

# Knowledge and awareness level about radial head subluxation mechanism among Saudi population living in western region of Saudi Arabia

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## Abstract

**Background:** There is a scarcity of published studies on the Saudi population's knowledge of radial head subluxation. The purpose of this study was to determine the level of Saudi community awareness regarding pulled elbow.

**Methods:** A cross-sectional study was done on 396 Saudi residents. An online questionnaire was used to collect data about participants' demographic characteristics and their knowledge about radial head subluxation, mechanism of injury, and how to deal with it.

**Results:** 47% of the participants had heard of radial head subluxation, 32.7% studied it, and 32.2% heard about it through friends or family members. Only 23.1% heard about it via doctors. Males and 1-5 year-old children are the most commonly affected, according to 21.2% and 63.1% of participants, respectively. The majority of participants (68.9%) properly identified the case presentation as pain at the injury site, 61.6% identified the case as being diagnosed by clinical examination. Of them, 50.8% correctly identified the cause as children being held

by their hand or forearm and 19.4% have had to deal with an elbow subluxation. Only 44.7% identified the hospital management as the professional management of this situation and 15.4% of the participants had a good level of knowledge regarding radial head subluxation. Participants who were medical practitioners or studying medical sciences, and who had already heard about elbow subluxation or dealt with a case of elbow subluxation, had a significantly higher percentage of having good knowledge.

**Conclusion:** There is a need to raise Saudi community awareness regarding elbow subluxation through community-wide health education campaigns.

**Keywords:** knowledge, radial, head, subluxation, Saudi, western

## Introduction

The annular ligament between the capitellum of the distal humerus and the radial head is displaced in a pulled elbow [1]. It is also known as nursemaid's elbow or radial head subluxation. It is the most common cause of upper-extremity immobility in children under the age of six, accounting for around two-thirds of all upper-extremity injuries [2]. It also accounts for a sizable fraction of all children's injuries treated in emergency rooms [1].

There are several ways of damage, but the most common is when parents or adults pull a child's forearm to keep him or her from falling. It can also happen when the forearm is dragged while the child is resisting [3]. The radial head slips over and subluxes into the supinator muscle and annular ligament as a result of abrupt traction of the radius hand against extended elbow and pronated forearm [4], causing the radial head to migrate out of the weak annular ligament and capitellum [5,6]. At this time, the child will not be able to move his/her arm due to severe pain. So the child presents holding his/her arm close to his or her body, without any deformity or swelling in the injured elbow [7]. This type of injury mostly affects children between one to four years old, and it is more common in girls [7,8]. According to a 1990 study, girls account for 58.6 percent of cases, with 60.9 percent of occurrences occurring in the left arm and 39.1 percent occurring in the right arm [9]. This condition is commonly diagnosed by a history and physical examination at a clinic or emergency department, with no need for imaging or tests. Treatment is also done at the same time by using a close reduction approach, either supination or hyperpronation [10].

Recurring pulled elbow is a relatively common problem, with a prevalence of 27% to 39% [9,11] and around 78.9% of children experience recurrent episodes in the same arm [9].

At this time, published research about the Saudi population's knowledge of radial head subluxation is scarce. This study aimed at assessing the level of awareness of the community in Saudi Arabia about pulled elbow.

## Subjects and Methods

**Study design:** a quantitative descriptive cross-sectional study was done.

**Study participants:** the study targeted every adult  $\geq 18$  years, either male or female, living in the Western region in Saudi Arabia. The participants were either married or single and citizens or residents. The exclusion criteria were children or people less than 18 years old from both genders and any participant from other Saudi Arabia regions (Eastern, Southern, Northern or the Middle region).

