



Causes And Risk Factors Of Burn Injuries Among Mothers Of Children Under 10 Years Attending/Admitted At Jaypee Hospital, Noida, Uttar Pradesh, India.

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ABSTRACT

An injury to flesh that is brought on by extreme heat or flame, electricity, chemicals, light, hot liquids, radiation, or friction is called a burn. The amount of heat and the duration of contact with the heat determine how much damage is done. Burn injuries pose a major risk to the patient's life and can result in problems like disability that put more strain on the patient's family, community, and country. Burn injuries are an emanate that strikes populace all over the world. They are extremely painful, can result in death or long-term morbidity, and cause suffering for the victim over and above their family and community. Burn injuries are prevalent in developing nations, posing a serious threat to public health because they are customarily fierce playing and having fun to notice whichever of two they acquiring too hot or cold until an issue arises, children are far more impressionable to burn injuries.

Objectives; The causes and the causative factors for burn injuries among children under 10 years attending/ admitted at Jaypee Hospital, Noida , Uttar Pradesh , India

Methods: A descriptive cross-sectional study was conducted at Jaypee Hospital from 21st September 2023 to 2nd October 2023. Sample size of 100 participants was selected randomly among mothers of children under 10 years attending or admitted at Jaypee Hospital in Noida region. Data collection was concluded by utilize a structured questionnaire and Participants were informed about the ambition of the scrutinize and they signed the consent form that show they have accepted willing to participate in this study. SPSS software version 26 windows was accustomed throughout data scrutiny and the aftermath were bestowed in frequencies and percentages, Chi square test (x2) was used to establish association between social-

RESULTS: The study involved 100 participants and revealed that the mostly cause of burn injury in children was due to hot liquids 51 (51.0%) and 47 (47.0%) were caused by flames. Most of the accidents occurred at home about 70 (70.0%) and areas of the body affected was upper limbs about 43 (43.0%) followed by lower limbs 18 (18.0%).

CONCLUSION: In our current climate, childhood burn injuries persist to be a threat due to their almost intolerably high morbidity and fatality rates. There is a need for a pivotal appraisal of the preventive measures and management principles currently being practiced.

Keywords: Burn injuries, Causes , Risk factors, Hospitalization

INTRODUCTION

Burn injuries remain a serious concern in both technologically advanced and evolving nations, making them a public health issue of significant economic significance. Any of the following factors, including flames, electricity, chemicals, hot liquids (scalds), and contact with any hot object, can result in burns. Burn injuries can result in severe scarring, contracture, and even death. Given how terrible burn injuries can be, efforts should be made to minimize burn incidents. 189,000 people die from burns each year, and 95.5% of these deaths occur in countries with poor and moderate incomes (LMICs), where the appraise of fire-related injuries

is accounted to be 1.1 per 110,000 people (WHO). Furthermore, non-fatal burns are the primary source of morbidity. Burns are extremely painful conditions for the patients. Both the immediate and long-term effects of the burns include ongoing pain, physical disfigurements due to scarring, cosmetic damage to body parts, and deeper burns that may result in damage or loss of function to the affected body parts. This has far-reaching effects, including social stigma, isolation, physical limitations that reduce productivity, loss of skin integrity and sensation leading to hypertrophic scarring, painful dressing changes repeatedly, an elevated risk of infection, and diseases linked to burn injuries such as acute kidney injury. Burn injuries cause emotional and psychological problems for both the patient and the cares, increasing the jeopardize of developing post-traumatic stress disorder. (1).

Gender is one of the peril intermediaries for burn injuries, pursuant to the WHO, and the utmost newfangled data evinces that girls die from burns at somewhat higher rates than boys. The rates of injury for the major damage mechanisms emerge to be higher in males, in discrepancy to the usual injury pattern that favor's males over females. Apart from grown-up females, children are eminently assailable to burn injuries. Burns rank fifth in terms of frequency among non-fatal childhood injuries. Child abuse is a major contributing factor to burn injuries in children, even though there is a considerable danger of poor adult supervision. People who live in countries with poor and moderate incomes countries are more prone than those in high-income countries to sustain burns by virtue of socioeconomic determinants in every country (2).

