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Childhood Injury Pattern During Covid 19 Pandemic: A Population - based Study in Rural Area in Basrah City (Iraq)

Abstract

Background: *Children injuries are a major public health problem globally and considered as an important social health issue that needs an urgent care and action, regards as a health consideration in the whole world, influencing both developed and developing countries. The increased exposure to potentially hazardous home environments and activities caused by stay-at-home orders and closures of schools due to COVID-19 pandemic may be responsible for a new spate of injuries among children in 2020.*
method: *population based cross sectional study done in rural area* ***(Al-Jazeera/Shatt Al-Arab)****. This cross sectional study involved households with at least one child in age group of less than 18 years, in rural area in Basra city (2020).*
Objectives: *To determine the magnitude of childhood injuries during COVID-19 pandemic in terms of incidence, to determine nature and causes of injuries and factors that may affect the incidence of childhood injuries that is associated with quarantine and homestay for long periods during pandemic.*
A total of 652 children under 18 years of age (according to the definition of WHO) were included in the study, 109 children had injuries during the pandemic year (2020). ***Result:*** *The incidence rate of injury in the area was 167.1/ 1000 children, males show higher incidence rate of injury rather than females. the effect of child sex, mother education and age on the incidence of injury were highly significant, while age of child and birth order were not significant. Soft tissue injuries and burns were the leading causes of injuries in our household study.*
General improvement and modification of sociocultural environment are recommended, children and adolescent education about safety and necessary precaution. establishing of injury surveillance system is important for preventing and control of injuries Governments and healthcare authorities should proactively implement appropriate intervention programs and better resources to prevent these home injuries during lockdown.

Keywords: Childhood Injuries, Rural Area, Household, Basrah.

Introduction

The direct effects of the COVID-19 pandemic can be measured in tens of millions of infections, and millions of deaths worldwide. Beyond this, the long-term health burden of COVID-19 infections remains to be seen and is expected to be substantial. Indirectly, the pandemic has caused unprecedented social and economic upheaval; in part, this is a consequence of 'lockdown' measures introduced by local and national governments to limit the spread of COVID-19 (Haug. N et al., 2020). The increased exposure to potentially hazardous home environments and activities caused by stay-at-home orders and closures of schools may be responsible for a new spate of home injuries among children in 2020. To identify risk factors for these injuries, we compare household

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characteristics between those that reported injuries and to those that did not.

Injuries are a major cause of child mortality worldwide and account for >10% of the global burden of disease. Every day, more than 2000 children and teenagers die from an injury, and over 95% of all childhood injury deaths take place in low and middle-income countries where under-resourced injury prevention and control initiatives have not been able to contain the increasing rates of injuries caused by urbanization, motorization, and environmental changes (Huang. Y et al., 2016; Carlson. LC et al, 2016).

Child injury is a global public health problem and considered as an important social health issue that needs an urgent care &action, regards as a health consideration in the whole world, influencing both developed and developing countries. (Parmeswaran. G et al., 2017).

Injury is defined as the physical damage that results when a human body is suddenly subjected to energy (mechanical, thermal, chemical or radial) in amounts that exceed the threshold of physiological tolerance. (Mathur A et al, 2018).

There are two types1) intentional injuries that include interpersonal violence, homicide, suicide and war injuries. 2)unintentional injuries that are classified according to their causes: Road traffic accidents, poisoning, falls, fires, burn injuries, drowning and others (Mathur A et al, 2018).

Child means every human being below the age of 18 years old as define by the United Nation Children's Funds (Convention on right of child, 2017). Child is regarded to be more liable for unintentional injuries because of their interest to investigate and test their encircling, their short and little stature and their inability to recognize danger due to their physiological and physical immatureness, in addition to that the effect of injury among children is greater than adults because they will be affected by disability for more years, impact on the family and high health-care cost. (Balan B et al, 2011; Halawa E et al., 2015).

The extent of childhood injuries is related with many elements like age group, gender, surroundings and their doings. In general, both fatal and non-fatal injuries occur more commonly in children with low socioeconomic status, about 95% of all injuries occur in low and middle income countries according to WHO (2017), about 855 000 deaths occur in children each year (Balan B et al, 2011; WHO injuries and violence 2017; Kalaiselvana G 2011).

