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Epidemiology and perceptions of non-fatal burns among select youth (15–24 years old) from Peshawar Pakistan; a sequential explanatory mixed methods study

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Abstract

Purpose: Burns are among the top five cause of unintentional injuries among youth. We aimed to determine the incidence and risk factors of burns in select youth from Pakistan and also explored their perceptions about burns.

Methods: A sequential explanatory mixed methods study was conducted which comprised of two phases. Phase 1 consisted of a cross-sectional quantitative survey (QUAN) in which 550 vocational school youth (15 to 24 years-olds) filled out the WHO community survey tool for injuries and violence and provided data on burns in previous 12 months (2021–22). Phase 2 consisted of qualitative (QUAL), in-depth interviews (IDIs) with participants selected from Phase 1 based on the occurrence of burns. STATA™ version 15.1 was used for Phase 1 data analysis and Zero-Inflated Negative Binomial regression was used for determining the Incidence Rate Ratio (IRR) of burns. Thematic analysis was performed for in-depth interviews from Phase 2.

Results: Out of 547 participants, 356 (65%) were males while 191 (35%) were females. Burns were reported by 85 participants (15%). A total of 137 counts of burns were reported showing multiple burns by some participants. The IRR for burns among young females was 2.89 (1.78–4.69) compared to males in the previous 12 months (2021–22). Age, sex, father's education, and combined family income were significant risk factors for burns in youth. Six IDIs were conducted with burn victims, two were males while six were females. Four cooking-related burns, and two occupational burns during vocational training were reported. Themes that emerged from IDIs were internal and external factors, personal carelessness and lack of knowledge and safety about burns.

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Author Contributions

SM contributed to the design of the study, acquisition of data, analysis of data and manuscript writing. AH contributed to the conception and design of the study. NUK & URK contributed to revising the article critically for important intellectual content. PP contributed to all aspects of the research and manuscript. All authors approved the final manuscript.

Two sub-themes that were significant for recovery from burns were family support and access to healthcare.

Conclusion: Young females are at a higher risk of burn injuries in Pakistan. Various social, demographic, and behavioral risk factors are associated with burns. Pre-burn and post-burn interventions are needed for prevention from burns in youth.

Keywords

Burns; Unintentional burns; Pakistan; Youth; Adolescents; Unintentional injuries

1. Introduction

Burn injuries rank as the fifth most common non-fatal childhood injury [1]. On a global scale, burns contribute to an annual death rate of 180,000 [1]. Global Burden of Disease study from 1990 to 2019, reported 117 million burns from the Asian countries [2]. The South Asian and Southeast Asian region accounted for up to 40 % of global burns [2]. Although a decline in childhood burn mortality was seen worldwide but, the incidence of burns remains seven times higher in low-income countries compared to high-income countries [2].

Burn injuries are known to exhibit a bimodal distribution, with children aged 0 to 5 years and youth aged 20 to 30 years being at higher risk for burns [3]. In Asia a high risk of burns is reported among adolescents 5–15 years-olds [2]. Beside geography and age, sex also emerges as an important determinant in the occurrence of burns. Globally men are commonly afflicted more with burns, while World Health Organization (WHO) reports a higher incidence of burns among Asian females [1,2]. This high risk in Asian females is attributed to their involvement in cooking, use of unsafe stoves and interpersonal violence [1]. Regional studies from the Southeast Asian region support the strong predilection of burns among females [4,5].

There is a high annual incidence of burns in Pakistan approximately 1388/100,000 compared to an estimated global annual incidence of 110/100,000 [6]. Tasleem et al has reported a significant correlation between sex and burn patterns of hospitalized burn patients at the Civil Hospital in Karachi [7,8].

Peshawar is a large metropolis in North of Pakistan and the capital city of Khyber Pakhtunkhwa. It has a population of 14 million, of which 52 % are males [9]. Literature from Peshawar on burn injuries is sparse and dated. Tanoli et al. captured data at the emergency department of Lady Reading Hospital to build a pilot trauma registry [10]. Out of the 267 trauma patients, 2 % had burns. Tanoli et al. did not publish the demographic characteristics of the burn victims [10]. Aslam et al. reported the patterns of burns from Lady Hospital in Peshawar [11], but no sex association was noted in their study [11].

