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Assessing hazards and associated fall risks among elderly population: a cross-sectional study of different residential settings in Karachi, Pakistan

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Abstract

Background Safety is one of the top priorities in caring for elderly people because they gradually lose their functional ability with age and are more vulnerable to injuries. Therefore, ensuring safety needs in one's own residential settings is crucial; however, public awareness of home hazards and associated risks of falls is limited. The current study assessed the hazards and associated risks of falling in various residential settings across Karachi, Pakistan.

Methods A total of 166 participants were recruited: 54 from old age homes, 58 from single-unit houses, and 54 from apartments for this cross-sectional study using the convenience sampling method. The study was conducted in 2022 for nine months. Data were gathered using the Home Falls and Accident Screening Tool. During the visit, the researcher asked questions related to demographics, history of falls and then completed HOME FAST by directly observing their home environment and elderly people while they performed their functional tasks at their residence. Independent-Samples Kruskal-Wallis test, chi-square test and cross tabulation were used for statistical analysis.

Results The median age of the elderly people was 65 years (IQR: 62–70 years). Approximately 22.3% of the participants reported falls in the last 12 months. Among 25 hazards, the most prevalent were lack of bath/shower grab rails, non-slip mats, lack of access to a bedside light, and slippery floor surfaces, where median number of hazards was 5 (IQR: 4–6) indicating a moderate level of risk of hazards. Moreover, a significant difference ($P < 0.007$) in risk of hazards scores was observed among old age homes, single-unit houses, and apartments. In addition, out of the 25 identified hazards between Fallers vs. Non-Fallers, six hazards; including difficulty in carrying meals, lack of non-slip mats in the bathroom, difficulty during bed transfers, lack of bath/shower grab rails, difficulty during toilet transfers, and reaching difficulties towards kitchen items, were significantly associated with falls.

Conclusions This study found that identified hazards in residential settings are significantly associated with the risk of falls and can compromise the functional ability, safety, and health of elderly people. Therefore, preventive measures should be taken to reduce hazards and fall incidence to promote safety and independence in daily activities.

Keywords Hazards, Fall risk, Elderly, Pakistan

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Background

The term "health" in the context of the elderly does not only refer to a disease-free state but also encompasses aspects such as safety, functionality and independence [1, 2]. Gradual decline in functionality is a natural aspect of ageing, and it can present itself in various ways, such as coordination, balance, and fall issues, reduced gross and fine motor skills, decreased endurance, and vision impairment [3]. Navigating the environment, handling home equipment, accessing objects, and managing daily life at home have become increasingly challenging [4]. Furthermore, when the physical and mental capacities of elderly people deteriorate with age, they develop non-communicable diseases and other long-term complications, resulting in a loss of ability to work [5]. However, cases involving minor injuries are widely ignored; therefore, it is difficult to estimate how frequently elderly people fall [6]. Thus, a comprehensive assessment should be carried out to reduce the history of fall using evidence-based screening tools [7]. Along with all of this, accessibility is just one of many aspects of housing that are important to consider [8]. It is crucial to provide age-appropriate housing for the elderly to keep them independent in the community for as long as possible because current housing options may not meet the needs of the elderly and may not be suitable for their current state of health [4, 8]. Furthermore, housing access is also a crucial aspect of the United Nation's Universal Declaration of Human Rights [9].

Asia accounted for more than 55% of the world's elderly population in 2015 [10]. According to the United Nations (2015), Asia's proportion of the global elderly population would increase by 60% by 2030 and by 62% by 2050 [11]. Medical costs for the elderly are more than twice as high as those for other age groups [12], presenting a significant challenge for developing countries such as Pakistan, which is already struggling with financial limitations in the fight against infectious diseases [13].

Elderly people are extremely prone to unintentional injuries common at home due to home hazards [14]. Home hazards are defined as the presence of a risk within the home environment that can result in injury, harm, or illness and cause functional limitations in the elderly [15]. It has become a growing public health concern and is now regarded as the cause of disability and death among those aged 65 years and older, with rates rising over the last decade [16, 17]. Furthermore, falls are the world's second largest cause of death among the elderly due to unintentional injury [18]. A fall is defined as an accidental event in which an individual falls to the ground or floor, with or without injury, because of a loss of centre of gravity and no effort or ineffective effort made to restore balance [19].