Many earlier studies show that pediatric unintentional injuries are related to many socioeconomic and environmental factors that include poorness, parents with low education level, mothers of young age group, unemployed, dangerous utilities at home, school or play area and load of the pediatric injury may overburden their families as well as the society. (WHO 2019). Studies from different countries have reported that the rate of occurrence of unintentional injuries is high in rural area compared to urban area (Boland M et al, 2005; Kim K et al, 2012; Mitchel RJ et al, 2010).

Children all over the world do not have the equal chance of having an injury, poor

children in poor countries are the most liable for injuries than the better off countries. (Johnston B, Rivara F, 2019).

In a pandemic situation, like COVID-19 pandemic that invaded the world in 2019, that is associated with quarantine and homestay for long periods.

This potentially increases the risk of domestic injuries to children under the age of 18years.

There is community based study about childhood injuries at 2019 in Basrah so we do this study to know the burden of childhood injuries residing in rural area in Basrah during pandemic year and compare it with the previous study done in Basrah one year befor, to know the pattern and determinants of childhood injuries and to know the incidence of childhood injuries in rural area in Basrah.

Methods and Materials

A descriptive cross- sectional population based study involving families with at least one child under 18 years of age in rural area Al Jazeera in Basra city over a period of two months from january 2021.

Cluster sampling technique was used which means the selection of an area that considered as the universe to be divided into clusters of houses. From which one or more clusters would be selected randomly to be the target cluster samples whose part of houses constituent is to be studied in Al Jazeera. This area characterized by its agricultural nature but as a result of population inflation, dredging of agricultural land and turning it into residential land had occurred, now it is filled with houses but in haphazard distribution, Al-Jazeera divided into 9 sectors, total population **26211**, main doors **3682**, the selected sector for the study called Al Saqir, the area was divided into blocks begin and end according to certain landmarks, the block was subdivide into clusters separated from each other by markets, roads or other landmarks, two blocks was taken and one cluster from each was chosen randomly. The starting point was from the right of the PHCC, number of the taken houses was **123** which represent about 20.36%

from the houses of the selected sector, the number of families **was 193,** all houses in the selected clusters were visited, empty houses were revisited again at least one time and if they still empty they would be excluded, two houses were found empty and these constituted **1.03%** of the selected houses. The total number of children included in the study were **652** child.

A special questionnaire was designed for data collection, It included demographic characteristic of the studied population which include information for each member in the family, age, sex, education and occupation and information of children with history of injury during the month and year preceding the day of interview, this included the child's age, sex, birth order, type of injury, nature, causes of the injury, place, date of the injury, and family response to the injury.

The responsible adult member in the family that is usually the mother or father or grandparents or may be from the child himself by direct interview were the source of information's.

The data were coded and analyzed using the Statistical Package for the Social Sciences (SPSS) version 26. Significance was tested using Chi-square and Fisher's Exact tests. A P-value of < 0.05 was the criterion of statistical significance.

Ethical Issue

The research was approved by the Department of Community Medicine, and Research Ethical Committee. Respondents consent were obtained verbally from all

mothers or any responsible of the children included in the study.

Results

Table 1.

The House Hold Study Population and Response Rate

Number of selected houses	**123**
Number of houses found empty and not eligible	**2**
Number of studied families	**193**
Response rate	**99%**
Number of studied children	**652**

Table 2.

