<br/>(n=1348)</b> |
|--|---------------------------------|
| <b>7. What do you expect the meaning of developmental congenital hip dislocation?</b>                    |                                 |
| Hip sheath inflammation  | 38 (2.8)                        |
| Hip malformations  | 118 (8.8)                       |
| Femur head dislocation   | 1121 (83.2)                     |
| Femur head osteoarthritis  | 71 (5.3)                        |
| <b>8. In your opinion, what is the method of diagnosing a patient with a congenital hip dislocation?</b> |                                 |
| History only   | 13 (1)                          |
| Examination only   | 99 (7.3)                        |
| Radiological only  | 252 (18.7)                      |
| All of them  | 984 (73)                        |
| <b>Q9 Symptoms of DDH</b>  |                                 |
| 9.1 Deviated gate  | 1010 (74.9)                     |
| 9.2 Hip Pain   | 621 (46.1)                      |
| 9.3 Falls while walking  | 568 (42.1)                      |
| 9.4 No symptoms  | 111 (8.2)                       |
| <b>10. Do you think this method of wrapping the baby is related to congenital hip dislocation?</b>       |                                 |
| Yes, with a negative impact  | 174 (12.9)                      |
| No   | 804 (59.6)                      |
| it is protective   | 370 (27.4)                      |
| <b>11. Is this sitting position related to congenital hip dislocation?</b>                               |                                 |
| Yes, with a negative impact  | 942 (69.9)                      |
| No   | 313 (23.2)                      |
| it is protective   | 93 (6.9)                        |
| <b>12. Do you think it is possible to prevent the disease before it occurs?</b>                          |                                 |
| Yes  | 986 (73.1)                      |
| No   | 362 (26.9)                      |
| <b>13. Do you think a congenital hip dislocation patient can move and walk normally after treatment?</b> |                                 |
| Yes  | 869 (64.5)                      |

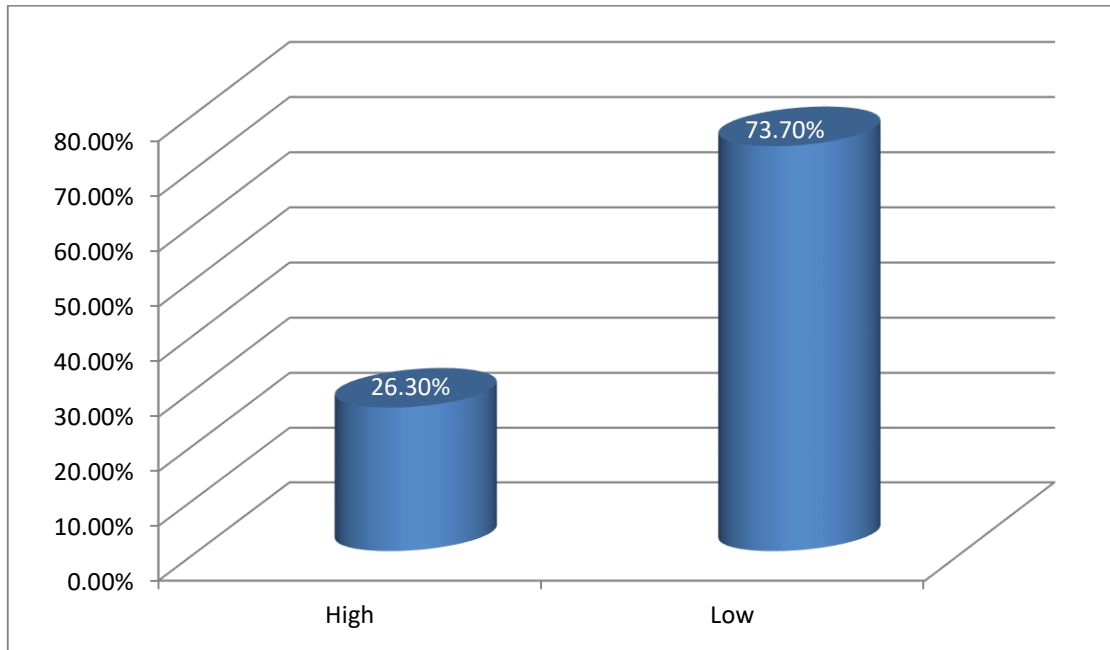
|   |            |
|---|------------|
| No  | 61 (4.5)   |
| For some extent   | 418 (31)   |
| <b>14. In your opinion, what is the appropriate way to treat cases of congenital hip dislocation?</b> |            |
| No need for TTT   | 32 (2.4)   |
| Social treatment  | 59 (4.4)   |
| Conservative only   | 178 (13.2) |
| Immediate Surgical  | 284 (21.1) |
| Surgical, if conservative, failed   | 795 (59)   |
| <b>15. In your opinion, when is the appropriate time for surgical intervention?</b>                   |            |
| Immediately after diagnosis   | 246 (21.6) |
| At six months   | 134 (11.8) |
| At 12 months  | 103 (9.1)  |
| It depends on the degree of dislocation   | 581 (51.1) |
| At 3 Years old  | 74 (6.5)   |
| <b>Q16 Complications of DDH</b>   |            |
| 16.1 Limited Joint Mobility   | 630 (46.7) |
| 16.2 Bone Atrophy   | 495 (36.7) |
| 16.3 Unequal bone length  | 799 (59.3) |
| 16.4 Pelvisdistortion   | 497 (36.9) |
| 16.5 Joint Pain   | 705 (52.3) |
| 16.6 No complications   | 27 (2)     |