**Study instrument:** a pre-designed online questionnaire was used. The questionnaire consisted of four parts covering the data about participants' socio-demographic characteristics (gender, age, residency, education level, occupation and social status and having or living with children). In addition, it contained questions about participants' level of awareness, mechanism of injury, and how to deal with the condition. The questionnaire was published online via social media by the researchers and their friends during the period from October to November 2021. All accessible and eligible population in the study setting were invited to fill in the questionnaire. The sample size was 396 participants. There were 11 knowledge items about radial head subluxation. For every right answer a score of "1" was given and for every wrong answer a score of "0" was given. The respondents' level of knowledge about radial head subluxation was reported as good knowledge if the study participant correctly responded to more than, or equal to, 80% of knowledge assessment tools, and poor for  $<80\%$  [12].

**Data analysis:** data were analyzed statistically using (SPSS) version 26. Qualitative data was expressed as numbers and percentages, and Chi-squared test ( $\chi^2$ ) was applied to test the relationship between variables. A p-value of less than 0.05 was considered statistically significant.

## Results

(Table 1) shows that 58.8% of the participants were females, 60.4% had an age ranging from 18-25 years and 95.7% had Saudi nationality. Most of them (77.3%) had a university level of education, 68.2% were not employed and 68.7% were single. Almost half of the participants were medical practitioners or studying medical sciences (51%), 23.7% had children and 60.6% were living with children.

(Table 2) shows that 47% of the participants had previously heard and 9.8% had maybe heard about radial head subluxation. Of them, 32.7% studied it, 32.2% heard about it from friends or family and 23.1% had heard about from doctors or health workers. Most of the participants (71%) correctly replied that radial head subluxation is a subluxation, 21.2% correctly knew that the most commonly affected gender are males and 63.1% correctly knew that the most commonly affected age group is from 1 year to 5 years. Most of the participants (68.9%) correctly reported that the presentation of this case, or the child, will complain of pain at the injured site and 53.3% correctly knew this condition can occur again. The majority (61.6%) correctly knew that this case is diagnosed by clinical examination, while 58.8% reported that it could be diagnosed by X-ray.

(Table 3) shows that only 39.9% of the participants correctly explained radial head subluxation phenomena as a radial head subluxation and more than half (50.8%) correctly knew the cause is holding children by their hand or forearm. Only 19.4% had faced or maybe had faced (1.8%) a case of elbow subluxation before, and of them,

61.4% directly took the patient to the hospital. Only 44.7% of the participants correctly knew that the professional management of this case is hospital management and 86.6% reported that on facing this case they will directly take the patient to the hospital.

(Figure 1) illustrates that only 15.4% of the participants had a good knowledge level about radial head subluxation.

(Table 4) shows that a non-significant relationship was found between participants' level of knowledge about radial head subluxation and their demographic characteristics or having and living with children ( $p > 0.05$ ).

(Figures 2, 3 and 4) illustrate that participants who are medical practitioners or studying medical sciences (Figure 2), who had previously heard about elbow subluxation "pulled elbow" (Figure 3) and those who had previously faced a case of elbow subluxation had a significantly higher percentage of those who had good knowledge level about radial head subluxation ( $p < 0.05$ ).

**Table 1: Distribution of the participants according to their demographic characteristics and having and living with children (No.:396)**

Variable	No. (%)
Gender	
Male	233 (58.8)
Female	163 (41.2)
Age group	
18-25	239 (60.4)
26-35	68 (17.2)
36-45	33 (8.3)
More than 45	56 (14.1)
Nationality	
Saudi	379 (95.7)
Non Saudi	17 (4.3)
Educational level	
University	306 (77.3)
Post-graduate	16 (4)
Intermediate or secondary school	74 (18.7)
Job status	
Parttime job	14 (3.5)
Not employed	270 (68.2)
Employee	112 (28.3)
Marital status	
Widow	4 (1)
Single	272 (68.7)
Married	111 (28)
Divorced	9 (2.3)
Are you a medical practitioner or studying medical sciences?	
No	194 (49)
Yes	202 (51)
Do you have children?	
No	302 (76.3)
Yes	94 (23.7)
Do you live with any children?	
No	56 (39.4)
Yes	240 (60.6)

**Table 2: Distribution of the participants according to their level of awareness about radial head subluxation (No.:396)**

