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Practices of Self-Medication at Home in Children: A Single-Center Cross-Sectional Study from A Tertiary Care Hospital in Peshawar

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ABSTRACT

Introduction: *Self-medication is the administration of drugs and medicinal products by consumers to treat "self-reported" and "Self-diagnosed" medical conditions. Self-medication is prevalent in developing countries, rural areas and in households with low socioeconomic status.*

Aim & Objectives: *To find out the description, prevalence and practices of self-medication at home for children under the age of twelve years before hospitalisation in a tertiary care hospital.*

Methodology: *This cross-sectional study was conducted at the pediatric wards of the Khyber Teaching Hospital, Peshawar, among 392 children under 12 years of age and their parents/caregivers. Data was collected from the parents and caregivers, and required information was recorded from patient files. Data were analysed to identify associations between sociodemographic factors, including parental education, employment status, and household income and self-medication practices using Chi-square tests, one-way ANOVA, and bivariate analysis.*

Results: *The prevalence of high self-medication practices was 67.60%, with 83% of children being under six years old. Significant associations were found between self-medication and parental education ($P < 0.001$), father's employment ($P = 0.025$), and household income ($P = 0.005$). Bivariate analysis indicated that parental illiteracy significantly increased the risk of self-medication (OR 2.45 for fathers; OR 1.90 for mothers). Additionally, a monthly household income of less than 35,000 PKR was associated with a two-fold higher risk of self-medication (OR 2.10).*

Conclusion: *Self-medication is highly prevalent among parents in rural Peshawar, largely driven by socioeconomic hardships and limited access to formal healthcare. Low parental education and financial constraints are primary determinants. Targeted public health strategies focused on improving health literacy and addressing financial barriers are essential to reduce reliance on unsafe self-medication practices.*

Introduction

Self-medication (SM) is the administration of drugs or agents for medicinal effects for self or by family members for others. This definition dates back to 2010 and was presented in a PubMed article on self- medication risks and practices [1]. The WHO definition has stated that self-medication is the administration of drugs and medicinal products by consumers to treat "self-reported" and "Self-diagnosed" medical conditions. Furthermore, the WHO definition has also included the "intermittent" or "continuous" use of medicines that are prescribed by healthcare professionals and physicians. In the third and last part of this definition, "Chronic", "recurrent diseases", and "symptoms" make it more inclusive, and involve all the possible areas of self-medication [2].

Once the definition of SM by WHO is analysed, it is understood that individuals who self-administer drugs or practice self-medication have background factors of self-reported diseases and self-diagnosis [3]. Such individuals had a background of physiological and pathological changes due to practices of self-medication. Or the possibility is doing PSM without the "real" existence of such conditions, and that is their only perception [4]. Thus, such practices are backed by self-perceptions. More than 55.6% of the students in health professions reported such practices of self-medication that were backed by perceptions of ill health [5].WHO definition also included medication that is "intermittent" or "continuous" by this segment, not following the physicians' guidelines in medicinal use is a practice of self-medication.

The practices of self-medication with Antibiotics have been reported with different. prevalence among the Southeast Asian countries of the WHO region [6]. A 2017 study Bhutan reported the practices of self- medication with Antibiotics as 23.6% of the surveyed population [7]. It was reported that 26.69% of the general public of Bangladesh practised SM when the survey was conducted in the community [8]. A systematic review of studies conducted in Pakistan reported the pooled prevalence of self-medication to be 64% from 65 studies recruiting more than 35,960 participants. Although heterogeneity and variations among the prevalence rates have been reported among different studies[9], another study conducted in Abbottabad, Khyber Pakhtunkhwa, Pakistan, explored the experiences of parents who were self-medicating their children at home, in a qualitative research study. The findings of the study concluded that most of the parents who were living in rural areas, having financial issues or financial constraints, and struggling with employment, were experiencing self-medication. Further, the parents also affirmed that, due to a lack of trust in healthcare professionals, they were self-medicating their children at home [10]. Likewise, a study was conducted in the city of Yogyakarta, Indonesia, where the patterns and predictors of self-medication were evaluated in children and mothers having children under the age of five years. Findings of the study reported the overall prevalence of self-medication as 58.2%, while mothers who had secondary or higher secondary education were found to be more inclined towards self-medication. Among the studied participants, 35.3% were such mothers who had this level of academic qualification, and they were practising self-medication [11]. A similar significant factor, which was also reported from the study conducted in Pakistan, was affirmed by the findings of the study conducted in Indonesia as well, and that was the financial factor [12]. So, the consecutive evidence about the financial element of the families, the household income, has been reported to be a significant factor for self-medication in children [10,11]. The current study has highlighted the description of the Practice of self-medication in children by parents, the common medical conditions which are frequently treated at home, and the determinants of self-medication in children less than twelve years old.