Burns in the community are often under-reported and missed [8]. Studies that investigate the epidemiology of burns in the youth community of Pakistan are non-existent. We aimed to determine the epidemiology of unintentional injuries (road traffic injuries, falls, burns,

poisonings, drownings and occupational injuries) among vocational school youth from Peshawar, Pakistan. In this manuscript, we report the incidence, risk factors and perceptions of unintentional burns among youth from Peshawar.

2. Methods

2.1. Operational definitions

Youth were defined as children and young adults between the ages of 15 to 24 years [12].

Burns were defined as unintentional exposure to substances of high temperature causing tissue damage [13]. Any participant having burns that led to seeking medical treatment, or missing half day or more of vocational schooling was considered having a burn injury.

Sex was classified as male, or female based on the biological classification.

Vocational training institutes (VTIs) are referred to as Technical and Vocational Education and Training (TVET) in Pakistan. TVET and VTI are synonymously in the manuscript.

2.2. Study design and settings

An explanatory sequential mixed methods study design was used [14,15] consisting of a quantitative Phase 1 (quan) followed by a qualitative Phase 2 (QUAL) (Fig. 1). In the initial quan phase participants filled out a WHO injuries and trauma questionnaire [16]. In Phase 2 (QUAL) participants were selected from Phase 1 on the criteria of having burn injuries in previous 12 months. A minimum sample of one male and one female participant with burns were to be included in an in-depth interview on burns (Fig. 1). The two phases were connected through participant selection based on presence of burns. This mixed method study is denoted as quan → QUAL (Fig. 1). Higher weightage was given to QUAL phase because of detailed information about burns provided during in-depth interviews (IDIs). The merging of the data from the two phases was done in results and discussion sections [14,15].

Young students enrolled at TVET were recruited as study participants. These youth were mostly 15–24 years old and taken as representative of the general youth in the community. This study was conducted at two male and two female vocational training institutes (VTIs) in Peshawar district of Khyber Pakhtunkhwa (KPK) province of Pakistan [17]. One male and female institute were located in Gulbahar, while the second male and female institutes were located in Hayatabad, Peshawar.

2.3. Study population and sampling

The study population was youth 15–24 years of age. The quantitative sample comprised of 550 youth enrolled at TVET over the last 12 months. (Assuming an incidence of unintentional injuries among 16–45 years age as (45.6/1000) 0.05 % [18], a 3 % risk difference of unintentional injuries between males and females [19], using a two sided test at a confidence level of 95 % and a power of 80 % a minimum sample of 505 was calculated using the formula $n = (Z\alpha^2 \sqrt{(Po(1 - Po))} + Z\beta \sqrt{(Pa(1 - Pa))})^2 / ((Po - Pa)^2)$. A non-response rate of 10 % (50) was added to achieve a total sample of 550.

The QUAL phase comprised of six categories for unintentional injuries (burns, falls, road traffic injuries, poisonings, drownings, and occupational injuries). A minimum of one male and one female interview per category were conducted. Details about burns are provided in this manuscript.

In Phase 1 of the study convenience sampling was done. In Phase 2 a purposive sampling strategy was used. Interview participants were selected from Phase 1 based on the presence of a burns in the previous 12 months. Both male and female participants were invited for IDIs to obtain broad data.

2.4. Data collection tools

Quantitative data was collected using the WHO guide for injuries and violence [16]. This tool was published “guidelines for conducting community surveys for injuries in 2004 by Sethi et al. [16]. The validity of this tool is unknown, but the selection of this tool for data collection was done based on recommendation from injuries experts. This tool was pilot tested on 50 participants and adapted to include burn counts. The questionnaire is available online in English [16]. It was translated into Urdu local language after consultation with a trained bilingual translator and multiple social sciences experts. The section on burns are included in this manuscript (Appendix A & B).

In Phase 2 qualitative an interview guide was designed specifically for this study. The section on burns is provided in the manuscript (Appendix C & D). IDIs were conducted with participants selected from Phase 1 based on burns.

2.5. Data collection procedure

Vocational students between 15 and 24 years old enrolled at TVET in Peshawar in the last 12 months were included in the study. Pashto is the local spoken language in Peshawar, but majority cannot read or write Pashto [20]. Participants that could read and write Urdu were included in the study. Participants unwilling to provide consent or absent from TVET during the days of data collection were not included in the study.