Variable	No. (%)
<b>Have you heard about elbow subluxation "pulled elbow"?</b>	
Maybe	39 (9.8)
Yes	186 (47)
No	171 (43.2)
<b>"If yes or maybe" where? (You can choose more than one) (No.:186)</b>	
I have faced this case before	42 (22.5)
I heard about it from friends or family	60 (32.2)
I heard about it from doctors or health worker	43 (23.1)
Social media and TV	28 (15)
Reading material and books	23 (12.3)
Studying it	61 (32.7)
<b>What do you think it is?</b>	
Others	6 (1.5)
Dislocation	33 (8.3)
Subluxation (correct answer)	281 (71)
Fracture	21 (5.3)
I don't know	43 (10.9)
Neurological problem	5 (1.3)
Muscular problem	4 (1)
Kind of disease	3 (0.8)
<b>What do you suspect is the most commonly affected gender?</b>	
Female	58 (14.6)
Male (correct answer)	84 (21.2)
Both are same	254 (64.1)
<b>What do you suspect is the most commonly affected age group?</b>	
More than 18 years	27 (6.8)
From 11 years to 18 years	34 (8.6)
From 6 years to 10 years	85 (21.5)
From 1 year to 5 years (correct answer)	250 (63.1)
<b>Presentation of this case or the child will complain of</b>	
Pain at the injured site (correct answer)	273 (68.9)
Child refuses to use the affected limb (correct answer)	292 (73.7)
Deformity of affected arm	81 (20.4)
Bruising at the injured site	61 (15.4)
Swelling at the injured site	124 (31.3)
<b>In your opinion can this condition occur again?</b>	
Maybe	111 (28)
No	14 (3.5)
I don't know	60 (15.2)
Yes (correct answer)	211 (53.3)
<b>This case is diagnosed by: (You can choose more than one)</b>	
Clinical examination (correct answer)	244 (61.6)
X-ray	233 (58.8)
Ultrasound	33 (8.3)
CT	122 (30.8)
MRI	75 (18.9)

**Table 3: Distribution of the participants according to their level of awareness about mechanism of injury and management of radial head subluxation (No.:396)**

Variable	No. (%)
<b>Mechanism of injury</b>	
<b>In your knowledge, how do you explain this phenomenon?</b>	
Others	2 (0.5)
Radial head subluxation (correct answer)	158 (39.9)
Muscle strain	8 (2)
Dislocation of elbow joint	165 (41.7)
Neuropraxia	3 (0.8)
Fracture of elbow joint	19 (4.8)
I don't know	40 (10.1)
Disease	1 (0.3)
<b>What do you think the cause is?</b>	
Others	2 (0.5)
Traumatic injury	72 (18.2)
Hold children from their hand or forearm (correct answer)	201 (50.8)
Hold children from their shoulder	12 (3)
Hold children from their elbow	32 (8.1)
Muscular weakness	10 (2.5)
I don't know	52 (13.1)
Nutritional problems	7 (1.8)
Congenital or Inherited problem	8 (2)
<b>How do you deal with it</b>	
<b>Have you faced any case of elbow subluxation before?</b>	
Maybe	7 (1.8)
No	312 (78.8)
Yes	77 (19.4)
<b>"If yes" what did you do with it? (No.:77)</b>	
Use of folk remedies	7 (9)
Give the patient pain killers and put muscles relaxant gel on site of pain	3 (3.8)
Directly- Trying to fix the trauma by your self	14 (18.1)
Directly- Taking the patient to the hospital	47 (61.4)
Put cold or warm pack, Compress, and massage on site of pain	6 (7.7)
<b>From your knowledge, what is the professional management of this case?</b>	
Hospital management (correct answer)	177 (44.7)
Home management	10 (2.5)
Combination of both	209 (52.8)
<b>Now if you face this case what would you like to do?</b>	
Give the patient pain killers and put muscles relaxant gel on site of pain	12 (3)
Use of folk remedies	7 (1.8)
Directly trying to fix the trauma by your self	19 (4.8)
Put cold or warm pack, Compress, and massage on site of pain	15 (3.8)
Directly taking the patient to the hospital (correct answer)	343 (86.6)

