



Bipolar perception of orthopedics fractures before and during covid-19 pandemic: a local study

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ABSTRACT

Background: Patients refrain from seeking medical help in the time of COVID-19 due to the fear of getting infected. Hospitals are overloaded with limited beds, interfering with inpatients stays. Awareness of first aid management of fractures among the general population has been neglected. Thus, the aim of this study is to assess the knowledge of the selected population regarding fractures' first aid, and their readiness to seek medical help before and during the time of quarantine. **Methodology:** Cross sectional vignette-Based study among Saudi population of Al-Ahasa. Data processed via SPSS using two tailed tests. A total of 1005 respondents were included in this study. **Results:** Good awareness was detected among 520 (51.7%) participants. Before pandemic, (83.7%) reported that they will Call the ambulance immediately, and only (15.1%) Consult a doctor without visiting the hospital (telemedicine). During the pandemic, (41.5%) told that they can call ambulance while the majority (57.3%; 576) told that they Consult a doctor without visiting the hospital (telemedicine). Men had significantly good awareness level regarding fracture first aids compared to women. Similarly, health care related participants had significantly good awareness level regarding fracture first aids compared to others.

Keywords: COVID-19, quarantine, telemedicine, pandemic

1. INTRODUCTION

Fracture is a very common pathology in children and adults requiring well-judged management and holistic approach. The goal of management of fracture is to restore the normal or near to normal structural integrity and physiology of the fractured part, at the earliest (Chopra and Vijay, 2020).

In December 2019, The COVID-19 virus was firstly identified in Hubei region of China and soon after, the virus spread widely in the city of Wuhan. A few months later, the outbreak was global, and has grown to be a pandemic that affected and killed thousands of people all around the world (Giorgi et al., 2020). COVID-19 is a highly contagious disease with a higher case fatality rate (1.4%) than seasonal influenza and is more transmissible, especially in the incubation or prodromal period (Guo et al., 2020).

Giving this fact, quarantine had played a role in decreasing the number of traumatic fractures but there was a spike in fractures caused secondary to slipping such as fractures around the hip like femur neck fracture, intertrochanteric fracture and distal end of radius fracture in the elderly due to slippage over kids toys, spilled food, water and wet bathroom floors (Yadav et al., 2020).

According to a study that was conducted in Italy, there has been an increase in purchasing of home play equipment and trampolines due to the closure of playgrounds during the pandemic to limit the transmission of infection. With an average of 40% of pediatric injuries requiring hospitalization or emergency department review occur in the home. Therefore, quarantine cannot prevent all injuries (Farrell et al., 2020). During the pandemic, there is increased emphasis on managing injuries with nonsurgical strategies and limiting outpatient visits to avoid transmission of the virus. The biggest contribution to any healthcare system at the moment would be to offload avoidable patient burden. This not only optimizes resource utilization but also decreases the chances of spread of COVID 19 infection (Stinner et al., 2020).

Before the era of COVID 19, KSA has been known to have an increasing number of trauma and fractures cases attributed to road traffic accidents, but only few studies was dedicated to study the epidemiology of fractures in Saudi Arabia (Sadat-Ali et al., 2015). Also, fragility fractures due to osteoporosis are not uncommon in KSA, since the prevalence in Saudi Arabia reaches up to 35%. Sadat-Ali et al. (2020) confirmed that fragility fracture is a concern for Ministry of health because it represents 14% of all hospital admissions, with hip fractures occupying 72.7% of those fractures (Sadat-Ali et al., 2020). It is seen now that most traumatological presentations have declined along the course of the outbreak with the population staying at home, but the number of osteoporotic hip fractures remained almost the same (Nuñez et al., 2020). Currently, the resources are redistributed to contain COVID 19 infected patients, putting non - COVID patients in a difficult situation. For example, patients with hip and femoral fractures should be managed urgently, however it is hazardous to take the most affected risk group to the hospital, as it dangerous not to with consequent complications when treatment is delayed. In this research we want to explore how people handle fractures in the eastern region during the pandemic of COVID 19, and what implications has this pandemic had on the community regarding approaching fractures.