Data collection was conducted during school at each of the participating TVET. A request was placed with the TVET staff for one-hour timeslot. The data collectors then collected data in the provided time slot with groups of 15–20 students. Paper-based questionnaires were distributed among students. The students filled out the questionnaire under the supervision of the data collector.

The IDIs were conducted in-person with each participant at their respective TVET. Convenience of the participants was prioritized for scheduling of the IDIs. Open-ended questions were asked during the interview and probing techniques were used. The interviews were audio recorded in Urdu and then transcribed in English. Transcriptions were done by SM and reviewed by PP. After which themes were created by SM which were reviewed by PP. Codes were assigned to participants and personal information was removed during transcription, for confidentiality.

2.6. Data management and analysis

STATA™ version 15.1 [21] was used for data management and data analysis of Phase 1 data. Continuous variables were reported using mean or median while categorical variables were reported using frequency and percentages. The outcome variable was “burn count” in youth for year 2021–22, which was obtained by asking the question “did you have any burns in the last 12 months?” If yes, how many burns did you have in the last 12 months?”. The data for burns was obtained per participant as counts (0.1.2. 3..) over the previous 12 months. For counts data with respect to injuries, the two popular models used are Poisson regression and Negative Binomial Regression [22]. The choice of using a Zero-Inflated Negative Binomial Regression (ZINB) was made due to the following two reasons. Firstly, the burn counts in data were noted to have zero predominance (higher zero counts), hence a ZINB model was used. Secondly, the data did not meet the assumption of mean equal to variance due to which Poisson regression could not be applied.

The independent variables were age, sex, father’s education, youth education, family income, number of family members in the household. Multivariable ZINB regression model was used to evaluate the relationship of burn counts with sociodemographic risk factors. STROBE checklist was used for reporting of the findings in this manuscript [23].

Data from Phase 2 comprised of IDIs in Urdu which were audio recorded and transcribed. The interviews were translated in English after which a thematic analysis was performed by SM and reviewed by MS. The analysis was further assessed for completeness and accuracy by PP. The qualitative findings were integrated with the quantitative findings in the results section and interpreted in the discussion section.

2.7. Ethical Considerations

All methods were carried out in accordance with the Code of Medical Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans. The study protocol was approved by the Ethical Review Committee at Aga Khan University Karachi (2022–6263–20497) and the National Bioethics Committee Islamabad (NBC-748). Approval letter was also obtained from the directorate office of TVETA in Peshawar prior to data collection.

For 18 years and older youth, written informed consent was obtained from the participants themselves. For youth less than 18 years of age written informed consent along with parental consent was obtained. An information sheet provided in Urdu included details about the study which was also explained verbally. The information sheet and consent forms in Urdu were sent home with participants less than 18 years old. The consent forms were then collected over the next 2–3 days.

Confidentiality of the participants was maintained. Identifiers like participant names and institutional names were de-identified in both quan and QUAL data. Arbitrary numbers were assigned to participants for the purpose of identification in data entry and analysis. Data is available upon reasonable request.

3. Results

The estimated sample of 550 students participated in phase 1 quantitative survey. Three participants were excluded based on missing data and a total sample of 547 were analyzed (Table 1). In the year 2021–22, 85 victims reported burns and 137 counts of burns were reported. A bar chart showing the sex-based distribution of burn counts in Fig. 2, shows higher 1,2,3 and 6 counts of burns among females. The main cause of burns was contact with a hot object (16 %) or hot liquid (10 %) (Table 2).

The median age of youth was 19 years with 328 (64.31 %) males and 182 (35.69 %) females. The sociodemographic characteristics of participants from phase 1 (quantitative) are provided in Table 1.

A ZINB model was used to analyze the data. At univariate analysis level age ($p = 0.003$), sex ($p = 0.001$), father's education ($p = 0.04$), family income ($p = 0.01$), and number of family members ($p = 0.07$) were significant with a p -value 0.25 or less (Table 3). They were included in the multivariable model for which the adjusted incidence rate ratio (IRR) is reported in Table 3. The adjusted IRR of burns for female youth was estimated to be 2.89 compared to male youth with a highly significant p value.

Out of the 85 burn victims, in Phase 1, six participants were selected for semi-structured IDIs during Phase 2, four were female and two were male. Characteristics of these participants are presented in Table 4. Two out of six participants had burn injuries during their vocational training, while four out of six participants had burns while cooking in the kitchen. Merged data from Phase 1 and Phase 2 are presented in Table 4.