The rate of falls significantly varies among countries. For example, in Taiwan, research conducted by the Ministry of Health and Welfare found that a significant proportion of elderly people who lived at home experienced falls, with half of them over 80 years old and one-third of those over 65 years reporting a fall in the past 12 months. Additionally, 70% of elderly people who experienced falls developed further complications [20]. Another study by Bakhtiar et al. in Khorramabad, Iran, found an alarming rate of 64.5% falls, similar to a study conducted in rural Haryana by Sirohi et al., which also showed a higher rate of 36.6% falls among 456 elderly people [21, 22]. Furthermore, elderly people who live alone are more than twice as likely to fall, making it a significant risk factor for severe consequences, such as being the leading cause of hip fractures, traumatic brain injuries, and more than 800,000 hospital admissions annually [23]. A study conducted in the Kırıkkale province of Turkey, found that 59.4% of elderly people experienced home accidents. The majority of these accidents occurred due to falls (70.2%) and kitchen accidents (31.7%) [24]. Recent studies have shown that several factors have been associated with an increased risk of falls, such as age (over 80 years of age), female sex, history of previous falls, hazards to falls, neurological conditions, visual impairment, vestibular causes, hypertension, postural hypotension, dementia, depression, sedentary lifestyle, use of certain medications, musculoskeletal issues, and gait problems have been documented globally in studies [20, 25–30]. It is important to highlight that numerous studies have also reported that the most common hazards (>30%) that increase the risk of fall among elderly people were inside the toilet and bathrooms, such as slippery floors, poor lighting, and inappropriate footwear [31–33]. Another important factor associated with the fear of falling without a history of falls was the ability to perform activities of daily living. Although the fear of falling was less common due to home hazards, it was more likely to be linked to restriction of everyday activities [34]. In addition to this, another study investigating the relationship between home accidents and fall efficacy among 600 elderly individuals in Ankara, Turkey showed that elderly people with a history of home accidents within the past 12 months had significantly lower fall efficacy scores. Furthermore, falling efficacy scores were lower among elderly people who lived with family, had lower monthly income, and had lower educational attainment, and these scores decreased as dependence on daily activities increased [35]. Pakistan is a lower middle income country, with the proportion of elderly people expected to rise from 6.6% in 2015 to 8% by 2020 and 13% by 2050, according to the United Nations (2015) [11, 36, 37]. The prevalence of falls among the elderly in Pakistan is 44%, and they are at risk of hospitalisation or even premature death due

to developing injuries [38]. Several observational studies on elderly people are also available from Pakistan, but their main objectives were related to identifying factors or management of specific medical conditions, including depression, sensory impairments, hypertension, diabetes, mobility impairment, arthritis, and health expenditures in the elderly [11, 38–43]. No analytical cross-sectional studies have been conducted to assess home hazards and associated fall risks among elderly people living in residential settings, such as assisted (nursing/ old age homes) and independent (own homes/apartments).

This study focuses on identifying existing knowledge gaps by assessing hazards and providing an association with fall risks in different residential settings. It will provide a foundation for developing effective interventions and strategies to reduce the incidence of falls, promote safety, enhance well-being and quality of life, and enable elderly people to live independently in one's own residential settings. Furthermore, this research will create future research options and contribute to local efforts to achieve the Sustainable Development Goal (SDG) 3 "Good Health and Well Being" set by the United Nations Assembly, which ensures healthy lives and promotes well-being for all people of all ages.

Methods

Study settings

A cross-sectional study was designed to assess home hazards and associated fall risk in residential settings covering all districts of Karachi, the largest metropolitan city in Pakistan. This ethnically and culturally diverse city, with a population of 27.51 million, is divided into six districts and 18 towns and has more old-age homes than the rest of the country [44, 45]. The duration of the study was from March to November 2022.