2. METHODOLOGY

Cross sectional vignette-Based study that was carried on 14th of July – September 2020 with duration of 2 months to predict the behavioral intention when dealing with fractures before and during COVID-19 pandemic among Saudi population of Al-Ahasa. This study included 1005 participants aged 18 years old and above who live in Alahsa. People who are less than 18 or who don't live in Al-Ahasa were excluded from the study. This study was approved by the medical ethics committee of the College of Medicine of King Faisal University in Alhasa. An informed consent was taken from all participants before filling the questionnaire. Participants were selected randomly. In this study Google Forms was used to make a vignette based questionnaire that will be used to collect data. The questionnaire consists of 15 questions that are directed to assess how people would act in different situations.

Data will be collected and stored in excel format. Privacy and confidentiality of the patients will be maintained. The collected data will be analyzed by Statistical Package for Social Science (SPSS) version 19.0.

Data analysis

After data were extracted, it was revised, coded, and fed to statistical software IBM SPSS version 22(SPSS, Inc. Chicago, IL). All statistical analysis was done using two tailed tests. P value less than 0.05 was statistically significant. For awareness items, each correct answer was scored one point and total summation of the discrete scores of the different items was calculated. A patient with score less than 60% (3 points) of the maximum score was considered to have poor awareness while good awareness was considered if he had score of 60% (4 points or more) of the maximum or more. Descriptive analysis based on frequency and percent distribution was done for all variables including demographic data, awareness items and behaviour towards fracture during and before covid-19 pandemic. Cross-tabulation was used to assess distribution of awareness according to participants' personal and fracture history. Relations were tested using Pearson chi-square test.

3. RESULTS

A total of 1005 respondents were included in the study. Majority of the respondents were females (57.4%; 577) and 506 (50.3%) aged 25-49 years old with mean age of 25.6 ± 10.3 years. Regarding marital status, 625 (62.2%) were married and 662 (65.9%) were

university graduated. Exact of 262 (26.1%) participants belonged to health care staff and 235 (23.4%) previously had fracture (table 1).

Table 1. Bio-demographic data of study participants in Saudi Arabia

Bio-demographic data	No	%
Gender		
Male	428	42.6%
Female	577	57.4%
Age in years		
18-24	376	37.4%
25-49	506	50.3%
50+	123	12.2%
Marital status		
Single	363	36.1%
Married	625	62.2%
Divorced/ widow	17	1.7%
Educational level		
Elementary graduate	22	2.2%
High school graduate	288	28.7%
College graduate	662	65.9%
High education graduate	33	3.3%
Belong to the healthcare staff		
Yes	262	26.1%
No	743	73.9%
Suffered from any bone fractures before		
Yes	235	23.4%
No	770	76.6%

Table 2 demonstrates Public awareness regarding bone fracture during covid-19 pandemic. Regarding first step taken to manage fracture, 735 (73.1%) old about Observing the injured area, looking for bleeding or laceration without touching it and 91(9.1%) reported Try to move the limb, to make sure there is no actual fracture. As for it is right to move the injured leg, 896 (89.2%) reported No, because it will cause more complications if it's fractured. Considering actions to reduce the swelling on the injured area, 561 (55.8%) selected Put ice compresses on the injured area and 419 (41.7%) selected don't put anything on it, pressure on the injured area could make it worse. About if the fracture is associated with bleeding, what will be your first step, 481 (47.9%) selected Use a clean towel to put pressure on the bleeding site. Also, calling the ambulance immediately was the behavior reported by 871 (86.7%) of the participants. In total, good awareness was detected among 520 (51.7%) participants.