LITERATURE REVIEW

Burn afflictions are a trauma that is often overlooked yet can happen to anybody, anywhere, at any time. Although friction, cold, heat, radiation, chemicals, and electric sources can all result in injuries, heat from blistering liquids, hard materials, or flames is the main trigger of burn afflictions. While energy transfer induces tissue destruction in all burn injuries, distinct causes can result in different physiological and psychophysiological reactions (2). The drives and risk determinants for burn injuries are displayed in the studies below.

CAUSES OF BURN INJURIES

A retrospective analysis conducted in the British region in 2011 found that 1156 (91.5%) of the 1349 patients to the pediatric burns unit had identified causes. The annual admission ranged from 225 to 281, with a mean of 250. 88% of burns were superficial and impacted less than 10% of the body's surface area. Men were involved in 744 cases, or 70% of the cases. Spills (765 cases; 61%) and contact (150 cases; 12%) were the main motives of burns. (5)

In the USA, flame burns continue to cause the preponderance of injuries (41%), followed by scalds (31%), according to the American Burn Association's (ABA) 2019 National Burn Repository. 1. There are significantly less electrical (3.6%) and chemical (3.5%) burn injuries¹. Infants underneath the lifetime of five usually sustain scald wounds from burns, with the reiteration of flame-related burns rising with age. The majority of burns that occur in the elderly population are triggered by fire. However, scald injuries have also significantly increased. Finally, certain vulnerable groups, such that over there who have epilepsy, are more impressionable to burn injuries depending on the situation. (6).

Based on a fragmentary domiciliary survey that was ferried out in Mumbai, India, between July 8 and July 22. Expressive enumeration were exploited to provide participant demographic information. Categorical variables were subjected to bivariate analysis using Pearson's chi-square tests in order to look into possible relationships .Burns accounted for 16.3% of reported injuries. For a month, the computed incidence was 1.73%. Hot liquids (33.8%) was the another most customary cause of burn injuries, after open flames (36.9%). Burns happened mostly in cities, with 88% of cases happening at home.

A significant connection with burn injuries was seen in the age rank of 0 to 4 (7). A contemplate done in Tokyo found that in kids underneath the age of sixteen, boiling water was the cause of 82% of cases and fire was the cause of 11% of cases (8). According to Aytac et al.'s study, the following factors contributed to burns: 1.5% flame, 3.8% hot material contact injuries, 1.1% chemical burns, and 68.8% hot water. (9).

RISK FACTORS OF BURN INJURY

Over a period of 14 months, the retrospective analysis was conducted at the burn unit of the National Institute of Child Health (Instituto Nacional de Salud del Niño) in Lima, Peru. The enrollment of 740 patients and controls was the outcome. Burns accounted for 77.5% of all cases, with 67.8% of those occurring in the kitchen and 74% being the upshot of scalding. The majority included kids below the age of five. An elevated risk was linked to low income (OR 2.8, 95% CI 2.0 to 3.9), crowding (OR 2.5, 95% CI 1.7 to 3.6), and lack of water supply (odds ratio (OR) 5.2, 95% confidence interval (CI) 2.1 to 12.3). Protective factors included having a living room (OR 0.6, 95% CI 0.4 to 0.8) and having a more educated mother (OR 0.6, 95% CI 0.5 to 0.9) (10).

A report from the study done in Hebron with population of about 706. The investigation of burn injury prevalence and causation is the aim of this study. During the research period of 2016 and 2017, the emergency department received 401 cases of burns. 62.3 percent of them were female, and 37.7% were male. Martial Stats: 13.3% married, 86.7% single. 47.1% of children, 37.4% of students, 8% of housewives, and 6% of workers fit this description. 51.8% of burn patients are under 10 years old, 32.4% are between 11 and 20 years old, and

15.4% are older than 21 years old. The same 51.1% of people live in rural areas and 48.9% in urban areas. Burn incidents occur outside 25.2% of the time and inside 74.8% of the time. Winter time is 42.9%, spring is 34.9%, summer is 17.4%, and autumn is 4%. (11).