Sociodemographic Characteristic of the Studied Population

Criteria		
Gender	**No.**	**%**
Male	**343**	**52.6%**
Female	**309**	**47.3%**
Total	**652**	**100%**
Age		
<2	**16**	**2.45%**
2-5	**88**	**13.5%**
6-9	**143**	**22%**
10-13	**251**	**38.4%**
14-18	**154**	**23.6%**
Birth order		
1-2	**380**	**58.2%**
3-4	**246**	**37.8%**
>5	**26**	**4%**
Maternal age		
15-24	**24**	**12.4%**
25-34	**36**	**18.6%**
35-44	**102**	**52.8%**
>45	**31**	**16.2%**
Maternal education		
<6	**166**	**86%**
6-12	**22**	**11.4%**
>13	**5**	**2.6%**
Father's education		
Died father	**4**	**2%**
<6	**123**	**63.7%**
7-12	**60**	**31.2%**
>13	**6**	**3.1%**
Maternal occupation		
Housewife	**179**	**92.7%**
Government employer	**14**	**7.3%**
Father's occupation		
Died father	**4**	**2.1%**
Self-employer	**136**	**70.5%**
Government employer	**51**	**26.4%**
Retired	**2**	**1%**

Incidence of Injury

The total number of children included in this study aged less than 18 years old was **652 child.109 child** had at least one injury in the preceding year, the total percentage of injury in the preceding year was 167.1/1000 and about **14** of injuries occur in the month preceding the visit day so the percentage of injury in the this month was **21.4/1000.**

Table 3.

Incidence of Childhood Injuries in Rural Area in Basra

Number of children	Number of injured children /year	Annual Incidence rate/1000	Number of injured children/month	Monthly incidence rate/1000
652	109	167.1	14	21.4

Incidence of Childhood Injuries by Child's Character in Rural Area in Basra

The total injured male in the preceding year were **67(195.3/1000))** and the total injured female in the preceding year were **42(135.9/1000)**. There was no significant difference in getting injury between male and female.

The highest incidence rate was seen at age group **(2-5)** which was (284.09/1000), followed by the **(`<1) and (10-13)** age group which were **(187.5/1000), (163.3/1000)** and then (**14-18)** age group and the lowest was among those of **(6-9)** years of age group(**118.8**/1000), the differences between the different age groups in the risk of getting injury was not significant. The highest incidence rate of children with injury was for children of fifth or more birth order **(500/1000)** followed by first and second birth order **(171/1000)** then the third and fourth birth order came after them **(126/1000),** there was no significant difference in the risk of injuries according to birth order.

Table 4.

Incidence of Childhood Injuries by Child Characters in Rural Areas in Basra

Criteria				P value
Sex	Number of children	Number of injured	Annual incidence Rate/1000	
male	343	67	195.3	0.211
female	309	42	135.9	
Total	652	109	167.1	
Age				0.211
<1	16	3	187.5	
2-5	88	25	284.09	
6-9	143	17	118.8	
10-13	251	41	163.3	
14-18	154	23	149.3	
Total	652	109	167.1	
Birth order				0.482
1-2	380	65	171	
3-4	246	31	126	
>5	26	13	500	
Total	652	109	167.1	

Incidence of Childhood Injuries by Mothers Character in Rural Area in Basra

The highest incidence of injured children seen belong to mothers of age group >45 years at the time of injury **(816/1000)** followed by mothers of age group **(35-44) years** which was **(154.6/1000)** then age group **(25-34) and (15-24) years** came after them in **(40/1000) and (19.2/1000)** respectively. The difference between the different mother age group in relation to the risk of injury to their children was significant.

Incidence of Childhood Injuries by Maternal Education

The highest incidence seen at children whose mother have high education followed by mothers of education **(6-12)** years **(681.8/1000)** then finally mothers with **(<6)** years **(536.1/1000),** the association between maternal education and risk of injury was significant.

Incidence of Childhood Injuries by Mother Occupation in Two Areas of Basra

The incidence was high among children whose mothers were housewives (928/1000) and less among children whose mothers were government employers (**536.3/1000)**. The differences in the risk of getting injury by mother occupation was significant.

Table 5.