Table 2. Public awareness regarding bone fracture during covid-19 pandemic, Saudi Arabia

Fracture awareness items	No	%
First step you will take to manage this condition		
Observing the injured area, looking for bleeding or laceration without touching it	735	73.1%
Give painkillers to the injured person	88	8.8%
Go to the hospital	46	4.6%
Try to move the limb, to make sure there is no actual fracture	91	9.1%
Take history, and do physical examination	1	.1%

<i>Calling an ambulance</i>	18	1.8%
<i>Put some cold water on it</i>	5	.5%
<i>Ask him to move his leg</i>	3	.3%
<i>Others</i>	18	1.8%
It is right to move the injured leg		
<i>No, because it will cause more complications if it's fractured.</i>	896	89.2%
<i>Yes, to make sure that it's fractured.</i>	109	10.8%
To reduce the swelling on the injured area		
<i>Put ice compresses on the injured area</i>	561	55.8%
<i>Put hot compresses on the injured area</i>	25	2.5%
<i>Don't put anything on it, pressure on the injured area could make it worse</i>	419	41.7%
If the fracture is associated with bleeding, what will be your first step?		
<i>Use a clean towel to put pressure on the bleeding site</i>	481	47.9%
<i>Call an ambulance immediately</i>	437	43.5%
<i>Raise the injured leg</i>	87	8.7%
Based on the symptoms of the previous scenario, you will have to		
<i>Call the ambulance immediately</i>	871	86.7%
<i>Manage this condition at home, only call the ambulance when the pain increases.</i>	126	12.5%
<i>To manage this condition at home is enough.</i>	8	.8%

Regarding change in management of fracture behavior before and after COVID-19 pandemic (table 3), before pandemic, 841 (83.7%) reported that they will Call the ambulance immediately and only 152 (15.1%) Consult a doctor without visiting the hospital (telemedicine). During the pandemic, 417 (41.5%) told that they can call ambulance while the majority (57.3%; 576) told that they Consult a doctor without visiting the hospital (telemedicine).

Table 3. Change in management of fracture behaviour before and after COVID-19 pandemic

Change in behaviour before and after COVID-19 pandemic	No	%
In case one of your family members went through the same scenario before the pandemic of COVID-19, you would		
<i>Call the ambulance immediately</i>	841	83.7%
<i>Consult a doctor without visiting the hospital (telemedicine)</i>	152	15.1%
<i>Deal with the suspected fracture at home without any medical consultation</i>	12	1.2%
In case one of your family members went through the same scenario during the pandemic of COVID-19, you would		
<i>Call the ambulance immediately</i>	417	41.5%
<i>Consult a doctor without visiting the hospital (telemedicine)</i>	576	57.3%
<i>Deal with the suspected fracture at home without any medical consultation</i>	12	1.2%

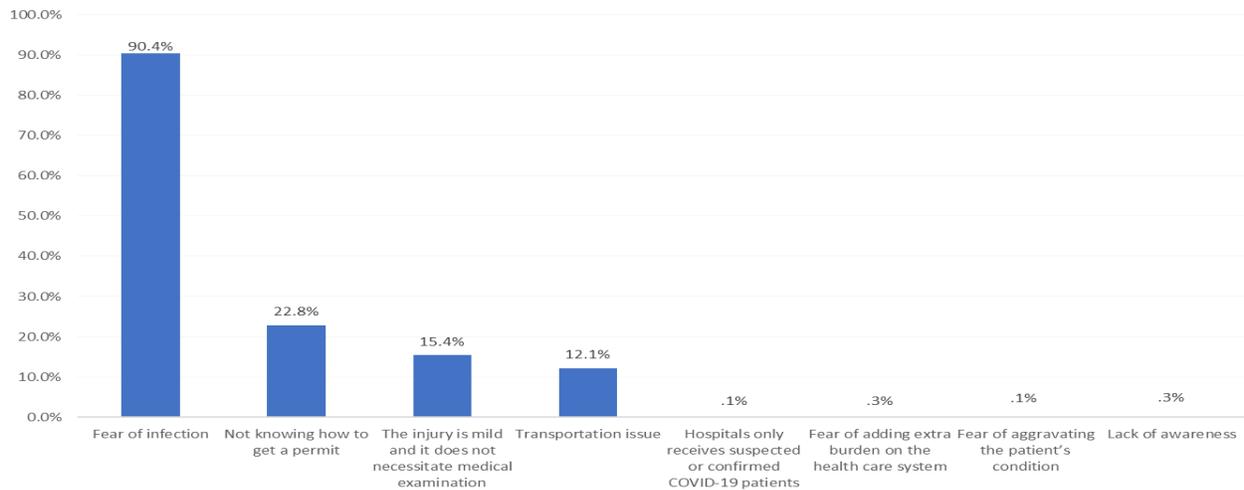


Figure 1 Reason that would prevent people from visiting the hospital during the pandemic of COVID-19 to treat their suspected fracture