Another study conducted in March 2021 in the West Bank (WB) in Palestine found that 51% of newly admitted burn patients were children below the age of 10 years, 32.4% were in the 11–20 age range, and 15.4% were over 21. The equivalent scrutinize identified that majority burns occurred in the winter and that 62.3% of burn victims were female. Furthermore, a number of studies focused only on the knowledge, practices, prevalence, and elements that contribute to burn injury at the WB district in Palestine. These aftermath revealed that most burn cases who were admitted were youngsters, and most burns occurred within the home. (12)

STATEMENT OF THE PROBLEM

Burn injuries are a major issue in underdeveloped nations. While children are the primary target of this incidence, older adults and those with concomitant diseases like epilepsy are also found to be impacted, and this condition is known to be fatal (13). This study aims to gauge the causes and risk elements affiliated with burn injuries in children younger than 10 years of age. It is challenging to assess the expense of burns and their care, particularly for a high-exposure group of vulnerable youngsters. It is a fact that burns place a significant financial strain on health care systems. For instance, research on hospital stays in Bangkok discovered that the hospitals were not satisfactorily remunerated for the expenses associated with treating burn patients. As a result, the hospitals had to redeploy resources from other therapeutic areas. The costs of hospitalization, long-term rehabilitation, missed school days and education, potential unemployment in the future, social rejection, and other psychosocial concerns are also borne by the family of the children admitted.

RATIONALE OF THE STUDY

1. The findings in this research will help to appraise the preponderance of burn injuries among mothers of children under 10 years.
2. The study's conclusions will assist people in understanding the magnitude of burn injuries in the community and what needs to be changed to ensure everyone is safe and protects themselves from burn injuries.
3. Interested parties, including NGOs, the commercial sector, and donors, can use the study's findings to develop policies for burn injury prevention and treatment.

RESEARCH QUESTION

1. What are the common burn injuries among mothers of children under 10 years attending / admitted at Jaypee hospital?
2. What are the causes of burn injuries among mothers of children under 10 years attending / admitted at Jaypee hospital?
3. What are the risk factors for burn injuries among mothers of children under 10 attending / admitted at Jaypee hospital?
4. What is the number of burn injured children under 10 years patients from 1st January 2023 to 1st September 2023 attending / admitted at Jaypee Hospital.

3 METHODOLOGY

1.1 STUDY DESIGN

A descriptive cross-sectional study was done to assess the factors at risk and their causes for burn injuries among mothers of children under 10 years attending/ admitted at Jaypee hospital, Noida region from 21.09.2023 to 02.10.2023.

1.2. STUDY AREA

Study was carried out at Jaypee hospital found in Noida region. The facility catchment area covers six councils of Noida region which has 24,994 square kilometer. Total population in the catchment area amounts to 803,529, of which the number of female population is 421,889, males is 381,410 and children of under five years amounts to 108,780. Patients are brought from low health facilities by ambulances which includes District hospitals and nearby health centers. In case the facility has surgical buildings, incinerator, Laundry, OPD, Laboratory and Obstetric and children building (12).

1.3. STUDY POPULATION

The target population was all mothers of children under 10 years with burn injuries attending or admitted at Jaypee hospital.

1.4. INCLUSION CRITERIA

All parents who were available on the day of gathering information and whose children under the age of ten had burn injuries.

1.5. EXCLUSION CRITERIA

- All burn injured patients above 10 years old
- Those who said no to approval of the study.
- Unconscious injured patients.
- All mothers of children under 10 years with no burn injuries.

1.6. SAMPLING

1.7. SAMPLE SIZE

The Leslie Kish method for cross-sectional studies was used to calculate the study's sample size:

$$n = \frac{Z^2 P(1-P)}{E^2}$$

Where; n= sample size required

Z= Standard normal deviation set at 1.96 correspond at 95% confidence interval

P= Estimated proportion of the prevalence of burn injuries among mothers of children according to the study done in Uganda 2022 was 11% (13).

E= Degree of accuracy 5%

n=

n= 100

Sample size of 100 participants was used.

