

# Knowledge, Attitude, and Practices of Parents Regarding Injections Use for their Children-A Study from Outpatient Clinics of a Tertiary Care Hospital in Pakistan

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## ABSTRACT

**Introduction:** Injections are frequently used in developing countries as a perceived potent medical treatment. However, unsafe injection practices, including the reuse of syringes without proper sterilization, can transmit infectious diseases like hepatitis B, hepatitis C, and HIV. In Pakistan, the average injection rate is 8.5 per person annually, with a significant proportion deemed unnecessary. Cultural beliefs and mutual reinforcement between healthcare providers and patients contribute to frequent injection use, further escalating infection risks. This study aims to assess parents' Knowledge, Attitudes, and Practices (KAP) regarding safe injection practices in the pediatric outpatient setting at Aga Khan University Hospital.

**Methods:** This cross-sectional study was conducted over six months at Aga Khan University Hospital's pediatric outpatient clinics. A total of 266 parents of children under 18 years were recruited using convenience sampling. Data were collected through interviewer-administered questionnaires focused on parental knowledge, attitudes, and practices regarding injection use. Knowledge scores were based on six questions, attitudes on another six, and practices on ten questions, with defined scores indicating adequate levels in each domain. Statistical analysis was performed using SPSS version 23.0, with *Chi-square* and Fisher exact tests applied for stratified variables and a significance level of  $p < 0.05$ .

**Results:** While the majority of parents (93.6%) demonstrated sound knowledge about safe injection practices, only 44.7% showed a positive attitude, and 29.3% engaged in adequate practices. Urban residency and higher education levels correlated with safer practices and better understanding ( $p = 0.001$ ). However, cultural influences, particularly Sindhi, Balochi, and Pashto-speaking families, were associated with more negative attitudes and suboptimal practices ( $p = 0.005$ ). A notable gap was observed between parental knowledge and practice, with financial incentives for healthcare providers and traditional beliefs about injections contributing to this discrepancy.

**Discussion:** The study reveals a critical gap between awareness and behaviour, emphasizing the need for targeted educational interventions. Socioeconomic factors like education and urban residency play a vital role in shaping safe injection practices. Cultural norms around injection use reinforce demand for injections, complicating efforts to reduce unnecessary use. These findings mirror trends seen in similar studies on immunization practices in Pakistan, where socioeconomic and cultural factors influence healthcare behaviours.

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**Conclusion:** This study emphasizes the need to address the gap between parental awareness and safe injection practices in Pakistan. Despite high awareness, cultural beliefs and reinforcement of injection overuse contribute to unsafe behaviors. Public health initiatives should focus on training healthcare providers, promoting auto-disable syringes, and enhancing parental education, particularly in underserved areas. These actions are crucial to prevent disease outbreaks and improve public health.

**Keywords:** Knowledge; Attitude; Practice; Parents; Unsafe injections; Children

## INTRODUCTION

The WHO states that a safe injection is one that does not harm the recipient, expose the provider to any avoidable risk, or result in hazardous waste [1]. Worldwide, 12 billion injections are administered annually, with 5% for immunization and 95% for curative purposes. With increasing numbers of injections, the probability of exposure to infectious agents also rises. In developing countries, injection is regarded as a powerful healing tool [2,3]. Patients frequently report higher satisfaction and perceive better care when they receive injections [4]. Healthcare workers receive financial incentives and gain prestige, which establishes a cycle where patients and providers mutually encourage overuse of injections [4,5].

The use of injections in low-income countries averages 3.4 injections per person per year. The estimated number of injections per person per year ranges from 1.2 in Tanzania and India to 8.5 in Pakistan. Approximately, 25–96% of outpatient visits result in at least one injection, with 70–99% of injections deemed unnecessary [6]. Many injections in developing countries are given with reused equipment due to lack of sterilization. In developing countries, the reuse of unsterilized injection devices caused millions of infections in 2000 as per the WHO global burden of disease study. In response, international organizations like WHO, UNICEF, UNFPA and the IFRC have advocated for the exclusive use of auto-disable syringes to eliminate the reuse of injections. According to one demographic health survey, 9% of injections given in Pakistan are unsafe [6,7].

In developing countries, injections are administered across three sectors: the formal sector by trained healthcare professionals, the informal sector by traditional healers and unlicensed medical shopkeepers offering low-cost services without training, and the illegal sector solely for financial gain. These last two sectors pose major public health risks [8]. The domestic sector involves injections given without payment by relatives or neighbours, adding to the complexity [9].