Methods

This cross-sectional study was conducted in the pediatric and children's wards of the Khyber Teaching Hospital, Peshawar, over a duration of three months, from January 2025 to March 2025. The research protocol was approved by the institutional ethical review board, and formal permission was obtained from the in-charge of the respective hospital departments. Before data collection, informed consent was secured from the parents of all included children. The objectives of the study were explained to the parents via a participant information sheet provided in the national Urdu language; for those unable to read, the information was communicated verbally.

The study population consisted of children under five years of age who were admitted to the hospital within the previous 24 hours. The inclusion criteria comprised children under five years old whose parents reported any history of self-medication or home-administered medicines before hospital admission. Conversely, exclusion criteria included children whose parents did not provide consent, patients with chronic conditions requiring long-term specialist-prescribed medication, and children admitted for routine follow-ups or elective procedures rather than an acute illness episode.

A sample size of 392 participants was calculated using OpenEpi, based on a 95% confidence interval, a 5% margin of error, and a default population of one million. The study utilised a non-randomised, purposive, and convenience sampling technique to recruit participants meeting the established eligibility criteria.

Data were collected using printed questionnaires during parental interviews and were supplemented by patient file reviews when necessary. The instrument captured the demographic profile of the child and parents, including age, gender, education status, employment status, and monthly income. Practices of self-medication were assessed using 12 questions on a Likert scale coded from one to five, along with four open-ended questions regarding the child's major complaint and the specific type of medication administered at home. Additionally, the questionnaire documented the clinical symptoms that prompted parents to seek medical attention and hospital admission.

Data were entered into Microsoft Excel 2024 and analysed using the Statistical Package for the Social Sciences (SPSS), version 27. The normality of the data was tested using the Kolmogorov-Smirnov test. Descriptive statistics were expressed as mean and standard deviation for normally distributed scale variables, while median values with interquartile ranges were used for variables with non-normal distributions. Inferential statistics were utilised to calculate the risk of self-medication in relation to poor and fair attitudes toward these practices. All results were presented in tables and graphs, with the level of significance set at 0.05.

Results

Data was analysed from n=392 participants in the current study. **Table 1** presents a comprehensive overview of the socio-demographic characteristics of the 392 study participants and their relationship with the frequency of self-medication practices. As shown in **Table 1**, the largest segment of the study population comprised children aged 0–3 years, accounting for 233 (59.4%) of the total sample. Regarding gender distribution, the majority of the enrolled children were male, representing 280 (71.4%) of the participants.

Table 1: Sociodemographic characteristics of children, parents and the households

Variable	Total (n=392)	Low Practice (n=58)	Medium Practice (n=69)	High Practice (n=265)