Three themes emerged from the QUAL interviews: accident, knowledge about safety from burns and post-burn recovery. The theme accident had three sub-themes; internal factors, external factors and combined factors. Some participants attributed their burns to internal factors (for example careless use of mobile phone), while other participants reported external factors that they did not have control over. Participants reported two sub-themes which were important in the recovery from burns; family support and access to health care (Table 5).

4. Discussion

Our study is one of the very few studies that combined a quan and QUAL approach to study the epidemiology of burns among the youth in Pakistan. The highlight of our study is the sex-based difference in IRR, with a higher incidence of burns in females compared to males. Although, there were a higher number of male participants, the number of burns reported were much higher in females which is significant. This study highlights the burns in the community which are often missed and underreported [8].

Our study highlights the vulnerability of young females in Pakistan that are often the victims of burns due to their sex-specific roles. Our findings are in accordance with a reputable report from WHO that emphasizes a heightened risks for burns in young Asian females [24]. The GBD 2009–2019 data for 53 Asian countries including Pakistan shows similar findings, with nearly half of global burns (46 %) occurring in Asia [2]. When we look at the GBD

2019 global data, males are seen to be more frequently affected by burns [2] while higher number of females are reported to be affected in South and Central Asia [2,8]. Studies from India [4,5] and Bangladesh [25], have confirmed this female preponderance for burns.

Studies from Peshawar, Pakistan that measure incidence and epidemiology of burns are very rare. Tanoli et al. reported 2 % burns among trauma patients from Lady Reading Hospital in Peshawar [10], which is much lower compared to the 18 % reported in our study. Tanoli et al. did not report any gender-based disparity of the burn patients [10]. An older study conducted at Khyber Teaching Hospital in Peshawar reported higher numbers of females among the young patients that were admitted [26].

All the burns reported in our study were accidental burns, which is similar to the findings by Tasleem et al. reporting 71 % burns as accidental while 4 % were suicidal and 3 % were homicidal burns among youth [7]. In our study of youth, the main cause for burns were unintentional exposure to heat. While self-inflicted burns were not identified in our study, reports by Human Rights Commission of Pakistan have shown that half of burns in females in Pakistan are intentional burns [27].

Other risk factors identified in our study were age, low family income, and father's lack of education. Our risk factors were similar to those identified by Holden et al in their qualitative study highlighting poverty, poor housing infrastructure, knowledge deficit and inability to provide adequate supervision for children as barriers to burn prevention [28].

Another important finding of our study is the perceptions of youth on the risk factors of burns.

Four out of six youth identified hazards in the kitchen like leaky gas cylinders, hot liquids and hot stove that led to burns, while two youth identified hazards at the workplace like heated machines and tools. Hence, our study confirms unsafe home and work environment as two common settings for burns. Our findings are similar to Iqbal et al. who found a majority of burns seen in hospitals are household burns (68 %) [29], while work related burns range between 17 % and 23 % of burns [30].

One important theme that emerged from the qualitative interviews, was accidents related to internal causes like personal carelessness or mobile use. Some participants perceived their personal carelessness as a predisposing risk factor for burns. Hence, modifying one's behavior and being careful can prevent future burn in youth (like avoiding the use of mobile phone while cooking or working). This theme is contrary to the previous misconception about unintentional injuries that "injuries are inevitable and cannot be prevented" [31]. Future burn prevention interventions can focus on internal modifiable causes for burns.

A second theme that emerged from the IDIs was family support and access to health care; both of which are important in the speedy recovery from burns. It is recommended that future interventions in burn patients focus on these themes. Lack of knowledge and safety from burns was identified as a barrier to burn prevention. Community-based interventions are needed that provide knowledge to youth about burn prevention [31]. Other factors of

workplace safety, use of protective equipment and educational training during vocational school were identified which are consistent with previous literature [31].

5. Limitations

We selected vocational school youth as representative of the general youth population. The vocational youth has a lower socioeconomic status compared to the school-going youth which is a limitation of this study. Convenience sampling was done which is another limitation. Data verification about the burns could not be done from another source. Since the selected vocational centers were in the urban areas, rural versus urban comparison could not be made. Classification of burns based on severity could not be done, since the participants had already healed without disabilities, which may indicate the burns were minor.