Figure 1 illustrates the reasons that would prevent people from visiting the hospital during the pandemic of COVID-19 to treat their suspected fracture. Fear of infection was the most reported reason (90.4%) followed by lack of knowledge for how to get a permit (22.8%), mild injury with no need for hospitalization (15.4%), and transportation issue (12.1%).

Table 4 shows the distribution of fracture first aid awareness by participants' personal data. Exact of 57.7% of male participants had good awareness level regarding fracture first aids compared to 47.3% of females with recorded statistical significance ($P=.001$). Also, good awareness level was detected among 61.5% of health care related participants in comparison to 48.3% of others ($P=.001$). Besides, 56.6% of the participants with previous history of fracture had good awareness level compared to 50.3% of those who did not ($P=.089$).

Table 4. Distribution of fracture first aid awareness by participants personal data

Personal data	Awareness level				P-value
	Poor		Good		
	No	%	No	%	
Gender					
Male	181	42.3%	247	57.7%	.001*
Female	304	52.7%	273	47.3%	
Age in years					
18-24	186	49.5%	190	50.5%	.554
25-49	236	46.6%	270	53.4%	
50+	63	51.2%	60	48.8%	
Marital status					
Single	174	47.9%	189	52.1%	.882
Married	304	48.6%	321	51.4%	
Divorced/ widow	7	41.2%	10	58.8%	
Educational level					
Elementary graduate	11	50.0%	11	50.0%	.330

High school graduate	152	52.8%	136	47.2%	
College graduate	307	46.4%	355	53.6%	
High education graduate	15	45.5%	18	54.5%	
Belong to the healthcare staff					
Yes	101	38.5%	161	61.5%	.001*
No	384	51.7%	359	48.3%	
Suffered from any bone fractures before					
Yes	102	43.4%	133	56.6%	.089
No	383	49.7%	387	50.3%	

P: Pearson X^2 test

* $P < 0.05$ (significant)

4. DISCUSSION

First aid is the initial step given to an injured person at the site of an accident before the arrival of the paramedics. The goals of a first aid provider include preserving life, relieving suffering, preventing further complications, and promoting recovery (Alsayali et al., 2019).

One of the conditions that require a first aid management is bone fracture which is a medical condition that occurs when significant pressure is exerted on the bones, caused by: falls, traffic accidents, or bone stress (to which stress fractures in athletes are attributed). Besides, fractures may be attributed to some medical conditions that weaken the bones, such as: osteoporosis and some cancers. Once a fracture is identified, a medical assistance is necessary to restore the normal structure and function of the bone (Ministry of Health – Kingdom of Saudi Arabia, 2020).

In this research we aimed to evaluate the knowledge and attitude of Alahsa society regarding fractures first aid as well as the reasons that may delay seeking medical professional assistance as the main treatment.

The sample of this study is 1005 participant, 57.4% were female while male constituted only 42.6% of the participants. As for the age of these participants, they were divided into 3 groups. First age group is the participants between 18-24 years and it constituted 37.4%. Second group aged between 25-49 with a percentage of 50.3%. Last group aged 50 and above constituted the minority which was 12.2%. As for marital status in our study, 62.2% of our participants were married, 36.1% were single and only 1.7% were divorced/ widowed. Regarding our participants' educational level, the majority were college graduates with 65.9%, followed by high school graduates with a percentage of 28.7%. While elementary school graduates and high education graduate constituted 2.2 and 3.3% respectively. Occupational status showed that the 26.1% of our participants belonged to healthcare staff while the majority (73.9%) did not. Finally, 23.4% previously had fracture while 76.6% did not (table 1).