Incidence of Childhood Injuries by Mother Characters in Rural Area in Basrah

Criteria				
Mother age	No.	No. of injured	Annual Incidence Rate/1000	P value
15-24	52	1	19.2	0.017
25-34	150	6	40	
35-44	401	62	154.6	
>45	49	40	816	
Total	652	109	167.1	
occupation				
House Wife	179	96	536.3	0.000
Worker	14	13	928	
Total	193	109	167.1	
Education				
<6 years	166	89	536.1	0.00
6-12	22	15	681.1	
13+	5	5	1000	
Total	193	109	167.1	

Types of Injury

In table **(6),** the distribution of injuries in accordance with type of injury as recorded by parents or other respondents or the same child, wounds by sharp instrument or hard objects was the leading cause of the total injuries **(51.37%)** followed by burns **(22.9%)** then RTA **(9.17%),** others which include scorpion and dog bite **(5.5%),** fall and foreign body injuries had the percentage **(4.6%),** finally poisoning of (1.8) percentage.

Table 6.

Distribution of Types of Childhood Injuries in Rural Areas in Basra

Types	Injured children	percentage
Wound	**56**	**51.37**
Fall	**5**	**4.6**
RTA	**10**	**9.17**
Burn	**25**	**22,9**
***Animal bite**	**6**	**5.5**
Foreign body	**5**	**4.6**
Poisoning	**2**	**1.8**
Total	**109**	**100.%**

*Animal bite include dog bite and scorpion bite

Nature of Injury

The distribution of injuries according to the nature of the injury as reported by the parents, same child or other responders in table **(7),** as we mentioned soft tissue injury was the main nature of injuries **(66.9%)** followed by burns which represent (22.9%), foreign body **(4.7%)** and kerosene poisoning was **(1.8%)**.

Table 7.

Distribution of Nature of Childhood Injuries in Rural Area in Basra

Nature	Number	%
Soft tissue injury	**73**	**66.9**
Fracture	**4**	**3.7**
Kerosine poisoning	**2**	**1.8**
Burn	**25**	**22.9**
Foreign body	**5**	**4.7**
Head trauma	**0**	**0**
Total	**109**	**100%**

Place of Injury

As all families and their children stay at home during COVID.19 pandemic so about more than half **of** children injuries occurred at home (65.1%), followed by **(27.5%)** occurred near by street and near by house, **(7.4 %)** away from house (garden, background). Table (8).

Table 8.

childhood Injuries by the Place of Occurrence in Rural Area

Place of injury		
	No.	**%**
At home	**71**	**65.1**
Nearby house	**13**	**11.9**
Nearby street	**17**	**18.1**
At school or kindergarten	**0**	**0**
Away from house	**8**	**7.4**
Total	**109**	**100%**

The Family Response and Severity of Injuries

As we mentioned **(16.7%)** of the studied children were have injuries, of them **(73.4%)** required medical attention, of them **(18.4%)** admitted to emergency room and need hospital admission, **(7.3%)** of them to outpatient with intervention like (suturing, dressing), **(46.7%)** to outpatient without intervention.

Table 9.

Childhood Injuries by the Family Response in Rural Area

The family response		
	No.	**%**
Home care	**30**	**27.6**
Out pt. Without intervention	**51**	**46.7**
Out pt. with intervention	**8**	**7.3**
Hospital/ER	**5**	**4.6**
Hospital/admission	**15**	**13.8**
Total	**109**	**100%**

Discussion

Indirectly, the pandemic has caused unprecedented social and economic upheaval; in part, this is a consequence of 'lockdown' measures introduced by local and national governments to limit the spread of COVID-19. The increased exposure to potentially hazardous home environments and activities caused by stay-at-home orders and closures of schools may be responsible for a new spate of home injuries among children in 2020.

Among our representative sample the annual incidence rate of injuries among children was 167.1/1000, most of injuries were unintentional in nature with no intentional injury. As we compare this incidence with previous study done in Basra at 1998, the incidence rate of injuries based on 12-month recall was 79.8/1000, which is highly different from present study which may be explained by changes in the environment, life style, technology, recreation and outdoor activities with the consideration that

the age of the studied children was under 15 years old.

Another study done in Saudi Arabia in 2011 (Kassebaum N.et al, 2015), annual incidence rate was 221.82/1000 which is nearly one and half time of our annual incidence rate and this may be due to the same causes mentioned previously.