6. Conclusions

This study highlights that age, sex, family income and parent's education are significant risk factors for burn. Hazards in the kitchen and at work emerged as two most common risk factors for burns in the youth. Future burn prevention programs should focus on knowledge about safe use of gas cylinder and stoves in the community. Furthermore, government programs within the vocational schools are needed can that can provide safety knowledge, personal protective equipment, and safety training to the vocational school youth. "Careless behavior" was perceived as a risk factor for burns a hence behavioral interventions that promote "careful behaviors" can be provided to youth. Post-burn recovery interventions need to focus on family support and access to healthcare to speedy recovery for burn victims.

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Appendix

Appendix A.: Phase 1 quantitative data collection tool for burn injuries in English

-
- | | | |
|---|----------------------------------|---|
| 1 | Have you ever had a burn injury? | 01 Yes, in the last 12 months
02 Yes, ever in your lifetime
03 Never
77 Refused
99 Don't know/can't remember. |
|---|----------------------------------|---|

2	How many burns have you had in the past 12 months	_____ times
3	What caused the burn?	01 Contact with a hot liquid, steam, or other gas 02 contact with a hot object or solid substance (e.g., cooker, kettle, stove, iron) 03 Contact with flames/fire 04 Inhalation of smoke from burning object/substance 77 Refused Other (specify) Don't know/can't remember.

Appendix B.: Phase 1 quantitative data collection tool for burn injuries in Urdu

کیا آپ کبھی جل کر زخمی ہوئے ہیں؟ ہاں، پچھلے 12 مہینوں میں ہاں، سناری زندگی میں شاید ایک بار کبھی نہیں جواب نہیں دینا چاہتے نہیں جانتے / یاد نہیں	پچھلے 12 مہینوں میں کتنی مرتبہ تعداد لکھیں؟ جلنے کی وجہ کیا تھی؟
گرم مائع، بھاپ یا کوئی اور گیس (کسی گرم چیز کو ہاتھ لگانے پر (جیسے کوکرو، کیتلی، چولہا، امتری آگ/قناریوں کی وجہ سے جلتی چیز / مواد کے دھوئیں میں سانس لینے سے جواب نہیں دینا چاہتے (دیگر (رضاحت کریں پتہ نہیں / یاد نہیں	

Appendix C.: Phase 2 qualitative data collection tool for burn injuries in English

A. Human Factors

Tell me a about yourself and your family?
 What existing physical or mental health conditions do you have?
 What predisposing conditions (lightheadedness, bad vision, medical conditions) do you have that could make you prone to unintentional injuries? What kind of physical activity do you do on weekly basis?
 What kind of alcohol/drugs/tobacco do you use? Did you use any before your injury/accident?
 What is your knowledge about safety from the accidents (burns)?
 Was it because of reckless behavior like:
 mobile use, unattended cooking, not turning off stove/electrical appliance?
 Please describe the accident What was your role in the accident?
 Did you have any already established medical conditions that made recovery harder? What were you doing when the burn/fire happened?

B. Agent Factors

What caused the burn(stove/chemical/fire)?
 Were there any mechanical issues with the stove/machine/electrical outlet? What safety methods did you use for extinguishing/stopping the fire/burn?

C. Environment Factors

Where did the burn happen? Tell me about the building/place of burn? Did it happen because of environmental factors?
 Was there anything else in the environment that made things worse? Did you receive any help, first aid, medical care after the accident?

D. Socioeconomic factors

Do you think your sex, social class had anything to do with the burns?
 What was the role of law enforcement at the time of the accident/injury?
 Did your financial situation affect your recovery from burns?

How did the injury affect your financial situation?
Do you think the people around you were supportive with allowing you to come back to work?

Appendix D.: Phase 2 qualitative data collection tool in for burn injuries in Urdu