As far as we know, there were no other published study that evaluated knowledge and attitude regarding fracture first aid in particular. However, there were many other studies that evaluated knowledge and attitude regarding first aid in general and fracture is one of these injuries. A research that was conducted in Egypt studied the knowledge, attitudes and practice about first aid among rural mothers with 1450 participants, 47.0% were aged between 25- 35 years with mean age of 30.8 (SD 7.9) years (range 19–54 years). 33.7% of them had secondary education while 35.2% had completed university education and only 5.2% had postgraduate education. As for their occupational status, the majority (73.5%) of the studied mothers were not occupied, while 10.2% worked as health care personnel (Eldosoky, 2012).

Table 2 demonstrates the level of public awareness regarding bone fracture during covid-19 pandemic. The overall awareness was good among 520 (51.7%) participants, which leaves the other group of people with insufficient knowledge. First aid knowledge regarding suspected fracture and external bleeding differ via different regions. In Baghdad, Primary school teachers' knowledge of first aid concerning external bleeding and fractures is poor and certainly inadequate (Al-Robaiaay, 2013). On the other hand, schoolteacher's in Palestine had high first aid knowledge regarding fractures and external bleeding (Amroand Qtait, 2017). In Saudi Arabia, the issue of low knowledge regarding bleeding and fractures first aid is causing serious concern. In assessing first aid skills among medical and non-medical students at Taif University, it appeared to be unsatisfactory (Alsayali et al., 2019). Also, a cross sectional study among parents in Madinah City showed that their first aid knowledge regarding incidents, injuries, and fractures was not satisfactory (Al-Johani et al., 2018). Using ice compressors is a common practice in sport injuries because of its ability in reducing

pain and swelling, but it was not a favored option among our participants. Terrible consequences as hypovolemic shock may result when people don't know that external bleeding must be stopped by direct compression, which was not that much favored by our participants as well. Regarding change in management of fracture before and after COVID-19 pandemic (table 3), before pandemic, 83.7% of our participants reported that they will call the ambulance immediately, 15.1% will consult a doctor without visiting the hospital (telemedicine) while the remaining 1.2% reported that they will deal with the suspected fracture at home without any medical consultation.

When the same question was asked but during COVID-19 pandemics instead of before, the percentage of people calling the ambulance dropped to 41.5% while the percentage of using telemedicine increased up to 57.3% with the percentage of not seeking a medical consultation remaining the same. Another research that studied the Impact of COVID-19 on Orthopaedic and Trauma Service found that Operations for the treatment of upper and lower-limb fractures decreased by 23% (from 98.5 ± 14 to 75.9 ± 15.2 per week) and 20% (from 210.6 ± 29.5 to 168.4 ± 16.9 per week), respectively, which is considered as a significant reduction. It was also found that clinical outpatient visits decreased by 29.4% (from $11,693 \pm 2,240$ to $8,261 \pm 1,104$ per week) (Wong and Cheung, 2020). This indicates that telemedicine is a good replacement for actual hospital visits in non-serious cases. It can offer essential medical support to the public during the COVID-19 outbreak, reduce social panic by promoting social distancing, enhance the public's ability of self-protection, correct improper medical-seeking behaviors, reduce the chance of nosocomial cross-infection, and facilitate epidemiological screening, and therefore, it plays an important role on preventing and controlling COVID-19 (Gong et al., 2020).