Unsafe injection practices in Pakistan had devastating consequences, as evidenced by the HIV outbreak in Larkana, Pakistan in April 2019. A private healthcare provider identified 14 children with HIV infection. Subsequently, Pakistan faced its largest HIV outbreak in children, where more than 930 individuals, primarily under 16 years old, tested positive for the virus. Two previous HIV outbreaks in Pakistan occurred in 2008 and 2018. These incidents emphasize the crucial role of safe injection practices in curbing the transmission of infectious diseases and safeguarding public health [10].

There is a notable scarcity of research on parental understanding and perspectives regarding injection practices in Pakistan. This gap underscores the pressing need for further investigation in this field. The HIV outbreak among children highlights the urgency of increasing awareness among parents. This involves educating parents about the risks associated with unnecessary injections, promoting oral medications, emphasizing precautions, addressing financial implications, and stressing the importance of verifying healthcare providers and facilities.

## Objective

To assess the knowledge, attitude and practices of parents regarding injection use for their children.

## MATERIALS AND METHODS

### Study design

A prospective quantitative cross-sectional study.

### Study period and area

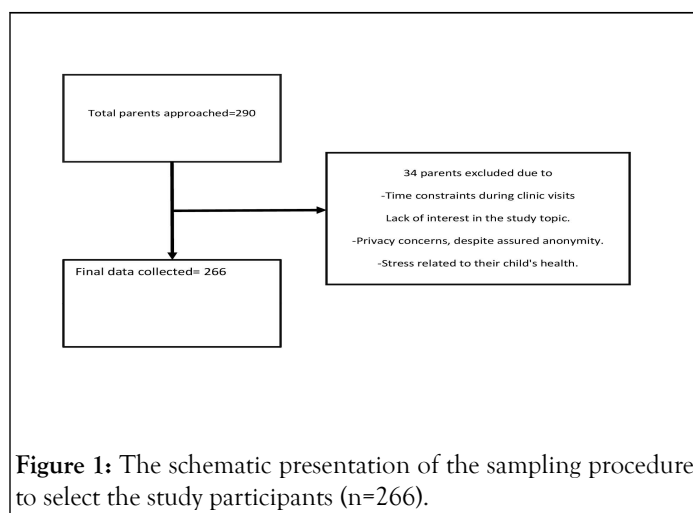
This study was conducted over six months, from January 1, 2020–June 31, 2021, after obtaining approval from the ethical review committee of Aga Khan University Hospital. The Aga Khan University Hospital in Pakistan is a private tertiary care hospital that serves a diverse patient population, welcoming individuals from all ethnic backgrounds and economic standings. In its pediatric outpatient clinics, parents from varying income levels seek care for their children. Notably, the hospital's welfare system ensures accessibility for low-income families too. AKUH's pediatric department offers a wide range of sub-specialized services.

### Study population

Parents of children under 18 years of age, visiting general pediatric outpatient clinics of AKUH were included in the study.

Inclusion criteria consisted of parents who consented to be involved in the study.

Exclusion criteria included parents who did not understand Urdu or English, non-consenting parents, and children brought by caretakers other than parents (Figure 1).



### Sample size

The sample size was calculated using open Epi for all 3 variables, showed n=233, n=266, and n=218 for knowledge, attitude and practices respectively taking a two-sided significance level (1-alpha):95 and Power (1-beta, % chance of detecting):80. Highest sample size was taken as 266, hence a sample size of 266 parents of children under 18 years of age would require to produce estimates at 5% precision and 95% level of confidence.

### Sampling technique

A non-probability, convenience sampling technique was used, approaching parents of children presenting in outpatient clinics at Aga Khan University Hospital and a total of 266 parents were enrolled in this study.

### Variables

Dependent variables included knowledge, attitude, and practice while independent variables included age, gender, ethnicity, residence, education, monthly income and relation to the child.

### Data collection tools and procedure

Data was collected through a structured and interviewer-administered questionnaire developed after an extensive literature search. Data was collected by the interviewers who were fluent in English and Urdu languages. The interview was conducted in a specified space in the clinic. The questionnaire tool was adapted from the study "Therapeutic injections in Pakistan: From the patients' perspective," originally conducted in an adult population in Karachi [11]. It was modified to suit pediatric contexts and was made available in both Urdu and English languages. The questionnaire consisted of the following themes:

- Demographics, which included age, gender, ethnicity, area of residence, relation with the child, education of parents and monthly income.
- Knowledge about injections.
- Attitudes towards injection use.
- Practices regarding injection use for their children.