1.8. SAMPLING TECHNIQUE

Straightforward random sampling techniques was used among adult injured patients attending / admitted at Jaypee hospital.

1.9. RESEARCH INSTRUMENTS

- Plain papers
 - Pens
 - computer
 - Marker pens
 - Pencil
 - Ruler
- A semi-structured questionnaire

1.10. DATA COLLECTION AND MANAGEMENT

A Self-administered questionnaire prepared in English and translated in Swahili version was used to collect data. In the field and at the of daily data collection activities the completeness of questionnaire was checked by the investigator.

1.11. DATA ANALYSIS

Data was gathered in an Excel master sheet to prepare the code book and was inspected for comprehensiveness and consistency; defective data was expelled from the analysis then it was transported to Statistical Package for Social Sciences (et al) (SPSS) version 25 for calculations. Descriptive statistics using tables and charts were used to reveal the data in frequency and percentages. unrelated chi square test was used to establish the association between the social demographic information and risk factors of burn injuries the p value of < .05 was adopted for significance.

1.12. ETHICAL CONSIDERATION

Permission to do the study was sought from Galgotias school of health and Allied Sciences the Medical Laboratory Department and Noida medical officer of the Noida region and the Medical officer in charge of Jaypee hospital. notified approval was obtained from participants before participating in the study. Enrollment in the study will be voluntary and any participant will be free to withdraw herself or himself from the study whenever she/he feels not to continue any longer.

RESULTS

1.1. DESCRIPTIVE ANALYSIS

The total size of study subjects who were respondents during the collection period was 100. The response rate of the study was calculated to be 100%. The bulk of members were mothers of children under 10 years were selected and there age was ranged from 20 years to 48 years of age and this was grouped as range between 20 to 30 years were 48% (48) and 31 to 40 were 43% (43) and from 41 to 50 years were 9.0% (9) and might help in giving the required answers on the questions asked on the interview. Majority of adults patients involved in

this interviewed mostly about 47 (47.0%) were married, followed by 23 (23.0%) were single, followed by 14 (14.0%) were separated, followed by 6 (6.0%) were cohabiting, 6 (6.0%) were widow/widower, followed by 4 (4.0%) were divorced and also on the education level status, 46 (46.0%) adult patients had high school education, accompanied by 21 (21.0%) had reached had diploma and above education, accompanied by 20 (20.0%) members had just primary school level of education, followed by 13 (13.0%) participants were illiterate. On the grade of children participated. The study showed 100 children participated involved in different ages ranges from 1 year to 9 years and their gender was 51% (51) were males and 49% (49) were female on the level of education between children participated 60 (60.0%) children started school and 40 (40.0%) children not started school

Table 1: Descriptive statistics of the social demographics of the respondent (N = 100).

VARIABLE	TOTAL (%)	VARIABLE	TOTAL (%)
Age, years		Marital status	
		Cohabiting	6% (6)
		Separated	14% (14)
20-30	48 %(48)	Widow/widower	6 %(6)
31-40	43 %(43)	Gender of children	
41-50	9 %(9)	Male	51% (51)
Educational level		Female	49 %(49)
		Education level	

Diploma SecondaryPrimary	21 %(21)	Nursery	26% (26)
No education relationship status Married	46% (46)	Primary	34 %(34)
separated	20 %(20)		
sole	13 %(13)		
	47 %(47)		
	4% (4)		
	23 %(23)		

4.2.1 The causes burn injuries in children under 10 years.

The study showed that knowledge on burn injuries is important because it would help in prevention of burn injuries on children, on the study revealed that the most causes of burn injuries in children was hot liquids (scalds) about 51.0% (51) and flames 47%(47) and chemicals 1%(1) and electricity 1%(1) and most of burn injuries to children occurred in different places on the study revealed that home covers 70%(70) and it was the most places were burn injuries occurred followed by 16% (16) and 8% (8) working places, streets 6%(6) and the highest area where burn injuries occurred was in rural area about 53%(53) and urban was 47%(47). The study revealed that the means of cooking at homes like charcoal stoves about 41% (41) leads to many occurrence of burn injuries to children under 10 years followed by wood stoves about 33% (33) gas stoves 22%(22) and electricity stoves 4%(4) and the climate conditions change of seasons that leads to burn injuries in children was winter season about 60% (60) caused many burn injuries to children under 10 years followed by spring 32% (32) summer 6%(6) and autumn 2%(2) and some diseases such as epilepsy in children shown as risk factor of burn injuries to children under 10 years on the study it showed about 18%(18) of children who had burn injuries had suffered epilepsy.