Child Age (years)				
0–3	233 (59.4%)	35	41	157
4–6	94 (24.0%)	14	16	64
7–9	30 (7.7%)	04	06	20
10–12	35 (8.9%)	05	06	24
Child Gender				
Male	280 (71.4%)	41	50	189
Female	112 (28.6%)	17	19	76
Father Education				
Illiterate	212 (54%)	26	31	155
Primary	62 (16%)	09	09	44
Matriculation	43 (11%)	15	14	14
College Level	27 (7%)	05	11	11
Madrassa Graduates	48 (12%)	03	04	41
Mother Education				
Illiterate	280 (71%)	34	39	207
Primary	48 (12%)	07	09	32
Matriculation	32 (8%)	10	14	08
College Level	15 (4%)	03	05	07
Madrassa Graduates	17 (5%)	04	02	11
Father Employment				
Unemployed/Daily Wager	301 (76.8%)	38	45	218
Part/Full-time/Self	91 (23.2%)	20	24	47
Mother Employment				
Unemployed	331 (84.4%)	40	50	241
Employed/Daily Wager	61 (15.6%)	18	19	24
Household Income				
Lower (<35k PKR)	335 (85.5%)	42	52	241
Middle (36k-70k PKR)	55 (14.0%)	15	16	24
Higher (>71k PKR)	2 (0.5%)	1	1	0
Reported Symptoms				
Respiratory	223 (57.0%)	30	38	155
Gastrointestinal	106 (27.0%)	16	19	71
Infections	55 (14.0%)	8	9	38
No Known Diseases	8 (2.0%)	4	3	1
Immediate Consequences				
No Immediate Symptoms	361 (92.0%)	52	65	244
Vomiting	16 (4.0%)	3	2	11
Cough	12 (3.0%)	2	1	9
Abdominal Pain	3 (1.0%)	1	1	1

Table 1 provides a comprehensive overview of the socio-demographic characteristics of the 392 study participants and their relationship with the frequency of self-medication practices. As shown in **Table 1**, the largest segment of the study population comprised children aged 0–3 years, accounting for 233 (59.4%) of the total sample. Regarding gender distribution, the majority of the enrolled children were male, representing 280 (71.4%) of the participants.

The educational and occupational backgrounds of the parents suggest a clear link to health-seeking behaviours. **Table 1** indicates that 212 (54%) of fathers and 280 (71%) of mothers were identified as illiterate. Furthermore, 331 (84.4%) of mothers were currently unemployed, while 301 (76.8%) of fathers fell into the unemployed or daily wage categories. A high prevalence of self-medication was observed among households with a monthly income below 25,000 PKR, which included 335 (85.5%) of the total participants.

When analysing the clinical context, the data in **Table 1** illustrates that respiratory symptoms were the most common reason for seeking medical attention, affecting 223 (57.0%) of the children, followed by gastrointestinal symptoms in 106 (27.0%) cases. Encouragingly, the majority of parents reported that their children experienced no immediate adverse symptoms following the administration of self-medication, with 361 (92.0%) participants reporting no immediate consequences. Across all demographic variables, the high-practice category (n=265) consistently represented the majority of participants, underscoring a pervasive reliance on home-based treatments regardless of parent education, employment, or income status.

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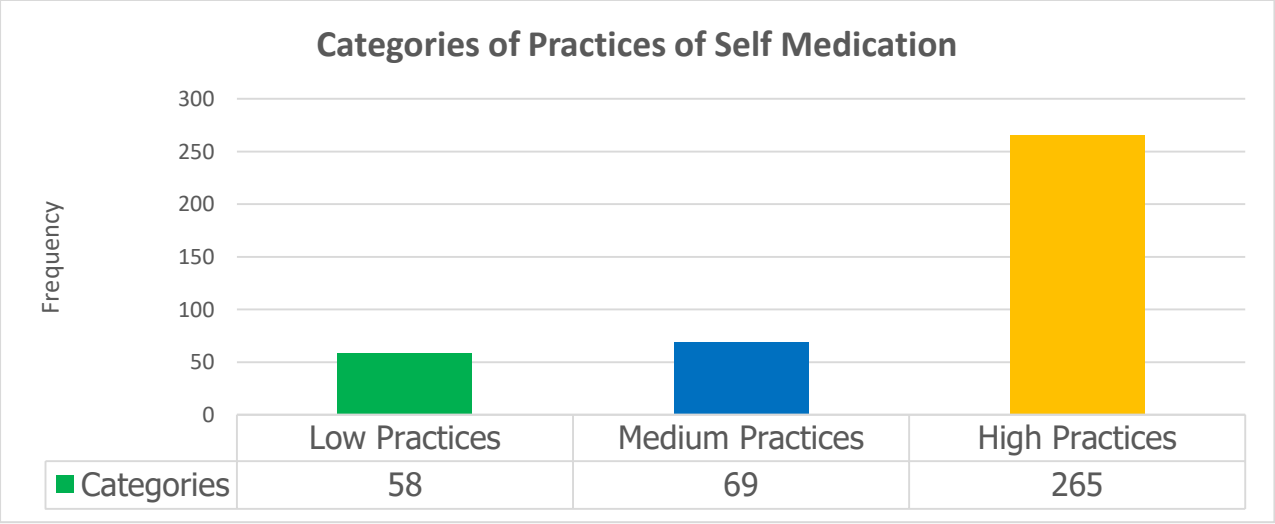