Study participants

Using the convenience sampling method, we recruited 166 elderly people (men = 97, women = 69), who were ≥ 60 years old, which is the minimum age required to become a senior citizen under the Islamabad Capital Territory Senior Citizens Act, 2021 [46]. Among the 166 elderly people studied, 58 lived in single-unit houses, 54 lived in apartments, while 54 were from four recognized old age homes in different districts of Karachi. Elderly people who were bedridden or unable to communicate verbally or had a history of severe hearing loss, dementia, memory loss, or psychiatric disorder(s) were excluded from the study. The sample size was calculated using OpenEpi software. The percentage of risk of falls in older adults was taken as 25.89% reported in previous research [6], with 7% margin of error, 80% power, and 95% confidence level, the total sample size was $n = 151$. The sample size was increased to 166 elderly, which included 10% of the calculated sample size, to reduce the chances of error and minimize missing information. This study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board (or Ethics Committee) of Dow University of Health Sciences, Karachi, Pakistan (protocol code IRB-2705/DUHS/Approval/2022/1063). Before the start of data collection, all participants provided written informed consent to participate in the study.

Data collection tool

To assess hazards in old-age homes, single-unit houses, and apartments, Home Falls and Accident Screening Tool (HOME FAST) was used; which is a 25-item tool that has been widely used in many countries for assessing home hazards in the elderly population [15, 34, 47, 48]. The researchers received permission via email from Professor Lynette Mackenzie, who developed the tool for using HOME FAST in this study [47]. This Home Falls and Accident Screening Tool (HOME FAST) covers seven domains (floors, furniture, lighting, bathroom, storage, stairways/steps and mobility) [34]. Each question in the tool is answered with a "yes" or "no" and there is also a "not applicable" response choice for certain questions. To score the responses, a standardized procedure was used where only "no" answers received a score of 1, indicating a hazard [34]. The cumulative score ranges from 0 to 25, with a higher value indicating more hazards. In an Asian study, a cutoff score of 6 or higher on a home hazards screening tool was associated with a high risk of home hazards [34]. The clinimetric properties of HOME FAST are good [49, 50]. The face validity of the questionnaire was assessed rigorously. This was ensured by translating the questionnaire into Urdu, the national language of Pakistan, and 18 residents (six from each residential dwelling) outside the selected residential areas participated in a review and discussion of the translated questionnaire. Two participants had trouble comprehending one question; thus, in collaboration with four field experts' feedback one question was slightly modified.

Data collection procedure

Initially, for old-age homes, permission was sought from the management to schedule visits and take consent from the participants interested to be a part of the study. Sample selection of single-unit houses and apartments was based on the availability of elderly participants who attended seminars, awareness sessions, and community gathering events in Karachi. The researcher contacted participants and requested their consent to visit their homes after receiving their contact details. Before participation, the researcher explained the study and discussed the HOME FAST tool. Consent was taken from

the elderly to ensure their voluntary participation. During the visit, the researcher asked questions to obtain demographic information and a history of falls from the elderly people, which was completed in either English or their native language. Participants' privacy and confidentiality was ensured during the interview and HOME FAST assessment within their residential settings. The researcher completed HOME FAST by directly observing their home environment and elderly people performing their functional tasks in it. The total duration for data collection was 30–45 min.

Data analysis procedure

Data were entered and analyzed using the Statistical Package for Social Science (SPSS) version 26.0. The Shapiro-Wilk test was used to check the normality of the data. The descriptive characteristics of the sample were reported as frequency and proportions for categorical variables, including gender, marital status, education, employment status, risk of falls, and residential hazards. Median with interquartile range (IQR) was reported for quantitative variables, including age and average score of residential hazards. Cross tabulation was performed to compare hazards between fallers and non-fallers. Chi-square test was used for assessing associations between variables while age and hazards score differences among old age homes, single-unit houses, and apartments, as well as hazard scores differences between fallers and non-fallers, were analyzed using the Independent Samples Kruskal-Wallis Test. P-values ≤ 0.05 was considered significant for all analyses.

Results

Socio demographic characteristics

The median age of the elderly people was 65 years (IQR: 62–70 years); among them, (58.4%) were males (Table 1). Half of the participants were married (50.0%), less than half were divorced/widowed (41.0%), and the remaining were single (9.0%). Participants with no formal education (24.7%) and those with secondary education (21.7%) were nearly identical. Nearly half (47.0%) of the participants were unemployed. Approximately (22.3%) of the participants reported falls in the last 12 months. However, no significant differences were found among residential settings of elderly people between fallers and non-fallers.