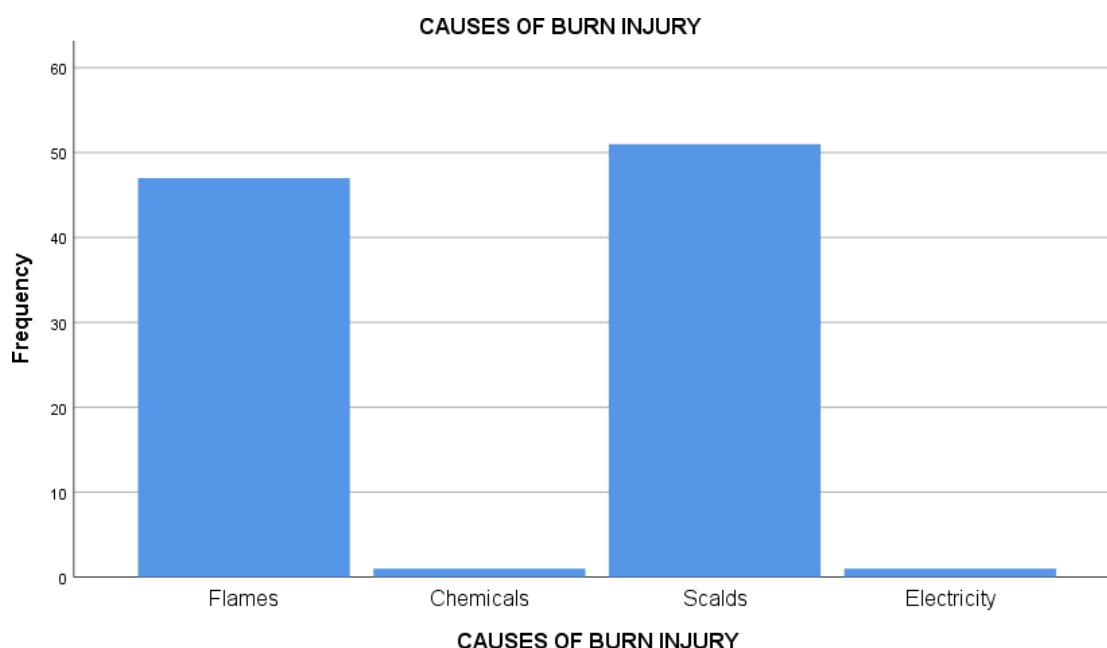


Figure 1: showing common causes burn injuries in children under 10 years

4.2.2 Risk factors of burn injuries in children under 10 years.

On the risk factors of burn injuries in children mostly was poverty life, poor housing conditions and climate change conditions and the means of cooking at home this lead to be on the risks factors of many burn injuries in children under 10 years. The study revealed that the means of cooking at homes like charcoal stoves about 41 (41%) leads to many occurrence of burn injuries to children under 10 years followed by wood stoves about 33 (33%), gas stoves 22 (22%) and electricity stoves 4 (4%) and the climate conditions change of seasons that leads to burn injuries in children was winter season about 60 (60%) caused many burn injuries to children under 10 years followed by spring 32 (32%), summer 6 (6%) and autumn 2 (2%) and some disease such as epilepsy in children shown as risk factor of burn injuries to children under 10 years on the study it showed about 18 (18%) of children who had burn injuries had suffered epilepsy.