انسانی عوام

مجھے اپنے اور اپنے خاندان کے بارے میں بتائی؟
 آپ کسی جویریہ چیمبائی یا ذنی صحت کے حالات کیا؟
 کیا آپ کو ایمری جویریہ چیمبائی یا ذنی بیماریوں کا ٹھیکہ آیا جو آپ کو غریب زلیوں کا ٹھیکہ بنا سکتی
 (آگودا) چیمبے (میر پکھرا) کی سوانا کا ٹھیکہ آیا، وغیرہ
 (آپ مستہ اور کس قسم کی چیمبائی بیروگو دیں آپ نے؟) (میر، زوروش، کھیل، راک وغیرہ
 کیا آپ قریب ازمنہ/میں/ات/تھی/تھا/کون سے پہلے کوئی اینٹریل کا
 ٹھیکہ یا؟
 کیا یہ چلنے سے ہونے والی حادثہ اپنی پرہیزی کی وجہ سے ہوا چیمبے
 جو بائی کا اینٹریل، یا کچھ نوجوان کے گھانا پکان، چولہ/پولہ کی کامران بن نہ کرنا؟
 براہ کرم حادثہ کی وضاحت کریں۔
 حادثہ میں آپ کا کیا کردار تھا؟
 کیا آپ پہلے سے ہی ایمری طبیی دیں کہ مریکڑا تھے جس سے صحت ایسی کی صحت میں ملے؟
 چلنے سے ہونے والے حادثات میں حفاظت کے بارے میں آپ کیا جاننے سے؟
 جب آپ کے مرنے سے حادثہ ہوا تو آپ کیا کر رہے تھے؟
 ایمری کے عوام
 چلنے سے وجہ کیا تھی (چولہ/کبھی/کبھی)؟
 حادثہ میں چھ چیزیں تھیں جس سے یہیں آیا اس کے بارے میں معلومات فراہم کریں
 کیا چولہ/پہلوں/لاری/کشتی/کل لٹ لٹو میں کوئی چیز تھی کے حادثہ میں ہوا؟
 آگ پھانے لڑکھنے کے لئے آپ نے کون سے حفاظتی طریقے استعمال کیے؟
 ماچول/تھی/عوام
 چلنے کے واقعہ کس ہوا؟ مجھے عمارت/چلنے سے چگہ کے بارے میں بتائی؟
 حادثہ کے وقت چارل یا آگودا کے ملازم تھے؟
 آپ کو اس حادثہ کے بیچ کس قسم کی درد، ابتدائی طبیی دیکھ بھال ملی؟ شوزان/پہلو/ایمری/پہلو/تھی/عوام
 ہمدانی
 ہمدانی کی عوام
 کیا آپ کو لگتا ہے کہ آپ کسی چیز، ہمدانی طبیی کے چلنے سے کوئی تعلق تھا؟
 چلنے/لڑکھنے ہونے کے وقت قانون نافذ کرنے والے اداروں کا کردار کیا تھا؟
 کیا آپ کو مالی حالت نے چلنے سے آپ کی ہمدانی طبیی کو متاثر کیا؟
 چلنے سے آپ کی مالی حالت کو کس سے متاثر کیا؟
 کام پر واپس آنے میں آپ کے آپ پاس کس طرح کی طبیی دیکھ بھال تھا؟
 ہمدانی کی عوام

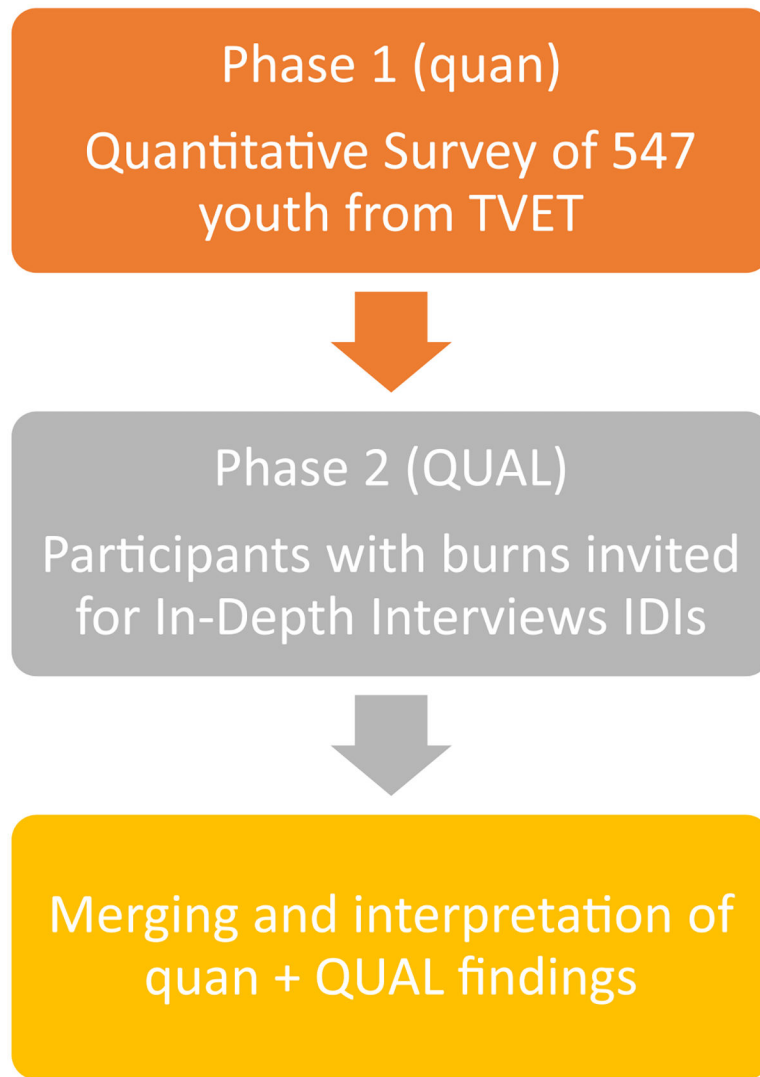
Abbreviations:

CI	Confidence Interval
GBD	Global Burden of disease
IDI	In Depth Interview
LMIC	Lower Middle-Income Country
PKR	Pakistani Rupee
STROBE	Standardized Reporting of Observational Studies
TVET	Technical Vocational Education and Training
VTI	Vocational Training Institutes
WHO	World Health Organization
ZINB	Zero-Inflated Negative Binominal

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**Fig. 1.**

Schematic diagram showing a sequential explanatory mixed methods design with quantitative phase 1 followed by qualitative phase 2.

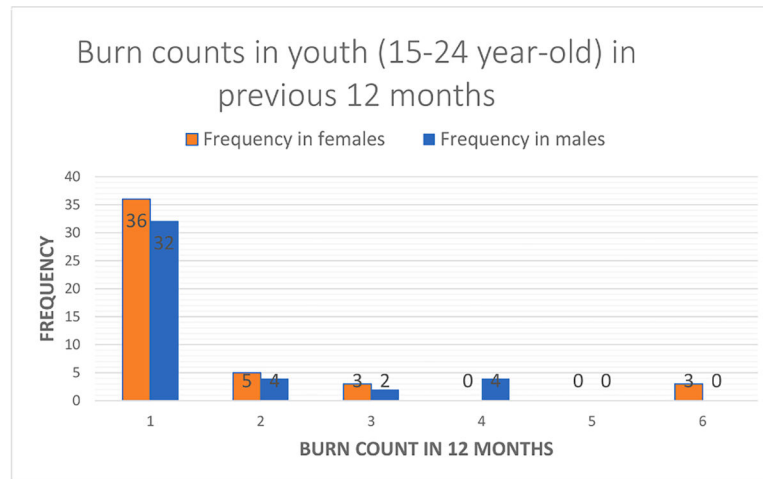


Fig. 2.

Bar graph of burn counts reported by male and female youth in the year 2021–22.

Table 1

Socio-demographics characteristics of the youth participants in the quantitative Phase 1.

Variables	Frequency (percentage) N = 547
Age group (years)	
19	297 (54 %)
>19	250 (46 %)
Median (IQR)	19 (18—20)
Range (Max – Min)	(24—16)
Sex	
Male	356 (65 %)
Female	191 (35 %)
Marital status	
Married	45 (8 %)
Unmarried	502 (92 %)
Technical vocational education training institute	
TVET A (males)	54 (9.8 %)
TVET B (males)	321 (58.6 %)
TVET A (females)	12 (2.1 %)
TVET B (females)	160 (29.2 %)
Youth education	
No formal education	12 (2.1 %)
Some formal education	535 (97.8 %)
Mother's education	
No formal education	221 (40 %)
Some formal education	326 (60 %)
Father's education	
No formal education	110 (20 %)
Some formal education	437 (80 %)
Monthly family income in PKR	
35000 PKR	272 (50 %)
>35000 PKR	275 (50 %)
Median [IQR]	30,000 (22000—40000)
Family members in household	8.4 ± 3.8
Range (Max – Min)	(29—1)
Family members classification	
8 family members	308 (56 %)
>8 family members	239 (44 %)

Table 2

Descriptive analysis of burn injuries.