Table 1 Socio-demographic characteristics of elderly participants in Karachi, Pakistan

Characteristics	Total (*n* = 166)	Old age Homes (*n* = 54)	Single unit Houses (*n* = 58)	Apartments (*n* = 54)	*P* value
	n (%)	*n* (%)	*n* (%)	*n* (%)	
Age (years)					
Median (25th, 75th)	65 (62, 70)	65 (61, 70)	65 (62, 74)	63.5 (62, 69)	*0.547
Sex					
Male	97 (58.4)	40 (74.1)	32 (55.2)	25 (46.3)	0.011
Female	69 (41.6)	14 (25.9)	26 (44.8)	29 (53.7)	
Marital Status					
Single	15 (9.0)	13 (24.1)	2 (3.4)	0 (0.0)	
Married	83 (50.0)	17 (31.5)	32 (55.2)	34 (63)	
Divorced/Widowed	68 (41.0)	24 (44.4)	24 (41.4)	20 (37)	
Education					
Uneducated	41 (24.7)	11 (20.4)	16 (27.6)	14 (25.9)	0.256
Primary	14 (8.4)	4 (7.4)	4 (6.9)	6 (11.1)	
Secondary/ Matriculation	36 (21.7)	13 (24.1)	15 (25.9)	8 (14.8)	
Intermediate	28 (16.9)	12 (22.2)	6 (10.3)	10 (18.5)	
Bachelors	32 (19.3)	6 (11.1)	12 (20.7)	14 (25.9)	
Masters and above	15 (9.0)	8 (14.8)	5 (8.6)	2 (3.7)	
Employment Status					
Employed	28 (16.9)	5 (9.3)	12 (20.7)	11 (20.4)	
Unemployed	78 (47.0)	45 (83.3)	11 (19.0)	22 (40.7)	
Housewife	24 (14.5)	0 (0.0)	16 (27.6)	8 (14.8)	
Pensioner/ Retired	36 (21.7)	4 (7.4)	19 (32.8)	13 (24.1)	
Falls in Residential Settings					
Falls in the last 12 months	37 (22.3)	8 (14.8)	15 (25.9)	14 (25.9)	0.275
No falls in the last 12 months	129 (77.7)	46 (85.2)	43 (74.1)	40 (74.1)	

*P-value calculated using Independent-Samples Kruskal-Wallis Test

P-value calculated using chi-square test

Table 2 Hazards identified by HOME FAST

Hazards	Total (*n* = 166)	Old age Homes (*n* = 54)	Single unit Houses (*n* = 58)	Apartments (*n* = 54)	*P* value
	n (%)	*n* (%)	*n* (%)	*n* (%)	
Slippery floor	86 (51.8)	54 (100)	14 (24.1)	18 (33.3)	0.001*
Bedside light	132 (79.5)	54 (100)	44 (75.9)	34 (63.0)	0.001*
Bath/shower grabrails	159 (95.8)	54 (100)	52 (89.7)	53 (98.1)	0.014*
Non-slip mats	139 (83.7)	54 (100)	43 (74.1)	42 (77.8)	0.001*
Outdoor rails	36 (21.7)	17 (31.5)	5 (8.6)	14 (25.9)	0.009*

P-value calculated using chi-square test

*Significant at $P < 0.05$

Table 3 Comparison and association of identified hazards between fallers vs. non-fallers

Hazards	Total (*n* = 166)	Fallers (*n* = 37)	Non-Fallers (*n* = 129)	*P* value
	n (%)	*n* (%)	*n* (%)	
Bed transfers	5 (3.0)	3 (1.8)	2 (1.2)	0.040*
Toilet transfers	9 (5.4)	5 (3.0)	4 (2.4)	0.014*
Bath/shower grabrails	159 (95.8)	33 (19.9)	126 (75.9)	0.024*
Non-slip mats	139 (83.7)	35 (21.1)	104 (62.7)	0.042*
Reaching in the kitchen	16 (9.6)	9 (5.4)	7 (4.2)	0.001*
Carrying meals	17 (10.2)	7 (4.2)	10 (6.0)	0.048*

P-value calculated using chi-square test

*Significant at $P < 0.05$

HOME FAST

Lack of bath/shower grab rails (95.8%), lack of a non-slip mat in the bathroom or toilet (83.7%), lack of access to a bedside light (79.5%), and slippery floor surfaces (51.8%) were the hazards most frequently reported among residential settings, including old age homes, single-unit houses, and apartments in selected participants as shown in Table 2.