Questions included in the questionnaire were focused on the patient's last encounter with a health care provider, use of injections over the previous 6 months, knowledge of risks of diseases transmitted by unsafe injections, and the necessity of authenticity of prescribers, dispensers, and settings where injections were administered. The questionnaire was developed with 22 multiple-choice questions. Knowledge was evaluated using six questions, with a score of 4 or higher out of 6 was considered good knowledge. Attitude was assessed by six questions, each with a maximum score of 4, and a total score of 18 or above out of 24 was considered a positive attitude. Practice was measured using ten questions, with a score of 7 or more out of 10 was considered adequate practice.

**Data processing and analysis:** Statistical analysis of data was performed using SPSS version 23.0. Median was used for quantitative variables. Frequency and percentage computed for qualitative variables. The quantitative data like age, and family income were expressed as mean with standard deviation, and qualitative data like gender, ethnicity, relationship with the child, family income, geographical location, education of parents, knowledge, attitude, and practice were expressed as frequency or percentage. Effect modifiers like age of the child, sex of the child, relationship with the child, ethnicity, geographical location, family income, and education level of parents were addressed through stratification. Post Stratification, the Chi/Fischer exact test was applied, and a p-value of <0.05 was considered significant.

## RESULTS

### Socio-demographic characteristics of the respondents

Table 1 shows that most respondents (84.2%) reside in urban areas, children's median age is 3.4 years, percentage of boys was 55.3% vs. girls 44.7%. Most respondents were fathers (54.9%) vs. mothers (45.1%). The ethnic composition is diverse: Muhajir parents were the majority (43.6%), 55.6% of mothers had higher education while 64.3% of fathers had higher education. Majority of families (97.4%) earn more than 30,000 per month.

**Table 1:** Socio-demographic characteristics of parents of children under 18.

Variable	Category	Frequency (n)	Percentage (%)
Area of residence	Urban	224	84.2%
	Rural	42	15.8%

Gender of child	Male	147	55.3%
	Female	119	44.7%
Age of child (Years, Median (IQR))	3.4 (1-7)	-	-
Relation with child	Father	146	54.9%
	Mother	120	45.1%
Ethnicity	Muhajir	116	43.6%
	Pakhtoon	28	10.5%
	Punjabi	41	15.4%
	Sindhi	45	16.9%
	Balochi	12	4.5%
	Other	24	9.0%
Education of mother	None	44	16.5%
	Primary	20	7.5%
	Secondary	54	20.3%
	Higher	148	55.6%
Education of father	None	21	7.9%
	Primary	36	13.5%
	Secondary	38	14.3%
	Higher	171	64.3%
Monthly income	<30K	7	2.6%
	>30K	259	97.4%

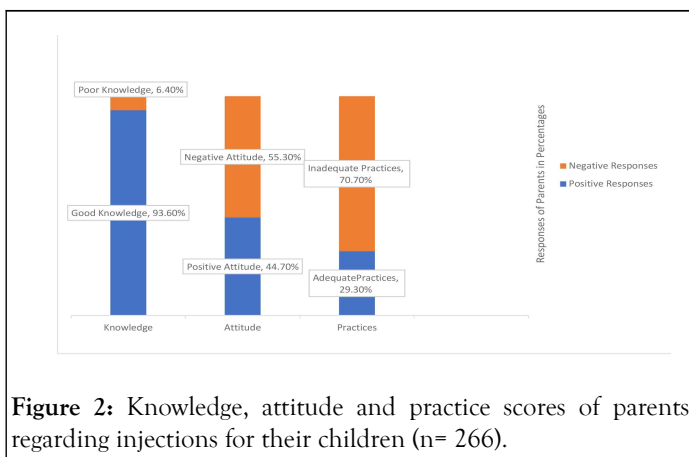
### Knowledge of parents regarding injection use

The responses to knowledge questions reveal a strong awareness of safe injections. An overwhelming majority (91.4%) of respondents recognize that HIV and hepatitis B/C can be transmitted through unsafe injections, most participants (94.4%) agree that injections should be prescribed only by certified individuals, 97% of respondents understand that reusing injections poses a serious infection risk for children. 92.1% of parents knew that overuse of injections is a significant problem in the country, and 96.2% of respondents acknowledge that used sharps should be disposed of immediately in designated sharp boxes (Figures 2 and 3).