Variables	Frequency (percentage) N = 547
No. of youth with burns	
Yes, in lifetime	101 (18.46 %)
Yes, in previous 12 months	85 (15.54 %)
Never	310 (57 %)
Refuse to answer	51 (9.41 %)
Counts of burns in last 12 months	137
Type of burn injury	
Contact with hot liquid or steam	57 (10 %)
Contact with hot object	83 (16 %)
Contact with fire/flame	21 (4 %)
Other *	329 (60 %)

Other*= refused to answer, did not remember.

Table 3

IRR for burns in previous 12 months (2021–22) calculated using a multivariable Zero-Inflated Negative Binomial (ZINB) model.

Variables	Unadjusted IRR (95 %CI)		Adjusted IRR (95 %CI)	
	IRR (95 % CI)	P-value	IRR (95 % CI)	p-value
Age	0.79 (0.68–0.91)	0.003 *	0.73 (0.63–0.85)	<0.00 **
Sex (Ref male)	2.13 (1.32–3.43)	0.001 *	2.89 (1.78–4.69)	<0.001 **
Combined Income (Ref > 35000 PKR)	1.88 (1.15–3.07)	0.01 **	1.99 (1.248999 3.173249)	0.004 *
Father's Education (Ref Educated)	0.49 (0.25–0.96)	0.04 *	0.35 (0.18–0.70)	0.003 *
Family Members (Ref 8 members)	1.41 (0.87–2.28)	0.07 *	1.34 (0.84–2.15)	0.21

*
p-value < 0.05 or

**
p < 0.001.

Table 4

Sociodemographic characteristics of six burn participants interviewed in phase 2.

	Age	Sex	Education	Income	Family members	Cause of burn	Role	Risk factor
659	21	F	Metric	30,000	6	Hot liquid	Cooking	Work in kitchen
643	18	M	Metric	25,000	24	Flame	Cooking	Faulty cylinder use
353	22	F	Metric	42,000	10	Stove	Cooking	Cooking recklessly
672	19	F	Metric	30,000	12	Flame	Cooking	Unsupervised cooking
620	22	F	FA	60,000	8	Hair straightener	Vocational training	Exposed to heated objects at work
347	21	M	Metric	50,000	7	Car silencer	Vocational training	Exposure to heated objects at work

Table 5

Themes and subthemes extracted from in-depth interviews of participants in Phase 2 (QUAL).

Themes	Subthemes	Excerpts from interviews
Accident	Internal factors	<p>“I left the gas cylinder on and on top of that I also lit the lighter, which started a fire” (643, male, cooking burn)</p> <p>“I was making tea. I picked up the pot. The pot slipped from my hand, and tea spilled on my hand” (353, female, cooking burn)</p>
	External factors	<p>“I was straightening a girl’s hair, and my friend was calling me, so I took the call at the time”. (620, female, occupational burn).</p>
	Combined internal and external factors	<p>“I was working at the car workshop. The car was overheated because the oxygen silencer was out of order. When I was repairing the oxygen silencer, I accidentally touched the silencer, and my entire hand got burned” (347, male, occupational burn)</p>
Knowledge and safety		<p>“We should be careful while carrying hot fluids. Better to wait till the water cools down and no one is in the way” (659, female, cooking burn)</p> <p>“One should be focused on cooking which can avoid burns” (353, female, cooking burn)</p> <p>“We should act responsibly, especially around gas cylinders. Open the gas cylinder only when you intend to cook, and then turn it off. Please do not leave it open for an extended period. It can burn down the entire house if you are not careful. You should not light a lighter or matchstick if you suspect a leak. Make sure you evacuate the house if you are suspecting a leak”. (643, male, cooking burn)</p> <p>“We are not provided any safety trainings at TVET, but I only know that we can protect ourselves from such accidents by being careful”. (620, female, occupational burn)</p>
Post-burn recovery	Support of family members	<p>“My family really supported me, they helped me with the bandages, due to which I recovered” (353, female, cooking burn)</p>
	Access to healthcare	<p>“My family took me to the hospital, where I received first aid. My wounds were cleaned and bandaged” (659, female, cooking burn)</p> <p>“I was in the workshop, my supervisor did my bandage, and took me to the hospital, he gave me my pay at home for a week” (347, male, occupational burn)</p>