On Chi-square test indicated no statistically significant difference in hazards was found among different residential settings, except for the lack of bath/shower grab rails ($P < 0.014$), inaccessible outside stairs grab rail ($P < 0.009$), slippery floor surfaces, lack of access to a bedside light and lack of non-slip mats in the bathroom ($P < 0.001$) respectively.

Hazards and falls history

Chi-square test indicated that out of the 25 identified hazards, six hazards; including difficulty in carrying meals ($P < 0.048$), lack of non-slip mats in the bathroom ($P < 0.042$), difficulty during bed transfers ($P < 0.040$), lack of bath/shower grab rails ($P < 0.024$), difficulty during toilet transfers ($P < 0.014$), and reaching difficulties towards kitchen items ($P < 0.001$) were significantly associated with falls. Table 3 shows comparison and association of hazards between groups (fallers vs. non-fallers), using cross tabulation and chi square test respectively.

Table 4 HOME FAST score

Score	Total (*n* = 166)	Old age Homes (*n* = 54)	Single unit Houses (*n* = 58)	Apartments (*n* = 54)	Total (*n* = 166)
	Median (25th, 75th)	Median (25th, 75th)	Median (25th, 75th)	Median (25th, 75th)	
Risk of hazards	5 (4, 6)	5 (5, 6)	4 (3, 6)	5 (3.75, 6.25)	0.007*

P-value calculated using Independent-Samples Kruskal-Wallis Test

*Significant at $P < 0.05$

HOME FAST identified that the median number of risk of hazards was 5 (IQR: 4–6), which indicates that a moderate level of risk of hazards is present irrespective of the residential settings, as shown in Table 4. The median number of hazards between fallers and non-fallers was also 5 (IQR: 4–6). A statistically significant difference ($P < 0.007$) in risk of hazards scores exists among old age homes, single-unit houses, and apartments, as indicated by the Independent-Samples Kruskal-Wallis Test. In addition, a statistically significant difference ($P < 0.032$) in hazards also existed between fallers and non-fallers.

Discussion

Hazards and falls are the leading causes of morbidity and mortality among the elderly people [14, 16–18]. Global data have shown that a significant number of elderly people who experience falls, may have injuries such as fractures, bruising, and pain [25, 51].

Several studies have mentioned that falls cause up to 80% of traumatic brain injuries (TBIs) and more than 90% of hip fractures in elderly people [52–54]. Upper extremity fractures and soft tissue hematomas accounted for 21% and 24% of all fall-related injuries, respectively [55]. Additionally, falls among the elderly predominantly occur in bathrooms and bedrooms, and risk factors such as poor literacy, polypharmacy, female gender, environmental obstacles, neurological and osteoarticular illnesses, sensory loss, and cognitive impairment have been identified [56–60]. Most such falls are caused by slipping, which accounts for 62.2% of the incidences [25]. Unfortunately, 75.7% of the elderly people who have falls require medical care [25]. According to a retrospective study done between 2016 and 2021 in patients admitted to Desert Regional Medical Centre, a Level 1 Trauma Centre in Palm Springs, USA, out of 164 patients admitted, 87% needed hospitalisation and 16% required intensive care as a result of falls from beds (FFBs). After hospitalisation, more than half of the patients (55%) could not return home, and 41% needed to be transferred to a skilled nursing facility [55].

Both home hazards and falls have now become major public health concerns. We addressed these concerns by assessing the hazards and associated risks of falls in residential settings, including old age homes, single-unit houses, and apartments. In this study, the most common hazards presented were similar to those reported in several studies such as lack of a non-slip mat in the bathroom or toilet, lack of bath/shower grab rails, lack of access to a bedside light, and slippery floor surfaces [33, 61–63]. However, the present results were unique in that a difference between residential settings, was not explored in other international or national studies.