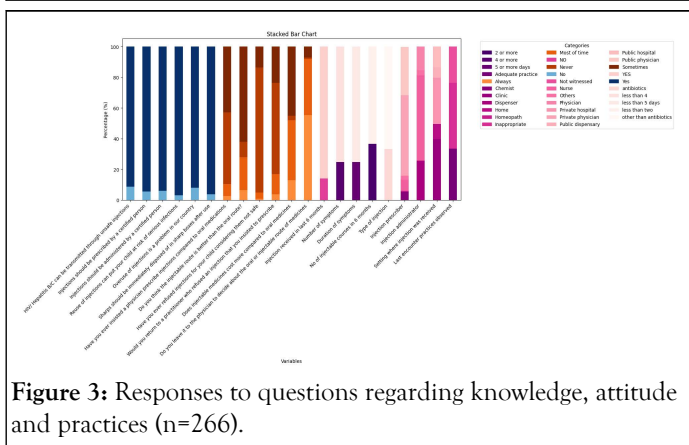
### Attitude of parents regarding injection use

The responses to attitude questions did not correspond to parents' knowledge. Nearly half (46.6%) responded with no preference for oral medication over injections. However, 42.9%

said they "sometimes" prefer the injectable route, suggesting an equal proportion believe the injectable route to be better. Only 10.2% believe that the injectable route is "never" preferable, indicating the overall preference of the parents towards injections. Parental safety concerns regarding injections for their children appear limited; 81.6% have "never" refused injections due to safety concerns, while only 13.5% have done so "sometimes." Regarding returning to a practitioner who refused an injection they requested, most parents (59.4%) would "never" return, reflecting a strong expectation for practitioners to accommodate their preferences, which could be a reason for the number of injections prescribed each day. Additionally, 45.1% think injectable medications "sometimes" cost more than oral (Figures 2 and 3).



**Figure 2:** Knowledge, attitude and practice scores of parents regarding injections for their children (n= 266).



**Figure 3:** Responses to questions regarding knowledge, attitude and practices (n=266).

## Practices of injections use reported by parents

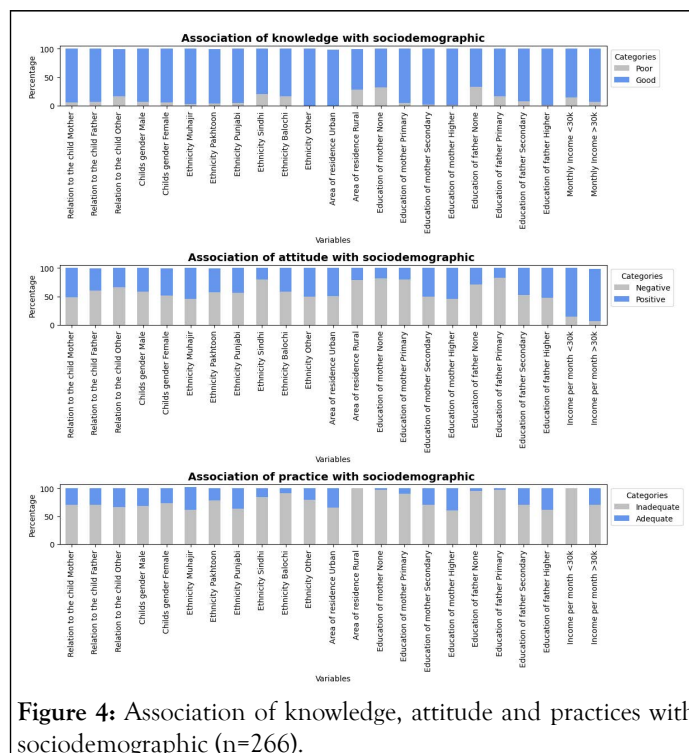
Most parents (86.1%) reported that their child received an injection in the last 6 months, most of these children had fewer than four symptoms (75.2%), the primary reasons for administering injections include fever (53.2%), vomiting and/or diarrhoea (53.4%), and cough (21.1%). Vaccination was also a common reason (46.2%). Injections were mainly administered for non-antibiotic treatments (66.9%), including vaccinations, fluids, antiemetics, and antipyretics, whereas 33.1% were for antibiotics. Most injections were prescribed by a qualified professional, with 52.6% prescribed by a private physician and 31.6% by a public physician. However, 13.3% of injections were prescribed by unqualified individuals, including nurses (7.1%), chemists (5.2%), and homoeopaths (0.8%). Most prescribers were given nurses (55.6%) or physicians (15.4%), while a quarter of injections (25.6%) were administered by unqualified dispensers. In terms of the setting, 39.8% of injections were administered in clinics, 30.1% in private hospitals, and 13.5% in public hospitals. However, 16.6% of injections were administered in inappropriate settings, such as at home (9.8%) or public dispensaries (6.8%). Parents observed practices in their last encounter were reported to be inadequate in 42.9%.