Figure 1: Categories of Practices of Self-Medication in Children

Practices of self-medication in children were reported on the Likert scale and were categorised as low self-medication practices, medium practices, and high practices of self-medication. The descriptive analysis concluded that 58 households reported low practices of self-medication,

comprising 14.79% of the studied sample. Meanwhile, 69 households, which was 17.60% of the studied sample, reported medium practices of self-medication. The majority of families, 67.60% of the studied sample, totalling 265 households, reported high practices of self-medication. The details have been illustrated in Figure 1.

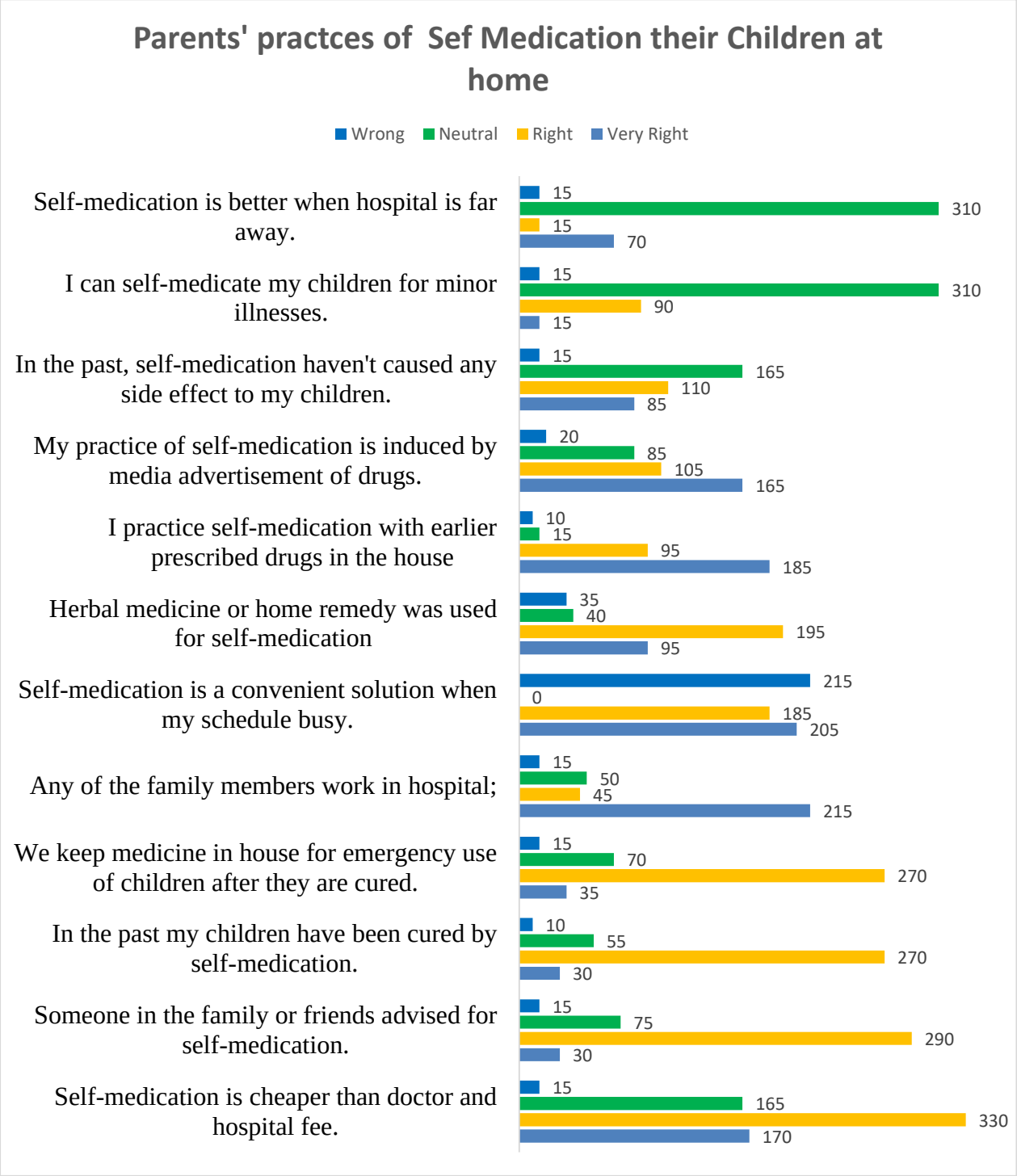

Figure 2: Parents' practices of self-Medication for their children at home

Figure 2 illustrates the diverse attitudes and justifications reported by parents regarding the practice of self-medicating their children. The data is categorised into four levels of agreement:

"Very Right," "Right," "Neutral," and "Wrong," across twelve specific behavioural and situational prompts. Economic and social factors emerge as significant drivers for these practices. The belief that self-medication is more cost-effective than professional medical fees received the highest frequency of "Right" responses, with over 325 parents supporting this view. Social influence is also prominent; approximately 290 respondents indicated it was "Right" to rely on the advice of friends or family members for self-medication. Experience and household habits further reinforce these behaviours. A substantial number of parents (around 270) viewed their previous success in curing their children through self-medication as a valid reason to continue the practice. This is reflected in the tendency to retain medication at home for future emergencies after a child has recovered, a practice deemed "Right" by roughly 270 participants. Additionally, the use of previously prescribed medications found in the home saw a high "Very Right" response from about 180 parents. The data shows a notable divide regarding