The prevalence of falls in residential settings is 22.3%, which is almost parallel to the globally reported prevalence of falls 28–35% but, in contrast, quite low 44% as compared to the study previously conducted in Pakistan [64, 65]. Of the 25 identified hazards, six hazards, difficulty in carrying meals, lack of non-slip mats in the bathroom, difficulty during bed transfers, lack of bath/shower grab rails, difficulty during toilet transfers, and reaching difficulties towards kitchen items were identified as risk factors in this study, similar to the study previously conducted in the Philippines [66]. However, these results differ from those of a study conducted in Canada, in which insufficient vegetable and fruit intake was a risk factor for falls [67]. In contrast to earlier studies that associated home hazards with a fear of falling, our study found a significant association between home hazards and fallers, indicating that home hazards may affect daily living activities such as bed transfer, bathroom mobility, and kitchen access, as well as compromise physical, social, and psychological well-being, all of which can have an impact on quality of life [15, 68–71]. A HOME FAST cut-off point of 9 or higher is required in Australia, while a cut-off point of 6 or higher indicates a high risk of falling. However, in this study, it was 5, which was slightly lower than expected. Despite this, it shows that there is an utmost need to take action for early intervention like home modification for mitigating the hazards that are reported in high frequency and for risk of falls [15, 47, 72]. A study conducted at the Ankara Mamak Halil Ulgen Health Centre in Turkey also suggested the need for targeted interventions by identifying proper footwear and inadequate nighttime illumination as the two main safety concerns among 121 elderly people aged 65 years and over [73].

To the best of our knowledge, this study is the first of its kind, conducted in Karachi, Pakistan, by public health professionals to assess the safety of the elderly by comparing hazards along with their associated risk of falls that can affect their functioning on physical and social levels in old age homes, single-unit houses, and apartments.

However, there are some limitations. The study sample was limited and collected only from urban setting (Karachi city), which may limit the generalizability of the findings; further investigations should involve samples from different cities. Convenience sampling may also limit the generalizability of the findings because of selection bias. The exact number of bathrooms in each old age home was not counted in this study. Furthermore, two of the four old-age homes had attached bathrooms/toilets in each of their rooms, while others had communal bathrooms/toilets, which limits the comparison of the findings between old-age homes and single-unit houses, apartments. Additionally, another limitation is that data of self-reported falls in the last 12 months were retrospectively collected, potentially leading to recall bias. Elderly people often underestimate the importance of home modifications due to a lack of safety awareness or culture and believe that falls result from their own incapacity [15]. Due to this reason, researchers may face challenges in obtaining elderly people's consent and permission to observe their residence and their functioning in it while using Home FAST assessment, which can affect scoring accuracy.

Based on the current study's findings, it is recommended that to reduce the incidence of falls, home modifications such as installation of grab rails, ramps, the use of non-slip mats, ensuring enough lighting, adequate height of furniture, maintaining clear walkways, and eliminating clutter should be included as preventive strategies in interventions among elderly people. Moreover, on the basis of this research, it is recommended that a public awareness campaign about home hazards should be launched through the media to reduce the risk of these hazards.

Conclusions

The findings of this study indicate that identified hazards in residential settings are significantly associated with the risk of falls and can compromise the functional ability, safety, health, and overall well-being of elderly people in Pakistan. To identify and reduce risks in residential settings, healthcare providers, policymakers and stakeholders should consider implementing regular home safety assessments. Evidence-based fall prevention initiatives such as fall of risk can be reduced by making environmental modifications, such as installing handrails and non-slip flooring as shown in our study. Additionally, it is important to engage local communities to raise awareness regarding home safety and fall prevention as part of intervention strategies. These measures can reduce the risk of falls and related injuries in elderly people. Therefore, it is crucial for all stakeholders, including policymakers, the government, healthcare professionals, researchers and family members, to take preventive

measures to reduce hazards and the incidence of falls; particularly in basic and instrumental daily activities, to ensure safety, independence and quality of life for the elderly population.

Abbreviations

DUHS	Dow University of Health Sciences
HOME FAST	Home Falls and Accidents Screening Tool
IQR	Interquartile range
MELoR	Malaysian Elders Longitudinal Research
SDG	Sustainable Development Goal
SPSS	Statistical Package for Social Science
UDHR	Universal Declaration of Human Rights

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Author contributions
IR conducted the study under ZI, SN and NS supervision for her master's project. SZ performed statistical analysis and interpreted the results. The final manuscript was written, reviewed, and edited by all authors.

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Data availability
The data can be requested from the research department of the School of Public Health, DUHS. To request access, please contact Prof. Muhammad Zafar Iqbal Hydrie at SPH, DUHS at email: zafar.hydrie@duhs.edu.pk.

Declarations

Ethics and consent to participate
The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board (or Ethics Committee) of Dow University of Health Sciences, Karachi, Pakistan (protocol code IRB-2705/DUHS/Approval/2022/1063). All participants in this study provided informed consent to participate.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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