The knowledge scores revealed that a significant majority (93.6%) of parents have a good understanding of injection practices, while a small proportion (6.4%) have poor knowledge. This indicates that most parents are well-informed about safe injection practices.

The attitude scores indicate that 55.3% of parents demonstrated a positive attitude towards safe injection practices, while 44.7% exhibited a negative attitude.

The practice scores of parents regarding injection practices show that a significant portion (70.7%) exhibit inadequate practices, while only 29.3% demonstrate adequate practices. This suggests that, despite having a good understanding of injection practices, many parents still fall short when it comes to properly implementing these practices.

Figure 4 shows the association of knowledge, attitude and practice scores with sociodemographic variables revealing several significant findings.



**Figure 4:** Association of knowledge, attitude and practices with sociodemographic (n=266).

Ethnicity had a significant impact on knowledge scores ( $p=0.0005$ ), with parents from the Sindhi (20%) and Balochi (16.7%) ethnic groups showing a higher proportion of poor knowledge. Area of residence was also significantly associated with knowledge scores ( $p=0.001$ ), with only 71.4% of rural parents having good knowledge compared to 97.8% of urban.

Parental education levels were strongly correlated with knowledge scores. Among mothers, 31.8% of those with no formal education had poor knowledge, while 99.3% of those with higher education had good knowledge ( $p=0.001$ ). Similarly, 33.3% of fathers with no formal education had poor knowledge, while 99.4% of those with higher education had good knowledge ( $p=0.001$ ).

Regarding the association of attitude scores, ethnicity played a notable role, with Sindhi parents showing a significantly higher proportion of negative attitudes (80%) compared to other ethnic groups ( $p=0.005$ ). Area of residence also had a significant impact on attitudes ( $p=0.001$ ), with rural parents exhibiting a much higher proportion of negative attitudes (78.6%) compared to urban (50.9%). Parental education levels were strongly



associated with attitudes ( $p=0.001$ ). Mothers with no formal education had the highest proportion of negative attitudes (81.8%). Similarly, fathers with no formal education exhibited more negative attitudes (71.4%). However, income per month did not significantly influence attitudes ( $p=0.704$ ), as both low and high-income parents demonstrated similar patterns of positive attitudes.

Lastly, the association between practice scores and sociodemographic variables revealed several significant patterns. Ethnicity was significantly linked to injection practices ( $p=0.019$ ), with Sindhi and Balochi parents displaying a higher proportion of inadequate practices (84.4% and 91.6%, respectively). Area of residence also had a strong impact ( $p=0.001$ ), with rural parents reporting 100% inadequate practices, while urban parents showed a more even distribution, with 65.2% exhibiting inadequate. Parental education emerged as a key determinant ( $p=0.001$ ), as those having no formal education had the highest proportion of inadequate practices (97.7% and 95.2%, respectively).

## DISCUSSION

The study reveals significant insights into parental knowledge, attitudes, and practices concerning injection use for children, highlighting a disconnect between high awareness and actual practices. While majority of parents (93.6%) demonstrated sound knowledge about safe injection practices, a considerable proportion still exhibited a negative attitude (55.3%) and engaged in inadequate practices (70.7%). The influence of media and healthcare workers may contribute to the high awareness levels. Similarly, in a study on vaccination practices, while most parents showed a solid understanding of vaccination protocols, many still held negative attitudes and followed suboptimal practices [12]. Both studies underscore a critical gap between parental knowledge and actual behaviour, highlighting the need for targeted educational efforts to bridge this gap and improve health-related practices among parents. We included vaccinations in our study as it is equally important to ensure safe practices while vaccines are being administered as discussed above, however, we did not ask questions like the choice between oral *vs.* injectables, duration of symptoms, efficacy of oral *vs.* IV route from the parents whose children got only vaccinations.