Figure 1: Percentage distribution of the participants according to their level of knowledge about radial head subluxation (No.:396)

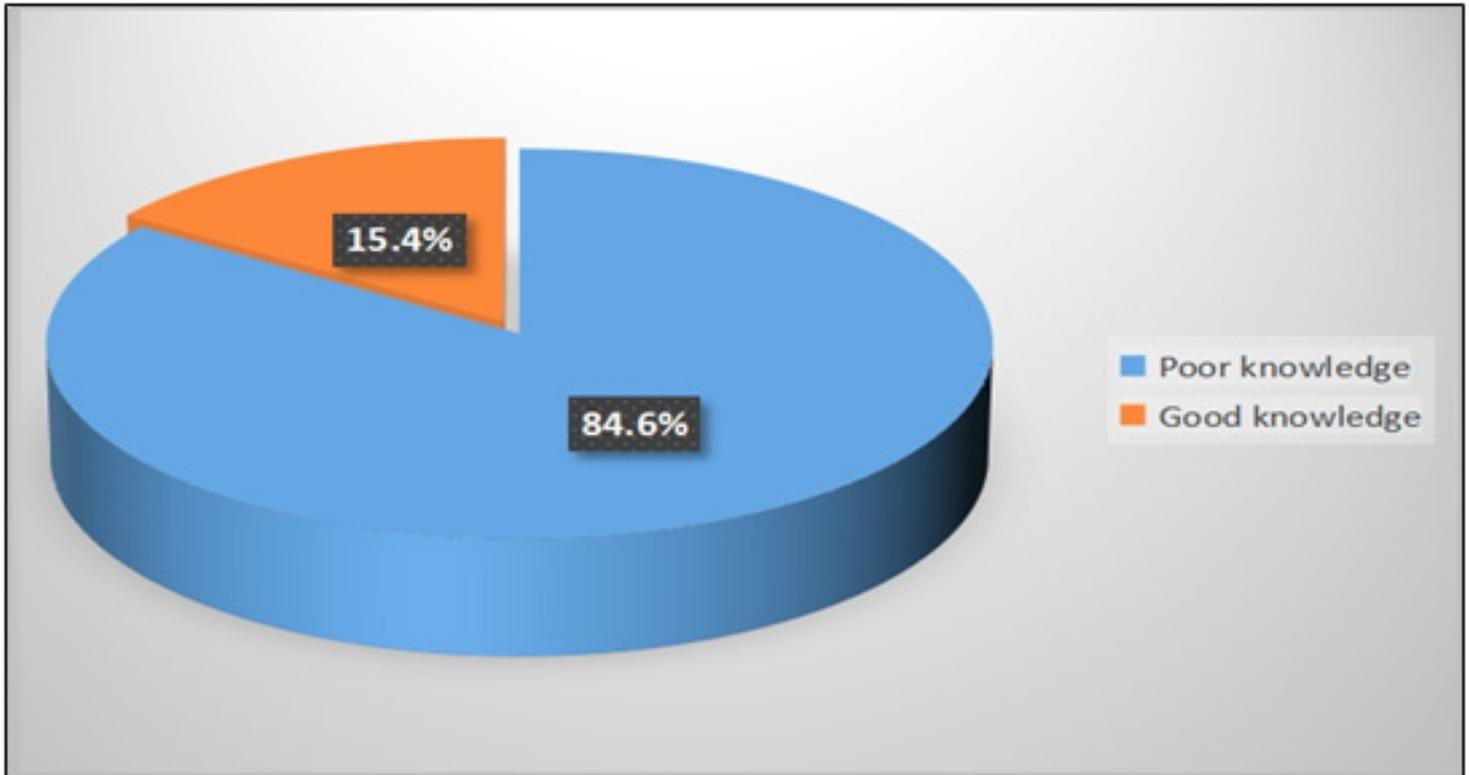
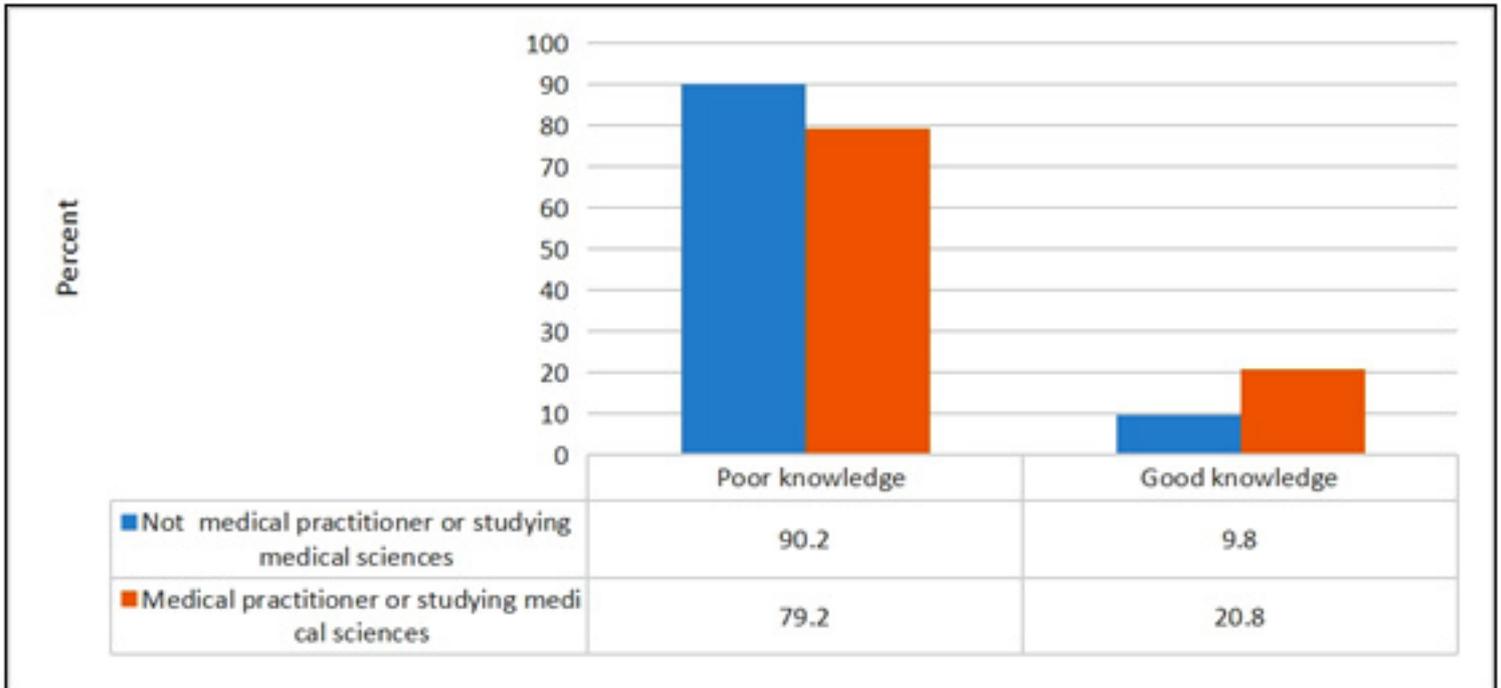