Hospitals visits in general and specifically outpatient clinics and emergency room visits had decreased during the pandemic of COVID-19 in many countries like Korea, Greece, and many European countries (Pikoulis et al., 2020; Lee et al., 2019; Masroor, 2020). In our study, Fear of infection was the most reported reason that would refrain people from visiting the hospital during the pandemic of COVID-19 even when it's urgent like treating their suspected fracture (figure 1). 90.4% of the subjects considered fear of infection as the main reason of refraining hospital visits, which is expected during the pandemic of a deadly virus and is also consistent with a study in Greece which suggested that patients were exposed to collateral damage due to their fear of infection resulting from not seeking medical care (Masroor, 2020). Also, another study in Italy showed a significant reduction of emergency room visits corresponding to the peak of the COVID-19 daily mortality curve which was attributed to fear of infections (Mantica et al., 2020). Lack of knowledge for how to get a permit was the second reason that would prevent people from visiting the hospital with 22.8% of the subjects. During times of curfew people are required to get an electronic permit to leave their residence, technical issues or deficient knowledge of the steps of the process can be attributed to why people would refrain from seeking medical care during times of curfew. The third reason that would prevent people from seeking medical attention is believing that the injury is mild and that there is no need for hospital attention (15.4% of our subjects), this can be attributed to their lack of awareness about the symptoms of fractures and not asking for a professional opinion via telemedicine or online healthcare services. 12.1% of our subjects considered transportation issue as the reason that would prevent people from visiting the hospital. This can be explained by the geographical diversity in AlAhsa as well as lack of public transportation and the new emergence of female driving in Saudi Arabia. As for association between demographic variables and level of knowledge of first aid for fracture (table 4), finding shows significant association between gender and awareness level. Where 57.7% of male who respond to the survey have a good awareness level, while in female only 47.3% of them have good knowledge regarding first aid for fracture. Other socio demographic variables i.e. age, educational status, marital status shows no significant association. This result was supported by cross sectional analytical study conducted in Mohali, Punjab, a total of 40 samples of school teachers were selected for the study including both males and females. The results showed no significant association between socio demographic variables i.e. gender, age, educational status, marital status and knowledge regarding the first aid management (Kaur et al., 2017).

For association between belong to the healthcare staff and level of knowledge of first aid for fracture, the results showed that more than half of the respondents who belong to health care 61.5% have a good awareness level, and only 38.5% of them are not, similar to study at Taibah University which showed the knowledge of first aid management in suspected bone fractures was about 89.1% among health science students (Alhejaili and Alsubhi, 2016).

Finally, association between who suffered from any bone fractures before and level of knowledge of first aid for fracture showed that Only 23.4% of the responders suffered from previous bone fracture and the results showed no association between who suffered from any bone fractures before and level of knowledge of first aid for fracture.

5. CONCLUSION

Bone fracture is a common pathology that requires medical attention. Therefore, high awareness regarding the signs and symptoms of bone fractures is necessary especially during COVID-19 pandemic. The results showed that more than half of the participants had

good level of awareness of fracture first aid. The level of awareness was proven to be significantly higher among: males, healthcare providers, and participants with previous history of bone fracture. As for the participants' responses to the suspected fracture a higher percentage of subjects would use telemedicine as their first line of management during this pandemic compared to the times before the pandemic. Fear of infection was the most reported reason that would refrain subjects from visiting the hospital to treat a suspected fracture followed by permit issues, underestimation of the injury, and transportation issue.

This study has several limitations. The primary limitation is that the investigation of 1005 respondent in Al-Ahasa is not representative of other parts of KSA, largely because there are significant socio-economic disparities between other provinces of the country. Similar studies conducted throughout the country are necessary. Our study was also limited in not evaluating peoples' skills in implementing first aid. First aid knowledge alone does not ensure proper emergency response. This could be an area for future research studies.

Therefore, we would recommend that external bleeding and fractures first aid training to be more widely available to the general public. The content of training should be both theoretical and practical, the training should be certified and trainees validated annually, to ensure their capabilities and their up to date knowledge. The quality of training is as important as receiving training as these suggestions indicate. The study can be done on a larger population scale to generalize the findings. Also, an experimental study can be done to assess the effectiveness of workshop conducted regarding participants knowledge of fractures first aid.

Authors contributions

- Dr. Naif Alhumam: Supervision, research idea generation, study design
- Dr. Adia Almutairi: Data collection, writing the manuscript
- Dr. Asma Alwesaibi: Data collection, writing the manuscript
- Narjes Alramadhan: Data collection, writing the manuscript
- Fatimah Alabbad: Data collection, writing the manuscript

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Conflict of interest

The authors declare that there is no conflict of interests.

Informed consent

Written consent was obtained from all individual participant included in the study.

Ethical approval

This study was approved by medical ethics committee of King Faisal University in Hofuf, Saudi Arabia, number 2020-10-01.

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Data and materials Availability

All data associated with this study are present in the paper.

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