convenience and professional proximity. While approximately 200 parents felt self-medication was a "Very Right" solution for busy schedules**,** an almost equal number (roughly 210) categorised this specific justification as "Wrong". Interestingly, the statement regarding hospital distance suggesting self-medication is better when professional care is far away elicited the highest "Neutral" response, exceeding 300 participants. Finally, the influence of healthcare proximity is evident. In households where family members work in a hospital, there was a strong "Very Right" leaning (over 200 responses), suggesting that a perceived level of medical literacy within the family may increase the confidence to self-medicate. Conversely, media advertisements had a more moderate impact, with about 160 parents viewing them as a "Very Right" inducement for the practice.

Table 2: Univariate analysis of participants' characteristics and Risk of self-medication practices

Variable	Low/Medium Practice (n=127)	High Practice (n=265)	P-value
Child Age (Mean±SD)	4.2±1.3	3.2 ±0.9	0.042*
Child Gender (Male)	91	189	0.650
Father Education (Illiterate)	31	185	<0.001*
Mother Education (Illiterate)	55	148	0.012*
Father Employment (Unemployed/Daily Wager)	83	218	0.025*
Mother Employment (Unemployed)	90	241	0.150
Household Income (<35k PKR)	94	241	0.005*

Table 2 provides the univariate analysis of potential determinants of self-medication practices, using the identified threshold of 67.6% (n=265) as the high-practice group. As indicated in **Table 2**, child age showed a statistically significant association with the frequency of self-medication ($p = 0.042$). Socio-economic indicators, including father's education ($p < 0.001$), mother's education ($p = 0.012$), father's employment status ($p = 0.025$), and household income ($p = 0.005$), were all significantly associated with high-frequency self-medication practices. Conversely, Table 2

demonstrates that child gender and mother's employment status did not show a statistically significant relationship with the frequency of these practices ($p > 0.05$).