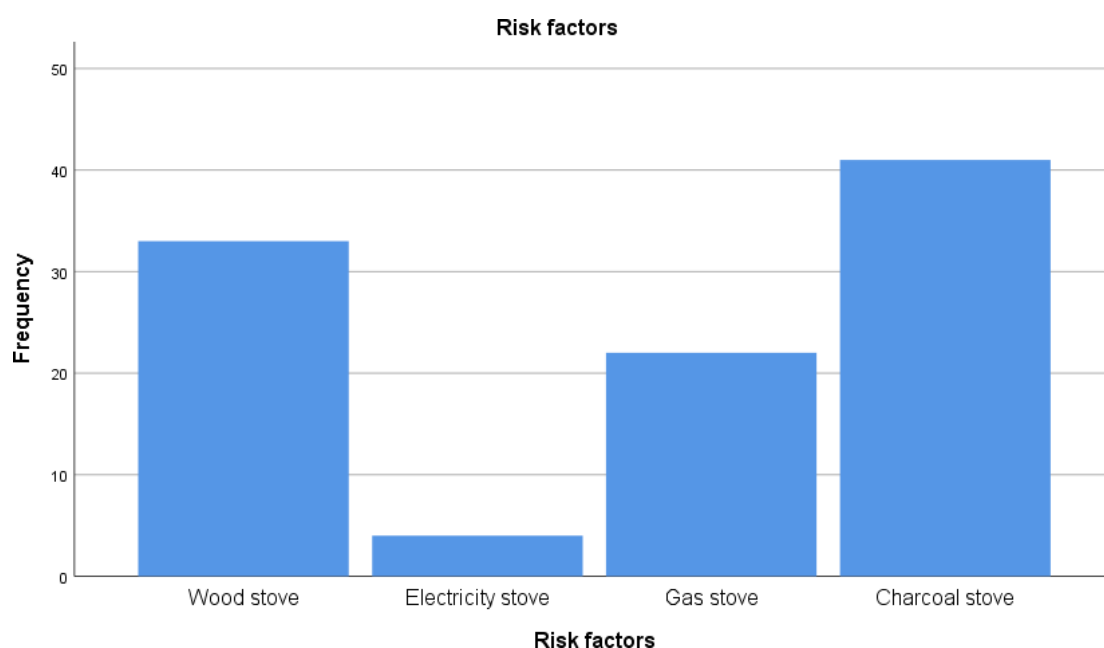
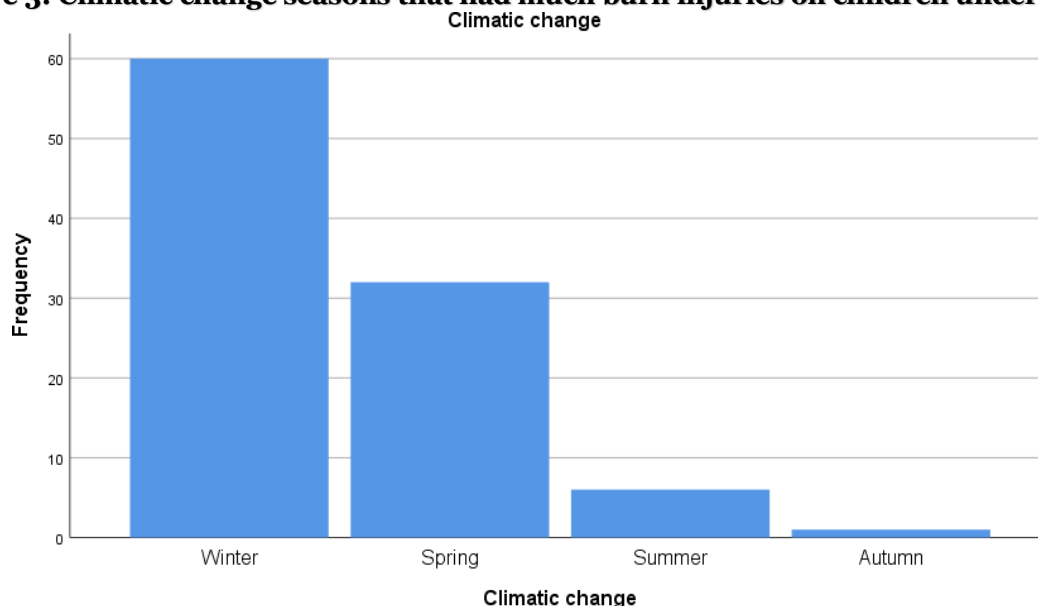
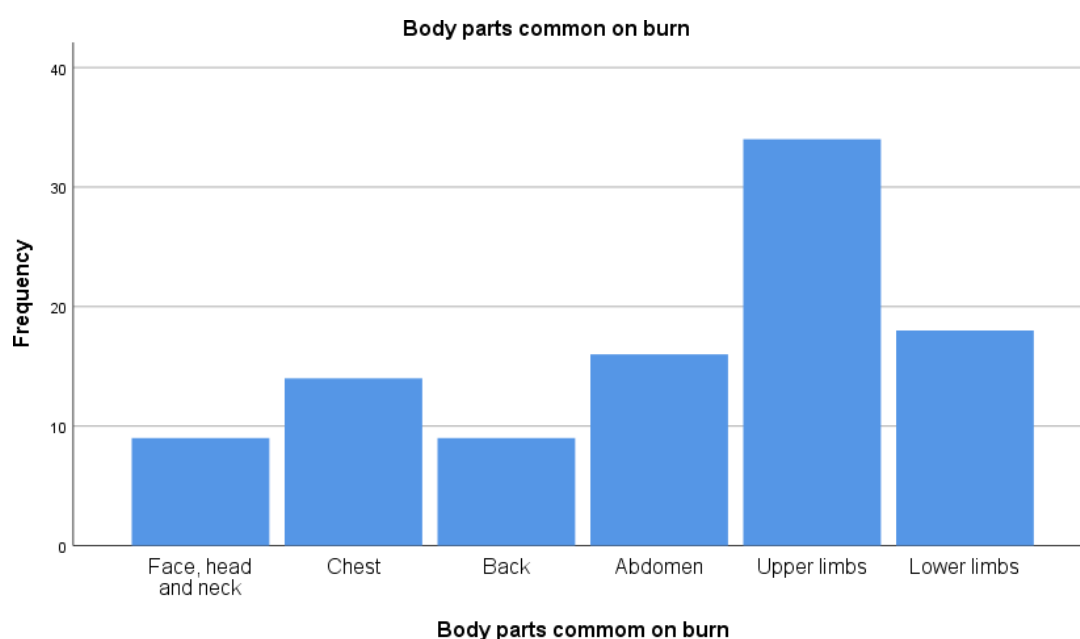