Figure 2. Relationship between participants' level of knowledge about radial head subluxation and being a medical practitioner or studying medical sciences (No.:39)

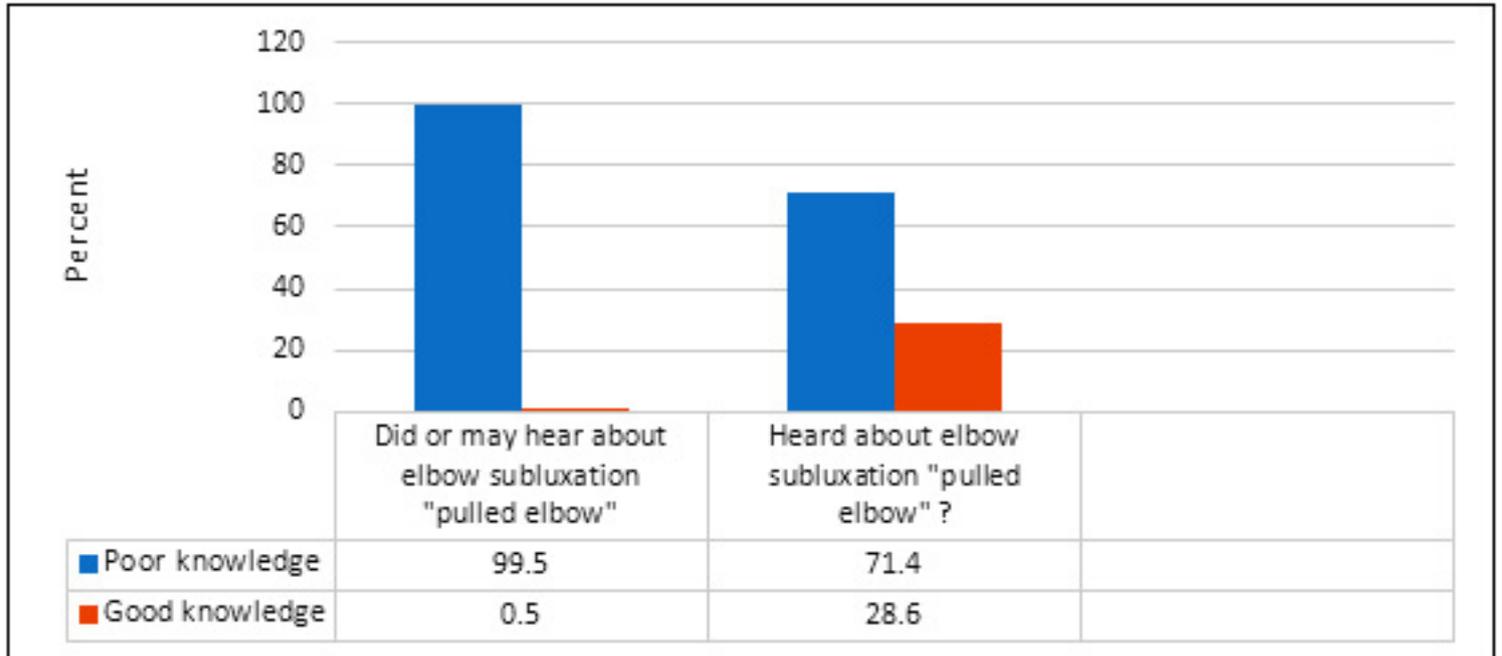


N.B.: ( $\chi^2 = 9.18$ , p-value = 0.002)

Table 4. Relationship between participants' level of knowledge about radial head subluxation and their demographic characteristics and having and living with children (No.:396)