**Table2-continue: Description of awareness questions**

| <b>16. The extent to which these factors are affected and related to developmental congenital dislocation</b> | <b>Related</b> | <b>Not related</b> | <b>I don't know</b> |
|---|----------------|--------------------|---------------------|
| <b>The patient is female</b>  | 340 (25.2)     | 522 (38.7)         | 486 (36.1)          |
| <b>Birth of the child by cesarean section</b>   | 376 (27.9)     | 563 (41.8)         | 409 (30.3)          |
| <b>the premature baby</b>   | 315 (23.4)     | 471 (34.9)         | 562 (41.7)          |
| <b>The patient is the firstborn in the family</b>   | 157 (11.6)     | 791 (58.7)         | 400 (29.7)          |
| <b>The position of the newborn in the womb</b>  | 764 (56.7)     | 219 (16.2)         | 365 (27.1)          |
| <b>Having a family history of the disease</b>   | 574 (42.6)     | 406 (30.1)         | 368 (27.3)          |
| <b>baby weight after birth</b>  | 382 (28.3)     | 497 (36.9)         | 469 (34.8)          |
| <b>Inbreeding</b>   | 268 (19.9)     | 636 (47.2)         | 444 (32.9)          |
| <b>narrow uterine space</b>   | 636 (47.2)     | 239 (17.7)         | 473 (35.1)          |



The overall awareness of participants was found to be high among 354(26.3%) and low among 994(73.7%), figure1.



**Figure 1: The awareness level among participants**

The correlations between participants' awareness and demographics and other reported information are shown in table3. Participants' awareness was significantly associated with age groups, whereas other investigated factors showed no significant correlation.

**Table3: Association of awareness levels with the basic characteristics**

| Variables                | Awareness level |                | P value      |
|--------------------------|-----------------|----------------|--------------|
|                          | High<br>(n=354) | Low<br>(n=994) |              |
| <b>Nationality</b>       |                 |                |              |
| Saudi                    | 350 (98.9)      | 987 (99.3)     | 0.493        |
| Non-Saudi                | 4 (1.1)         | 7 (0.7)        |              |
| <b>Age</b>               |                 |                |              |
| 10-20                    | 26 (7.3)        | 56 (5.6)       | <b>0.000</b> |
| 20-30                    | 141 (39.8)      | 278 (28)       |              |
| 30-40                    | 88 (24.9)       | 263 (26.5)     |              |
| 40-50                    | 81 (22.9)       | 273 (27.5)     |              |
| 50-60                    | 17 (4.8)        | 110 (11.1)     |              |
| 60+                      | 1 (0.3)         | 14 (1.4)       |              |
| <b>Educational level</b> |                 |                |              |
| Primary                  | 4 (1.1)         | 15 (1.5)       | 0.546        |
| Intermediate             | 7 (2)           | 31 (3.1)       |              |
| Secondary                | 74 (20.9)       | 236 (23.7)     |              |
| University               | 246 (69.5)      | 652 (65.6)     |              |
| Postgraduate             | 23 (6.5)        | 60 (6)         |              |
| <b>Educational level</b> |                 |                |              |
| Less than University     | 85 (24)         | 282 (28.4)     | 0.285        |
| University               | 246 (69.5)      | 652 (65.6)     |              |
| Postgraduate             | 23 (6.5)        | 60 (6)         |              |

Chi-square test

**Table3-continue: Association of awareness level with the basic characteristics**

|   | Awareness level |                | P-value |
|---|-----------------|----------------|---------|
|   | High<br>(n=354) | Low<br>(n=994) |         |
| <b>5. Have you ever read about the disease "congenital developmental dislocation of the hip in children"?</b> |                 |                |         |
| Yes   | 202 (57.1)      | 553 (55.6)     | 0.642   |
| No  | 152 (42.9)      | 441 (44.4)     |         |
| <b>6. What is your information source about congenital hip dislocation in children?</b>                       |                 |                |         |
| From patients   | 82 (40.6)       | 257 (46.5)     | 0.151   |
| Health care worker  | 36 (17.8)       | 65 (11.8)      |         |
| Social media  | 46 (22.8)       | 122 (22.1)     |         |
| Readings  | 38 (18.8)       | 109 (19.7)     |         |
| <b>17. Has anyone in your family ever had a congenital hip dislocation?</b>                                   |                 |                |         |
| Yes   | 88 (24.9)       | 256 (25.8)     | 0.740   |
| No  | 266 (75.1)      | 738 (74.2)     |         |
| <b>18. What is your relationship with the patient?</b>  |                 |                |         |
| Father  | 1 (1.1)         | 14 (5.5)       | 0.175   |
| Mother  | 15 (17)         | 24 (9.4)       |         |
| Brother   | 4 (4.5)         | 11 (4.3)       |         |
| Sister  | 5 (5.7)         | 16 (6.3)       |         |
| Other   | 63 (71.6)       | 191 (74.6)     |         |