Figure 2: Risk factors of burn injuries on children under 10 years.

Figure 3: Climatic change seasons that had much burn injuries on children under 10 years.

4.2.1 Common areas burn injuries in children under 10 years.

Most of burn injuries to children occurred in different places on the study showed that home covers 70 (70%) and it was the most places were burn injuries occurred followed by 16 (16%) and 8% working places, streets 6 (6%) and the most area were burn injuries occurred was in rural area about 53% and urban was 47% and the commonest site of burn in children was 34 (34%) was upper limbs, lower limbs 18 (18%), abdomen 16 (16%), face, head and neck was 9 (9%) and back was 9 (9%).

**Figure 4: Body parts common on burn Association between risk factors and demographic information**

1. The chi square test to determine the association between marital status and number of burn incidents.
2. The results showed no association between marital status and number of burn incidents since the P value was 0.43 which is greater than $P > 0.05$
3. The chi square test to determine the association between level of education of mother and means of cooking at home.
4. The results showed an association between level of education of the mother and means of cooking at home since the P value was 0.025 which is less than ($P < 0.05$).
5. The chi square test to determine the association between level of education of child and place where the accident occurred.

6. The results showed association between level of education of the child and place where the accident occurred since the P value was 0.023 which is less than ($P < 0.05$)
7. The Chi square test to determine the association between the age of the child and number of burn incidents
8. The results showed no association between the age of child and number of burn incidents since the P value was 0.147 which is greater than $P > 0.05$.