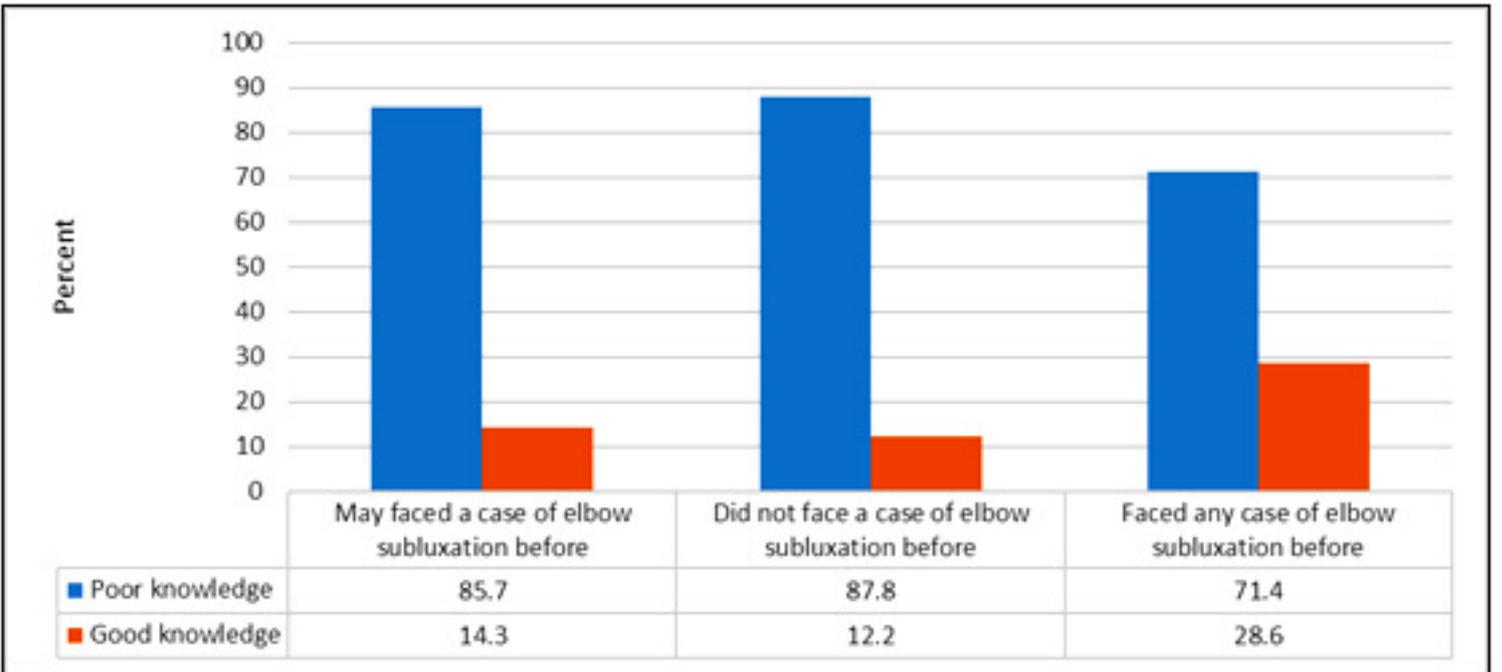
Variable	Knowledge level		$\chi^2$	p-value
	Poor No. (%)	Good No. (%)		
Gender				
Male	193 (82.8)	40 (17.2)	1.35	0.245
Female	142 (87.1)	21 (12.9)		
Age group				
18-25	204 (85.4)	35 (14.6)	3.36	0.339
26-35	53 (77.9)	15 (22.1)		
36-45	28 (84.8)	5 (15.2)		
More than 45	50 (89.3)	6 (10.7)		
Nationality				
Saudi	320 (84.4)	59 (15.6)	0.18	0.671
Non Saudi	15 (88.2)	2 (11.8)		
Educational level				
University	264 (86.3)	42 (13.7)	2.99	0.224
Post-graduate	13 (81.3)	3 (18.8)		
Intermediate or secondary school	58 (78.4)	16 (21.6)		
Job status				
Parttime job	12 (85.7)	2 (14.3)	0.72	0.697
Not employed	231 (85.6)	39 (14.4)		
Employee	92 (82.1)	20 (17.9)		
Marital status				
Widow	4 (100)	0 (0.0)	1.06	0.786
Single	228 (83.8)	44 (16.2)		
Married	95 (85.6)	16 (14.4)		
Divorce	8 (88.9)	1 (11.1)		
Do you have children?				
No	254 (84.1)	48 (15.9)	0.23	0.628
Yes	81 (86.2)	13 (13.8)		
Do you live with any children?				
No	138 (88.5)	18 (11.5)	2.95	0.086
Yes	197 (82.1)	43 (17.9)		

**Figure 3. Relationship between participants' level of knowledge about radial head subluxation and previously hearing about elbow subluxation "pulled elbow" (No.:39)**



N.B.: ( $\chi^2 = 59.48$ , p-value = < 0.001)

**Figure 4. Relationship between participants' level of knowledge about radial head subluxation and previously facing a case of elbow subluxation (No.:39)**



## Discussion

This study aimed to determine the awareness level of the Saudi community about pulled elbow. The study explored the awareness and knowledge regarding radial head subluxation mechanism and how to deal with it, in the western region of Saudi Arabia.