Table 3: Bivariate Analysis of the significant factors from the univariate analysis table

Variable	Odds Ratio (OR)	95% CI	P-value
Father Education (Illiterate)	2.45	1.82–3.30	< 0.001*
Mother Education (Illiterate)	1.90	1.35–2.68	0.002*
Father Employment (Unemployed/Daily Wager)	1.55	1.10–2.20	0.030*
Household Income (<35k PKR)	2.10	1.50–2.95	0.001*

Table 3 displays the results of the bivariate analysis, utilising odds ratios to quantify the strength of the association between socio-economic factors and high-frequency self-medication. As shown in Table 3, fathers with no formal education were 2.45 times more likely to engage in high-frequency self-medication compared to those with higher education (OR = 2.45; 95% CI: 1.82–3.30; $p < 0.001$). Similarly, Table 3 indicates that lower household income (below 25,000 PKR) significantly increased the odds of high-frequency practices (OR = 2.10; 95% CI: 1.50–2.95; $p = 0.001$). Maternal illiteracy also significantly increased the likelihood of these practices (OR = 1.90; 95% CI: 1.35–2.68; $p = 0.002$), as did paternal unemployment.

Discussion

The study was conducted in the paediatric and children's wards of the Hayatabad Teaching Hospital, Peshawar. The study aimed to find out the description of the practices of self-medication carried out for children at home by parents and caregivers. The study included 392 children under the age of 12 years and their mother, father, or immediate caregiver. In the study, 59.4% of children were under the age of three years. It was followed by 24% of children in the age group of four to six years. Thus, 83% of the studied children were under the age of six years, and the remaining 16.4% were in the age group of seven to 12 years. In the study, 71.4% were male and 28.6% were female.

Referring to the parents' education status, 54% of fathers and 71% of mothers had not attended formal schooling; they were termed as illiterate in the current study. It was followed by 16% of fathers and 12% of mothers with primary level of education, 11% of fathers and 8% of mothers with matriculation level of education, 7% of fathers and 4% of mothers with college level of education, and 12% of fathers and 5% of mothers with graduation from a religious institute or Madrasa.

Among the employment status, 76.8% of fathers reported to be unemployed or working as daily wagers, while 23.2% of fathers had formal employment in terms of part-time, full-time, or self-employment opportunities. Referring to the mothers' employment status, 84.4% of mothers reported being unemployed, while 15.6% were working mothers.

Among the household income, 85.5% of households reported having an income level lower than 35,000 PKR per month, followed by 14% of households in the middle-income category reporting income levels between 36,000 and 70,000 PKR per month, while 0.5%, which was only two

households, had a monthly household income of more than 71,000 PKR. Thus, the study concludes that the participants were mostly from the middle-income or lower-middle-income categories.

The parents reported the symptoms which stimulated them to practice self-medication at home: respiratory symptoms in 57% of children, gastrointestinal symptoms in 27% of children, and infections in 14% of children. Furthermore, 92% of children presented to the hospital with no immediate symptoms, 4% of children presented with a history of vomiting, 3% with a history of cough, and 1% of children; only three participants reported abdominal pain at the time of presentation to the hospital.

In univariate and bivariate analysis, the trichotomous variable of the practices of self-medication was transformed into a dichotomous variable by combining the low and medium practices as a single category and comparing it with the high practices of self-medication as a comparative variable. Thus, the low and medium practices had a cumulative frequency of 127 households, while the high practices had a frequency of 265 households. The mean age of the child in the low and medium practices category was 4.2 years with a standard deviation of 1.3 years, while in the high practices group, the mean age was 3.2 years with a standard deviation of 0.90 years. A significant difference was reported in the chi-square test between the low/medium practices and the high practices, with a P-value of 0.042. The gender of the child showed no significant difference, with a P-value of 0.650. Regarding father's education, the illiterate category showed higher significance when compared with other categories using one-way ANOVA, with a level of significance of less than <0.001. Similarly, for mothers' education, the illiterate level reported higher significance using one-way ANOVA when compared with other education categories, with a P-value of 0.012. In terms of employment, father's employment reported a significant difference ($P = 0.025$), while mother's unemployment did not have a significant association ($P = 0.150$). Households with a monthly income of less than 35,000 PKR reported a significant association with the mean difference in self-medication practice scores, with a level of significance of $P = 0.005$.

