

Evaluation of the awareness of Saudi people about the warning manifestations following head injury; A single-center cross-sectional study

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ABSTRACT

Road traffic crashes, resulting in Traumatic brain injury, claim the lives of approximately 1.3 million people every year. Individuals, their families, and nations suffer considerable economic losses because of road traffic injuries. Treatment costs and lost productivity for those killed or disabled by their injuries, as well as family members who must take time off work or school to care for the injured, contribute to these losses. The purpose of this cross-sectional study was to assess public awareness of the warning signs of traumatic brain injury and the importance of its acute presentation in Saudi Arabia. The questionnaire, was constructed from 41 items, was used in this cross-sectional study which had been conducted at Jeddah region in the kingdom of Saudi Arabia to assess Saudi people's awareness about head injuries. 620 participants were interviewed, of whom 312 were men and 308 (49.7%) were women. 56.1% of respondents knew about head injuries. About 30% of the family members (excluding the mother) indicated that more education about head injuries was needed. Nearly 416 participants didn't know that they shouldn't drink water after head injuries. The public needs to be made aware of the dangers of head injuries. Public awareness about Traumatic brain injury needs to be raised. Families must be trained on how to recognize the symptoms of traumatic brain injuries and how to seek medical attention.



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1. INTRODUCTION

The traumatic brain injury (TBI) has been called the ‘silent epidemic’ of modern times and it refers to an insult to the brain that occurs because of an external mechanical force and can result in permanent or temporary changes to cognitive, physical, or psychosocial functions, as well as altered states of consciousness. Traumatic brain injury occurs suddenly within the skull from the external trauma. There is a potential for life-threatening brain insult due to elevated intracranial pressure from excessive bleeding and

consequently oxygen deprivation of the brain [1]. There are four patterns of intracranial hemorrhage: epidural hemorrhage, subdural hemorrhage, subarachnoid hemorrhage, and intraparenchymal hemorrhage. Upon CT scan, a contusion appears as a hyperdense area surrounded by hypodense edema and it may cause disruption of intracranial capillaries, resulting in intra-cerebral hemorrhage, with a possibility of higher hospital mortality in comparison to small one [2], [3]. With 1.4 million cases of head injuries presented each year in the UK, head injury is an important cause of death and disability in young people. Kingdom of Saudi Arabia (KSA) accounts for 4.7% of all road traffic fatalities, while Australia, the UK, and the USA do not exceed 1.7%. Body parts most injured were the head and neck [4], [5].

According to a systematic review, those who presented within 24 hours had a lower incidence of traumatic intracranial pathology, however, further research is required to characterize the delayed presentation to the emergency room (ER) in people with head injuries. According to another study, some people with head injuries didn't go to the ER immediately; some go 24 hours after they have suffered a head injury [7].

Therefore, in this cross-sectional activity, the public awareness of Saudi population were evaluated in relation to the warning signs of the Traumatic brain injury and the significance of its urgent presentation. Educating the population about road traffic accidents (RTAs) and reducing the complications and mortality caused by head injuries, further steps should be taken.

2. Materials and Methods

2.1 Study design, setting, and participants' recruitment

A six-month cross-sectional activity using an electronic form took place in the Jeddah region of KSA (5/6/2019 to 5/12/2019). the public awareness of Saudi population were evaluated in relation to the warning signs of the Traumatic brain injury and the significance of its urgent presentation.

2.2 Sample size and study population

This study recruited a pilot study sample of 238 participants .620 cases were collected for male and female participants, respectively, according to the reliability test with Jeddah population size and effect size (0.31) . The G*power program was used to recognize the sample size.

2.3 Inclusion criteria

It includes both men and women of different ages (from 18 to 60 years old). This study excluded students and graduates of medical schools.

2.4 The questionnaire form

Five scales were used within the form: (1) basic information scale, which included demographic variables including gender, age group, social class, education level, family size, how many children there are, and their relationship to the children.