Chi-square test

## Discussion

There is a lack in the literature that reported the awareness of DDH among the population in the world and Saudi Arabia; therefore, we conducted this study. In the current study, more than one-half of our participants reported hearing about DDH in children. The major source of information was patients, followed by social media and readings. In contrast, healthcare worker was in the fourth and last rank as the source of information. Almost one-quarter of participants reported having a family member having DDH; a higher proportion reported affected mothers (11.3%) compared to affected fathers (4.4%). Similar to our study, more than one-half of pregnant ladies from a previous Saudi study reported knowing about DDH.

Different methods for diagnosing DDH include physical examination, ultrasound, and plain radiograph (Ortiz-Neira et al., 2012). In our study regarding the diagnosis, the most significant proportion of participants reported that the diagnosis of DDH can be made through history, examination, and radiology. A close percentage also noted that DDH symptoms deviate from gait. Regarding treatment, more than one-half thought that a patient with congenital DDH can restore normal movement and walk after treatment. Also, more than one-half stated that the appropriate way for treatment is surgical intervention if conservative failed. It was stated by almost one-half of the participants that the proper time for surgical treatment of DDH depends on the degree of dislocation.

In contrast, it was reported that surgical treatment is indicated in patients older than six months. In contrast, non-surgical methods are indicated in the early presentation of fewer than six months (Hosalker et al., 2018). This shows that our participants didn't know the appropriate time for surgical treatment, which may lead them to delay treating their affected children. The major complications reported by participants were unequal bone length and joint pain.

In our study, more than one-half of the participants didn't think that the method of wrapping the baby is related to congenital dislocation. In contrast, a larger proportion reported that setting posting is related to congenital hip dislocation. Participants reported the impact of various factors on DDH; the most reported factors were the position of the newborn in the womb, having a family history, and narrow uterine space, whereas the largest proportions stated that each female patient, birth by cesarean section, the firstborn baby in the family, baby weight after birth and inbreeding weren't related to DDH. Our participants were aware of the risk factors of DDH as they reported breech presentation and family history are risk factors of DDH, but they failed to confirm that female gender is a risk factor for DDH (Alshahrani et al., 2018; Aronsson et al., 1994).

A systematic review from Saudi Arabia conducted on articles from 1980 to 2018 showed that breech presentation and family history were risk factors for 17.3% and 23.6%, respectively, of DDH patients (Sadat-Ali, 2020). A recent Saudi study revealed that female gender, age of fewer than three years, positive family history, and associated abnormalities increased the risk for DDH (Shipman et al., 2006).

A previous Saudi study conducted on mothers showed that 77% of women weren't aware of the negative impact of wrapping the hips of children (Wright and James, 2016), which was higher compared to our findings, where 59.6% of our participants reported that wrapping the baby isn't related to hip dislocation.

The overall awareness in our study was found to be low; only a few percent (26.3%) had a high level of awareness, whereas the remaining percentage showed a low level of awareness. The age of participants was a determinant factor for the awareness level. There were no other determinants for awareness level that could be identified.

A Saudi study conducted on pregnant women in the Aseer region showed there was poor knowledge and awareness among women regarding DDH and its causes, treatment modalities, and complications; higher knowledge was associated with high parity of having a child with DDH (Masse, 1990). Although the previous study reported poor awareness similar to ours, we didn't assess the previously reported factors affecting the awareness of pregnant women.

Another Saudi study conducted on parents in Riyadh also showed that the awareness among parents was suboptimal, and it was much lower among fathers compared to mothers (Wright and James, 2016). Low awareness of DDH seems to be a significant problem as it isn't restricted to the general population; one Saudi study stated that awareness of DDH should be increased among pediatricians to reduce the incidence of late DDH diagnosis (Mahan et al., 2009).



## **Conclusion**

The population in the Aseer region has a low level of awareness about developmental dysplasia of the hip. Increasing awareness among the people is substantial for the early management of the condition to avoid further complications and surgical options for treatment. Awareness can be increased by the establishment of awareness campaigns and healthcare workers. In our study, healthcare workers had a minor role in reporting participants' conditions information. Also, further studies are required to be performed in other Saudi regions to identify the awareness in the whole Kingdom.

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