A study done in Nepal in 2015, the annual incidence rate was 24.6/1000 while another study done in India at 2018 (Mathur A. et al, 2018), showed that annual incidence rate was 166.3/1000 which is also less than our annual incidence rate, it is nearly about 1/3 and this may explained by adaptations of the safety procedures, providing places for playing and recreation, the roads are well paved, their modern medical equipment and technologies.

The pattern of injuries of present study was nearly same as that was done in Basra in 1998 (AL-Mulla, A Ajeel N.,1998), that the highest injury rate was found among 1-4 years age group which may explained by same social, environmental, lifestyle in rural area, also in an Egyptian study in 2015 (70%) of injuries was seen in (2-6) years age group (Halawa E et al, 2015), a pattern different than that was seen in a community based Indian study in 2018, that the highest rate was in the age group (6-10) years old which is 189.88/1000 (Mathur A. et al,2018) and in a study done in Nepal in 2015, the highest injury rate was at age group(5-9) years old (30.3/1000) (Pant P.et al, 2015), and this difference may explain by differences in cognitive, perceptual, motor and language abilities in addition to that the differences in the environment and exposure to hazards.

Males had the highest rate of injuries with significant differences with females, also in age group classification males had higher rate in most age groups, same pattern was seen in several studies (Pant P. et al, 2015; Hemalatha K.et al, 2018; Kato T et al, 2017), this males predomination mostly may be due to their riskier behavior and their broader freedom in playing.

In present study the youngest mother age group had the lowest annual incidence Rate and there was significant association with age of mothers while in a study done in Basra in 1998, the higher risk of injury was found among children whose mothers were less than 25 years old, this may be due to an increase in the awareness of young mothers about their children by increasing their knowledge about how to take care of their children, by using social media, internet and other sources of information.

Many studies show that advanced maternal age associated with fewer unintentional injuries in Japan in 2017 and in United Kingdom in 2012 (Kato T et al, 2017; Sutcliffe AG et al, 2012), and this may be explained by that older mother age was positively associated with adoption of safety measures which is different than present study.

In our study the children with 3-4 birth order were with less percentage of injury but there was no significant association between exposure to injuries and birth order, the same is seen at the study done in Basra in 1998 in that there was no significant association between risk of injury and the birth order (AL-Mulla Y, Ajeel N,1998), many studies showed that the percentage of injuries was lowest in the first birth order children as compared to other birth order as in studies done in Urban Delhi in 2016 and Hong Kong in 2012 (Orton E et al, 2012) which may be explained by that mothers in first child are more alert and aware about their first child.

In present study, about 92.5% of childhood injuries occur inside home injuries, near home and nearby street, which is more than that seen in the study done at Basra in 1998 by which 75.4% of injuries occurred inside and nearby house, this may be explained by that most families prefer keeping their children inside the house due to the security instability and the fear of external hazards and due all children were out of school during peak of pandemic COVID 19 and before COVID-19, children spend a significant proportion of time outside home for school and extra-curricular activities, thus parents may not have taken home safety measures diligently, leading to a rise in domestic injuries during COVID-19 period.

The same was seen in studies done in India in 2015, Nepal in 2018 and Saudi Arabia in 2017 (AL-Zahrani M et al, 2018) that the most common places of injuries were at home and nearby streets and roads.

In our study, 73.4% of injured children received home care and only 18.4% seek hospital care the remaining (7.3%) treated in outpatient with intervention. This may be explained that most of injuries are mild. As compared with the study was done in Basra in 1998, nearly half of injured children received homecare, while (11.4%) seek hospital care, which may be explained by increased people' awareness of first aid and the general medical information.

Type of Injury According to the Nature

About the nature of injury we select the most important and most common injury and it's risk factors which help us to select the suitable preventive measures which occur inside and outside doors. It is found that percentage of soft tissue injuries (which include all injuries from wounds, falls, RTA, animal bites, sport& recreation) were higher it is the first type of injury among all types, this is the same as found in the study in Basra in 1998 and the Indian study in

2018 (Mathur A et al, 2018), and this may be due to no change in the life style of rural area, spread of videogames and cartoons that include fighting and violence scenes that may lead to the increase in the risk and violence among children due the blind imitation of these scenes, in addition the tension and nervousness experienced by the child as a result of the stay home as result to COVID.19 pandemic. Same result is seen in the Egyptian study in 2015 (WHO. Injuries and Violence 2019), this may be due to the similarity in the social and environmental conditions.