(2) The respondents' understanding of the predisposing factors for RTA, such as hypertension, bleeding disorders, anticoagulant use, chronic hepatitis, and repeated minor trauma. After regaining consciousness, they should be aware of the lucid interval and its significance of presenting to the medical facility in case of loss of consciousness again.

(3) The scale to measure how aware participants are of the warning signs and symptoms that require an urgent hospital visit, including; disturbed conscious level immediately after trauma, fatigability and sleepy state, continuous headache, disturbed visual field one or both of the eyes, seizures, , nausea or vomiting, clear discharge from nostrils or external auditory canal, central or peripheral nervous signs, and symptoms

as slurred speech, weakness of arms, legs or the face, and loss of balance. Drinking water prior to a CT scan to avoid hypoosmolarity, which may cause death, is a symptom of internal bleeding, as is feeling thirsty as a sign of internal bleeding.

(4) An assessment of participants' awareness and ability, in particularly, mothers and those who deal with children daily should be aware of any alarming signs and symptoms on their children.

(5) Participants who had previously dealt with head trauma were only surveyed on the last scale to determine how well they behaved after experiencing head trauma.

For all scales, the questionnaire was validated by both face and concurrent means. Both Arabic and English versions of the questionnaire were available. Response behavior on subsequent questions could be altered by the viewpoint. Therefore, the data before and after each reporting was compared on case-by-case evidence. A date and time were recorded for all changes made during the data collection process to guarantee scientific traceability.

2.5 Interpretation of Statistical Data

The statistical software used was IBM SPSS version 21. Statistical analyses were performed on the collected data (descriptive, frequency, cross tabulation), reliability of the questionnaire, regression, correlation, and an ANOVA test.

3. Results

3.1 Demographic characteristics

The total sample size was 620, of which 312 (50.3%) were males, and 308 (49.7%) were females. Nearly the highest level of education was attained by 77.1% of participants and the majority (54.8%) were between the ages of 18 and 30. Another 530 individuals dealt with children, and about 348 of them had a relationship with a child as a family member other than the mother (Table 1).

Table 1: socio-demographic dataset of the participants (n=620)

parameter	N (%)	Mean±SD	P-value
Sex			
Male	312 (50.3%)	--	0.621
Female	308(49.7 %)		
Age			
18-30	340(54.8%)		
31-40	138(22.3%)		
41-50	88 (14.2 %)	26.8±0.775	0.063
>50	54 (8.7%)		
Family members			
2-4	198 (31.9 %)		
5-8	328 (52.9 %)		
>8	94 (15.2%)	4±0.455	0.411
< 15 years old Children			
Yes	276 (44.5 %)		
No	344 (55.5 %)		
> 60 years old Elderly			

Yes	276 (45.5 %)		0.421
No	244 (56.3%)		
Marital status		--	0.000*
Single	294 (46.3%)		
Married	302 (47.8 %)		
Divorced	22 (3.7 %)		
Widowed	2 (4%)		
Educational level			
Illiterate	62(12%)	--	0.321
Limited education (primary, preparatory)	10 (1.6%)		
Secondary school certified	70(11.3%)		
Highly educated	478 (77.1 %)		
Dealing with children?			
Yes	512 (82.6 %)	--	0.042
No	108 (17.4 %)		
If yes, clarify the relation			
Mother	96 (17.8%)	--	0.543
A family relation (not the mother)	348 (59%)		
Working relation	66 (13.9%)		
Limited dealing	2 (0.6 %)		

SD=standard deviation, *statistically significant

3.2 Comorbidities

Participants were also asked about their awareness of the comorbidities. Sixty-four of the participants were hypertensive and 38 were keeping on blood-thinning drugs. About 42.6% of respondents were recognized that head injuries can lead to brain insult due to their health condition (Table 2).

Table (2); Co-morbidity distribution among the participants.