Based on the significant results of the univariate analysis, a bivariate analysis was performed, which reported that fathers with no formal education (illiterate) had a 2.45 times higher risk of practising self-medication for children at home, with an OR of 2.45 (95% CI: 1.82–3.53; $P < 0.001$). Similarly, mothers' illiteracy was associated with a higher risk of self-medication practices at home for children, with an OR of 1.90 (95% CI: 1.35–2.68; $P = 0.002$). Fathers who were unemployed or working as daily wagers, which also fell into the lower-income category, had higher odds of practising self-medication at home, with an OR of 1.55 (95% CI: 1.10–2.20; $P = 0.030$). Finally, a household income of less than 35,000 PKR showed a two-fold higher risk of self-medication practices at home, with an OR of 2.10 (95% CI: 1.50–2.95; $P = 0.001$).

Practices of self-medication have been found to be 67% in the current study, which can be affirmed by the findings of a systematic review of relevant studies conducted in Pakistan, which reported the pooled prevalence of 64% in the Pakistani population [9]. A cross-sectional study conducted among female university students in Islamabad, Pakistan, reported that the prevalence of self-medication among the studied participants ranged from 32.2% to 55.6%. The most common conditions for which self-medication was performed were headache, flu, cough, and symptoms related to fever [13,14]. A study conducted in Mexico reported that the prevalence of self-medication by parents for their children was 49.6%. The significant factors reported were the age of the child, having two or more children, chronic illnesses in the children, medium educational level, unemployment or employment-related issues, and the socioeconomic level of the households. The current findings are relevant to the findings of our study, reporting that low education level and employment issues were significantly associated with self-medication in

children [15]. In our social and cultural circles, the socioeconomic status of the household and the household income can be attributed to the father's income or educational status. Although findings of a study reported that the education level of mothers and unemployment have also been associated with self-medication in children. This finding can be affirmed by a study conducted in Egypt, which reported that 42% of mothers demonstrated satisfactory antimicrobial self-medication practices, while their educational level, living in a rural area, larger family size, and low income were associated with antimicrobial self-medication practices [16]. Larger family size has been affirmed as a significant factor in the findings of the study conducted in Egypt, just as a study conducted in Mexico reported that having more than two children is significantly associated with self-medication practices [15]. Although family size was not included in the findings of the current study.

A study conducted in the southern areas of Punjab, Pakistan, reported the prevalence of self-medication as 95.5% among 391 studied parents. According to the findings, the most common medications used for self-medication at home included antipyretics in 86.7% of participants, antiemetics in 54.2%, painkillers in 55.1%, and the irrational use of antibiotics at home was reported in 52% of households. The most common conditions for which self-medication was used included fever (95.5%), cough symptoms (89.5%), diarrheal symptoms and vomiting (69.2%), and 57.3% cases of flu symptoms [17]. Thus, likewise, the study conducted in Mexico [15] and another study conducted in Egypt [16], the current study also reported the number of children ($P = 0.021$) as a significant factor of self-medication in children. Furthermore, the level of education ($P = 0.001$) and profession ($P = 0.001$) were also significant factors of self-medication [17], which aligns with the findings of our study.

The current study was helpful in identifying the description and prevalence of self-medication in the rural areas of Peshawar. It reported important factors, including low levels of education and financial constraints, such as unemployment or insufficient employment opportunities, which lead to socioeconomic difficulties and, consequently, practices of self-medication at home. These are perceived as convenient and cost-effective by parents, as they avoid hospital and doctor consultation charges.

Limitations of the current study include its cross-sectional, single-centre design, and the findings cannot be generalised to the wider population, as socioeconomic constraints and financial difficulties are not uniform across the whole province. Thus, further research studies should be conducted in varied populations and different areas to better estimate the true prevalence and description of self-medication.

Conclusion

This study highlights a high prevalence of self-medication practices among parents in rural Peshawar, primarily driven by socioeconomic constraints and low levels of education. Our findings demonstrate that financial limitations and unemployment lead caregivers to rely on self-medication as a perceived cost-effective and convenient alternative to professional medical consultation. Specifically, parental illiteracy and low monthly household incomes emerged as significant predictors for higher frequencies of self-medication. While this research provides essential baseline data, the single-canter, cross-sectional design limits broader generalizability. We conclude that addressing this issue requires targeted public health interventions that improve health literacy and mitigate the financial barriers currently forcing parents to bypass formal healthcare systems. Future multi-centre studies are recommended to further validate these trends across diverse populations and inform effective policy-making.

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