Burns which (scald burns& flame burns) are considered as the second common cause of childhood injuries in this study same as in the study done in Basra in 1998 the burn injury was the second most common cause of injury, the similar was seen in India in a study done in 2015 and this may be due to Domestic accidents during COVID-19 due to stay at home included scald injuries usually due to children pulling pots from kitchen tables accidentally pouring hot water onto their body or due to decrease people's awareness about the danger of fire and hot steam due to low education, with no cautions in the use of chemical detergents, using the primitive fire stoves (Choola) in rural area, or using the unsafe oil heater, the same is seen in the Egyptian study in 2015 (Halawa E et al, 2015) this mainly may be due to the similar social, environmental factors in addition to the previous causes mentioned above.

Scorpion bite or sting injury and Dog bite, this type of represented the fourth common cause of injury in this study, occurred mainly because the agricultural nature of the area and the hot dry climate which is the preferred climate for the scorpion, scorpion sting is common among children and still considered as a threatening health problem in developing countries as in Egypt (Abd El Aziz F et al, 2019).

According to World Health Organization (WHO), the indicators for using scorpion ante venom, are not well known and there are some controversy but in general most experts have focused on the use of this drug in patients with severe symptoms and less than ten years old (Khatony A et al, 2015). The scorpion venom shows variability by subspecies and has a complex structure composed of neurotoxic proteins, salts, acidic proteins, and organic compounds, there by causing neurologic, cardiovascular, hematological and renal side effects in addition to the local side effects like redness, pain, swelling and burning sensation (Abd El Aziz F et al, 2019). The percentage of

children with scorpion sting among the injured represent about 3.5%, all our cases occured in June and July. In a study done at Iran in 2015, of the overall incidence, 8.2% were aged less than ten years old, about 53% of scorpion sting happened in summer mostly in June (Khatony A et al, 2015) and this happened because scorpions hibernate at winter and activate at summer, at night looking for food while at day time looking for cool and dark places to hide.

Another study done in Egypt in 2017, 34.5% of scorpion sting occurred among children aged less than 18 years old (Abd El Aziz F et al, 2019) which may be explained by the spread of settlement of areas of desert nature because of population inflation and also due to differences in sample size and study duration.

Other type include (kerosene poisoning) which with very low frequency about (1.8%) this will not give us a realistic representation about extent of these injuries in Basra mainly because of small size number and short duration of this research.

Conclusions

1. Males showed higher incidence rate than females with significant relation.
2. The highest incidence rate of injury was among the 2-5 years age group, (284/1000), and the lowest was seen at age group 6-9(118.18/1000) with highly significant relation between the different age groups.
3. The relation between (mother education, mother age) and the frequency of injuries was highly significant.
4. The principal type of injury was wounds due to pointed objects and sharp instruments, nearly half of the total injuries 51.37%. Burns was the second most common type of injury, followed by road traffic accident and animal bite.
5. Regarding the nature of injury, soft tissue injury was the leading type of injury accounting for (66.9%). burns was the second most common type (22.9%), followed by animal bite (5.5%).
6. About 65.1% of injuries occurred at home due to COVID 19 pandemic and stay at home, 73.4% required medical attention.

Recommendations

1. Educational children and adolescents about safety and necessary precautions for preventing injuries to reduce the incidence of injury.
2. Modifications of the home environment for the reduction of injuries & education about home safety.
3. Establishing injury surveillance system to provide documented information about childhood injury.

4. Provision safe playgrounds and recreation places.
5. Increasing mothers awareness about ways to avoid child injury through short lectures in primary health care center.
6. Education of the people to check for the presence of scorpion in clothes, beds and shoes and importance of early approach to medical center.
7. Governments and healthcare authorities should proactively implement appropriate intervention programs and better resources to prevent these home injuries during lockdown.

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