2nd SCALE QUESTIONS (Co-morbidity)	YES	NO	P- Value
	N (%)	N (%)	
Hypertension?	64 (10.3%)	556 (89.7%)	0.484
Use of blood-thinning medications?	38 (6.1%)	582 (93.9%)	0.668
Any disease that prevent clotting of blood as hemophilia?	6(1%)	614(99%)	0.467
Chronic hepatitis?	2(0.3%)	618 (99.7%)	0.647
The previous comorbidities make you more vulnerable to have ICH after head trauma?	264 (42.6%)	356 (57.4%)	0.069
The repetitive head trauma for elders may cause ICH ?	318 (51.3%)	302 (48.7%)	0.113
the hospital visit is a must after head trauma? lucid interval ?	332 (53.5%)	288 (46.5%)	0.746

3.3 The awareness of the study population about the warning signs of TBI

Participants were also evaluated on their knowledge of warning symptoms and signs that require urgent hospital visit. The warning sign, according to almost 400 respondents, is loss of consciousness or any type of neurological condition. Convulsions were the warning signs for 60.6% of respondents, while nausea and vomiting were the alarming signs for 54.8% of participants (Table 3).

Table 3: The knowledge of the study participants about the warning manifestations of TBI(n=620)

3 rd SCALE QUESTIONS (The warning signs)	recognized	not	Other	P-Value
	N (%)	N (%)	N (%)	
Altered conciseness early after head trauma?	400 (64.5%)	220 (35.5%)		0.653
Chronic head or neck pain?	314 (50.6%)	306 (49.4%)		0.762
Altered awareness or wakefulness?	276 (44.5%)	344 (55.5%)		0.688
Nausea or vomiting?	340(54.8%)	280 (45.2%)		0.843
Altered vision or eyes abnormality?	308 (49.7%)	214 (34.5%)		0.203
seizures?	376 (60.6%)	244 (39.4%)		0.421
Clear discharge from the nose or ears?	226 (36.5%)	394 (63.5%)		0.356
Neurological manifestations as: heavy tongue, weakness of the limbs or face, and anormal balance?	400 (64.5%)	216 (34.8%)	4 (6%)	0.721
you should not drink after trauma until CT result organized?	110 (17.7%)	510 (82.3%)		0.069

3.4 The awareness and recognition of warning manifestations on pediatric group

Participants also had to demonstrate their awareness and recognition of warning manifestations on pediatric group, especially for mothers and those who deal with children daily (Table 4).

Table 4: the awareness of warning manifestations of TBI in pediatric group

4 TH SCALE QUESTIONS (Pediatric care)	Recognized	not	Other	P-Value
	N (%)	N (%)	N (%)	
altered lactation and eating	206(33.2%)	414 (66.8%)		0.542
Unusual irritability and crying	330 (53.2%)	290 (46.8%)		0.876
Altered behavior and mood towards daily activities	268 (43.2%)	352 (56.8%)		0.543
altered sleep rhythm and pattern?	176 (33.6%)	346 (66%)		0.231
Disturbed primitive skills as toilet use	250 (40.3%)	270(59.7%)		0.231
Inability to balance, abnormal gait	408 (65.8%)	212 (34.2%)		0.211
Vomiting, and fatigability	394 (63.5%)	226 (36.5%)		0.215
delayed academic performance	192 (31%)	428 (69%)		0.351
Others? as tendency to sleep, headache, disturbed memory.			28 (4.5%)	0.312

3.5 The Assessment of the previous experience of dealing with head trauma

We also assessed the participants for their experience with a previous head trauma to determine their level of behavior. According to Table 5, 15.8% of head trauma cases resulted in loss of consciousness. Of those, 58.22% went to the hospital and 41.8% did not.