DISCUSSIONS

Burn injuries caused a lot of death and disabilities to children in numerous parts of the world, particularly in developing countries. Therefore, this study addressed knowledge on causes and the risk factors that lead to burn injuries in children. Our study indicated educational level of mother, areas of burns specially in rural areas, climatic change and means of cooking and marital status showed a significant association, for other characteristics, the results were not statistically significant.

5.0 The causes of burn injuries.

According to our study, hot liquids (scalds) account for 51 (51%) of all burn injuries in children, followed by flames (47), chemicals (1%), and electricity (1%). This is similar to a 2015 research study conducted in Tokyo, Japan, which revealed that 82% of burn cases were triggered by hot liquids and 11% by flames.[7]. Also on the study done Aytac showed the typical induce of burn was found to be hot liquid (water) about 68.8% and flames was 1.5% and 1.1% was chemical burns all this was similar to our study and in conclusion it gave clue that hot liquid was a leading causes of burn despite of the different on the percentage and would be due to the different in development in technologies and lead to various variations of value but it was the same reason of burn injuries to youngsters under 10 years. But in compliance with to the study done in USA it showed slightly different causes of burn in children as it stated as 41% of burn injuries in youngsters was due to flames and 31% was due to hot liquids (scalds) and some children how were suffered with paroxysm were more presumably to get burn injuries and this all contents lead to that the commonest causes of burn injuries in youngsters under 10 years was due to hot liquid (scalds) and flames.

Risk factors of burn injuries

Our scrutinize revealed that were various risk factors like poverty, Means of cooking, climatic change and educational level that lead to occurrence of burn injuries to children under 10 years also means of cooking at home showed as the risk factors of burn injuries in youngsters like most of cooking means lead to burn injuries was charcoal stove 41 (41%) and wood stove 33 (33%) and gas stove 22 (22%) and electricity stove 4 (4%), lack of educational level among of mothers of children under 10 years also this lead to the occurrence of burn injuries to children about 13 (13%) were illiterate and 20 (20%) had primary education this might put the children at risk on get burn. On climatic change this leads to the occurrence of many burn issues on children about 60 (60%) of burn injury in our scrutinize occurred during winter and this was similar on the study done in Pakistan 2021 west bank places stated that about 62.3 (62.3%) of most frequent burns injuries that happened it occurred during winter seasons and female children were the most burned children than male children and this due to female children stayed more close to their mothers during cooking in the cookhouse and this put them to the risk of burn injuries than male children[12].

5.1 Common burn injuries

Our study revealed that the commonest burn injuries in children under 10 years of age on their body parts was on the upper limbs about 34 (34%), lower limb 18 (18%), followed by chest 14 (14%), face, head and neck 9 (9%) and back was 9 (9%) all this were the common site of injuries of burn on children under ten (10) years and this was analogous to the study done in British region showed that about 70 (70%) of children got burns on the superficial body parts like upper limbs and lower limbs and this showed that upper limbs and lower limbs showed the leading parts of the body burns in the children under 10 years of age[8]. In conclusion the four limbs in human body leads to the most parts of injuries of burn occurred in children and this burn injuries common eventuated at home residences.

Conclusion

In this context, burn injuries to children still pose a threat due to their almost intolerably high morbidity and fatality rates. A rigorous evaluation of the management theories and preventive strategies now in use is required. Because of significant advancements in critical and surgical care treatment over the past few decades, there has been an increase in the proportion of persons who survive burns. Consequently, a greater number of patients must cope with permanent psychological issues, impairments, and deformities, which are typically a repercussion of a burn. This led to a change in emphasis from long-term patient-reported outcomes, which focused on psychological aftereffects and physical appearance, to short-term clinical outcomes (such as an improvement in mortality). The research presented in this thesis seeks to evaluate the available data from

frequently used measurement tools critically and, by assessing surgical practices, to enhance surgical burn care.

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Availability of data and materials

Data was available to authors via Hospital databases and mother of childrens. The datasets used and/or analyzed during the current study available from the corresponding author on reasonable request.

Competing interests

This study is supported by Galgotias University and Jaypee Hospital declare no competing interests.

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