Urban residency and parental education were positively associated with better understanding and practices ( $p=0.001$ ), suggesting that socioeconomic factors significantly shape healthcare behaviors. Higher education levels enable parents to gain a thorough understanding of their child's health, making it easier for them to comprehend safe injection practices and their importance. Additionally, education enhances communication with healthcare providers, reducing the likelihood of adopting incorrect beliefs about injection practices.

Healthcare access disparities typically exist in rural areas due to limited infrastructure, fewer healthcare providers, and financial constraints which may account for why parents in urban residency had better understanding of safe injection practices. Cultural and ethnic influences, particularly among Sindhi,

Balochi, and Pashto-speaking families, were also linked to negative attitudes and suboptimal practices ( $p=0.005$ ), emphasizing the need for culturally sensitive interventions [13]. These findings on injection practices align with trends observed in studies on immunizations in Pakistan, where socioeconomic and cultural factors similarly impact healthcare behaviours.

Despite high levels of awareness among urban, educated parents, the study indicates that traditional beliefs about injections as potent treatments persist, driven by social norms and reinforcement from healthcare providers. This aligns with research showing that patients and healthcare workers often mutually reinforce the demand for injections, complicating efforts to reduce unnecessary use. These findings are particularly concerning in light of Pakistan's high injection rates-up to 8.5 per person annually. Unnecessary injection use in Pakistan is widespread, particularly in private clinics and dispensaries where prescribers administer injections and IV drips for conditions that could be treated with oral medications. The drive for these injections stems from a desire for quick relief and financial incentives for healthcare providers. Patients, often unaware of the health risks associated with reused syringes and IV equipment, rarely question the need for these treatments [14].

Similarly, unsafe practices have previously led to severe public health crises like the 2019 HIV outbreak in Larkana with children making up 80% of the number [15].

While some healthcare workers are aware of safe procedures, they struggle to implement them effectively [16]. Infection prevention and control practices are minimal or altogether lacking in many private healthcare settings, and this issue extends to government facilities across all levels. Even at tertiary hospitals, sterilization processes for minor and major surgeries are often insufficient. Significant gaps exist in healthcare waste and sharps management. Although some government hospitals are equipped with incinerators, these are frequently non-operational.

## CONCLUSION

The study's single-center design and focus on a relatively privileged urban population however limit the generalizability of its findings to broader rural or underserved communities, where healthcare access and attitudes may differ. Additionally, data collection from outpatient clinics, including follow-up patients, may have influenced results by over-representing frequent injection prescriptions.

To address these issues, comprehensive public health initiatives are essential. Training programs for healthcare providers should focus on promoting evidence-based alternatives and safe injection protocols, including the use of auto-disable syringes. Additionally, public awareness campaigns targeting parents could encourage safer decision-making, particularly in regions where cultural factors drive high injection use. By fostering a healthcare environment that emphasizes safety and alternative treatments, these interventions could substantially reduce injection overuse, mitigate infection risks, and improve overall public health outcomes in Pakistan.

## ETHICAL CONSIDERATIONS

This study was conducted in adherence to the highest ethical standards as outlined in the Declaration of Helsinki and Good Clinical Practice (GCP) principles, with approval from the Ethical Review Committee of AKUH with approval ID: 2021-5621-17423. All participants received a comprehensive explanation of the study through an informed consent form, emphasizing their voluntary participation and the freedom to withdraw at any time without any consequences. Before data collection, all parents willing to participate were asked to sign an informed written consent form. No participant IDs were collected to protect anonymity, and all data obtained through the questionnaire was kept confidential. There were no associated risks or benefits for participation.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was taken from The Aga Khan University Ethical Review Committee.

## INFORMED CONSENT

Before data collection, all parents willing to participate were asked to sign an informed written consent form. The children of non-consenting parents did not participate in data collection.

## CONSENT FOR PUBLICATION

Not Applicable

## AVAILABILITY OF DATA AND MATERIALS

The data supporting this study's findings are available upon reasonable request from the corresponding author.

## COMPETING INTERESTS

The authors declare that they have no competing interests and report no conflicts of interest.

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## AUTHOR CONTRIBUTIONS

BR, AA, NS: These authors made a significant contribution to the work reported, whether that is in the conception, study design, execution or data collection. AP, SZ and AN: Contributed to data analysis and interpretation of data collected. KH, AA and BR: Drafted, wrote and revised the manuscript. FM and BR: Critically reviewed the article; gave

final approval of the version to be published; have agreed on the journal to which the article has been submitted. BR as the corresponding author is accountable for all aspects of the work.

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