Table 5: The Assessment of the previous experience of dealing with head trauma

	immediate hospital visit	According to severity of the injury	According to the severity and symptoms	others	P-Value
Your action with head trauma?	260 (41.9%)	74 (11.9%)	278 (44.8%)	6 (1%)	0.123
	Yes		No		
Previous experience with head trauma?	314 (50.8%)		302 (48.9%)		0.765
	1-3 162 (48.5%)		4-7 130 (38.9%)		
If yes, Assessing the severity of 10	7-10 40 (12%)				0.211
	YES	NO			
The trauma with loss of consciousness?	98 (15.8%)	290 (46.8%)	-		0.434
If yes, did you visit the hospital?	92 (25.7%)	66 (18.4%)	200 (55.9%)		0.882
	YES	NO	hospital visit with symptoms not mentioned in the questionnaire		
the injury associated with any manifestations that mentioned above?	228 (32.8%)	260 (66.1%)	8 (1.1%)		0.195
If yes, did you visit the hospital?	86 (32.8%)	130 (49.6%)	46 (17.6%)		0.013

4. Discussion

TBI is a disruption in the normal function of the brain because of trauma. Depending on the degree of brain damage, it can be mild, moderate, or severe. Due to head injuries, some children did not receive an accurate diagnosis of TBI [8], [9]. Using this study, we aimed to determine whether residents of the Jeddah region can recognize the warning manifestations of head injuries, and the significance of urgent consultation, so that certain measures can be done. It was the main endpoint of this activity to assess the recognition of the participants in general and those in relation with children in their role as a parent, family member, or employee; specifically, with how to recognize the warning manifestations of TBI in their children. According to scale one, 2730 (82.6%) individuals had a relationship with the children, and 348 (56.1%) were dealing with the children as someone other than the mother. It demonstrated the significance of the knowledge about TBI as studies have suggested that mothers and caregivers recognize the warning manifestations of TBI so that early management can be provided timely to decrease the consequences as literatures have reported that children with TBI due to head injuries had delayed diagnosis [9]. There were 438 children under 15 years old (70%), and 344 elderly family members over 60 years old (55.5%). Consequently, it was recommended that it is advisable to raise the population's awareness to recognize the warning manifestations of TBI among children and the elderly, specifically, as well as across all age groups. In another study, children (58%) who were traumatized developed TBI. In the study, trauma modalities were found to affect the TBI and neurological status of children for a long time [9], [10].

One of the principal endpoints of the research was to determine how well the participants dealt with a prior head injury. The fifth scale of the questionnaire evaluated this aspect. Almost 130 (49.6%) respondents responded incorrectly to the warning manifestations (did not go to the hospital) because they didn't recognize that. Although TBI is commonly associated with head injuries, delayed interventions are uncommon in this study, in agreement with the previous study [11], [12]. Additionally, the secondary endpoint was to assess how knowledgeable the participants was about "feeling thirsty", which can be a sign

of internal hemorrhage after a head injury, where they must stop drinking anything before medical consultation and CT scan organization to avoid the risks of hyperosmolarity and eventual death.³ Accordingly, 510 participants (82.3%) did not know that feeling thirsty after a head injury is a symptom, as well as the dangers of drinking water before consulting a physician.

This study had few limitations as it was recommended that further research be done on a larger sample size and to do it in a multicentric national study, as this study was conducted on a small sample size in Jeddah region. Furthermore, statistical analysis was needed to examine the relationship between awareness, educational level, socioeconomic status, and environment, whether rural or urban. Public awareness of head injuries should be raised by health physicians. Based on this activity, to establish a background of proper actions after head injuries, educational programs are required. As a result of this activity, the society is expected to take more responsibility for head injuries in the future.

5. Conclusion

The public needs to be made aware of the dangers of head injuries. Public awareness about head injuries needs to be raised. A governing body of every educational organization must inform youth and their parents or guardians of the nature and risks associated with TBI. Parents must be trained on how to recognize TBI symptoms and how to seek appropriate medical treatment.

6. Abbreviations

Traumatic brain injury (TBI), Computed tomography (CT), Emergency room (ER), Intra-cranial Hemorrhages (ICH), Road Traffic Accidents (RTA), Kingdom of Saudi Arabia (KSA), the emergency room (ER).

7. References

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