Previous studies revealed that radial head subluxation is considered one of the most common injuries of the elbow joint in children who represent 22% of the total number of emergency cases of closed injuries of the upper limb [13].

In the present study, it was observed that 47% of the participants had previously heard about radial head subluxation, and only 15.4% of them had a good knowledge level about radial head subluxation. The mechanism of radial head subluxation is a sharp traction of the wrist or hand with an unbent elbow joint and pronated forearm [14,15]. In this study, more than half (50.8%) correctly knew the cause is holding children by their hand or forearm.

The clinical presentation of radial head subluxation in typical cases is characterized by acute pain at the site of injury and subsequently the child will not be able to move the injured limb [15]. The child usually holds the injured arm with the other hand or keeps it next to their chest. The presence of deformities, swelling of surrounding tissues, and bruising around the injured elbow are not characteristic of pulled elbow [14,16]. Most of the participants (68.9%) in our study correctly reported that in the presentation of this case the child will complain of pain at the injured site.

The diagnosis of radial head subluxation is made by a clear history and clinical presentation at clinic or emergency department. Further diagnostic studies are not required unless there is sign of fracture (swelling, ecchymosis, or deformity) or when indicating a fall from a height of 1m or more [7,14,17]. Treatment is also done at the same time by using a closed reduction approach, either supination or hyperpronation. In this work, the majority (61.6%) of the participants correctly knew that this case is diagnosed by clinical examination, while 58.8% reported that it could be diagnosed by X-ray. And 44.7% of them correctly knew that the professional management of this case is hospital management and 86.6% reported that on facing this case they will directly take the patient to the hospital.

This study finding shows that there is a need to promote awareness and educate all Saudi adults about the mechanism that predisposes to radial head subluxation and prevention of RH subluxation. But as there is no specific preventive method, the aim is to prevent the sharp traction of the arm of children as well as training parents or caregivers on noticing the symptoms of subluxation to prevent late visits.

### Limitations

In this study, the use of a questionnaire for data collecting could lead to recall bias. Another drawback was that the study was cross-sectional, which highlighted the relationship between variables but made detecting the cause-effect relationship challenging.

## Conclusion

According to his research, 47% of the participants had heard of radial head subluxation, 32.7 percent had studied it, and 32.2 percent had heard about it through friends or family members. Only 23.1 percent of people had heard about it via their doctors or health care providers. Males and 1-5-year-old children are the most typically impacted, according to 21.2 percent and 63.1 percent of participants, respectively. The majority of participants (68.9%) properly identified the case presentation as discomfort at the injury site, 61.6 percent correctly identified the case as being diagnosed by clinical examination, and 58.8% correctly identified the case as being diagnosed by X-ray. More than half of those polled (50.8 percent) correctly identified the cause as children being held by their hand or forearm. Only 19.4 percent of them had dealt with an elbow subluxation, and 61.4 percent of them took the patient to the hospital right away. Only 44.7 percent of the participants correctly identified hospital management as the profession in charge of this situation. Only 15.4% of the participants had a high level of knowledge regarding radial head subluxation, and there was no correlation between their level of knowledge and their demographic characteristics. Participants who were medical practitioners or studying medical sciences, and who had already heard about elbow subluxation or who had dealt with a case of elbow subluxation, had a significantly higher percentage of having strong knowledge. There is a need to raise the awareness of the Saudi community about elbow subluxation through direct information from health care workers and health education campaigns directed to the whole community.

**Ethics approval and consent to participate:** an ethical approval for the study was obtained from the unit of biomedical ethics at Taif university, Saudi Arabia.

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