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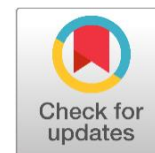
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Research Article:

## COVID-19 and Hand Hygiene: Has the Pandemic Heightened Mothers' Awareness in Quetta City, Pakistan?

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### Abstract

**Background:** Supported by evidence-based literature, hand hygiene (HH) is one of the cost-effective and simple preventive measures against COVID-19. The phenomenon is least reported in the developing world. **Method:** We therefore were interested in assessing whether the COVID-19 had influenced knowledge and practice of HH and to highlight the determinants of HH among mothers of children under five years of age. This was a questionnaire-based, cross-sectional predictive analysis. Four hundred and seventeen mothers of children under five years of age visiting a public healthcare institute were targeted for data collection by using a pre-validated, structured questionnaire. Data were coded and analyzed by Statistical Package for Social Science (SPSS) version 26. Followed by the descriptive analysis, the binary logistic regression was used to find the predictors of knowledge, attitude, and practices toward HH. Although adequate insight into HH was reported, certain areas of misconceptions were also observed. **Results:** Educational level was significantly associated with knowledge, attitude, and practice items and the Jonckheere-Terpstra test revealed a moderate positive trend ( $\tau = 0.3 - 0.5$ ) toward higher education. The binary logistic regression model had eight independent variables and all predictors were statistically significant ( $\chi^2 = 18.5$ ,  $p < 0.001$ ,  $DF = 4$ ). The strongest predictor of knowledge, attitude, and practice was education with significant OR of 2.5, 1.6, and 1.5, respectively. The study managed to highlight good HH among mothers, however; certain limitations were observed. Such limitations are related to a lack of health literacy that needs to be addressed as early as possible. Adequate HH ensures exceptional preventive measures against COVID-19 that provides a surety of an ailment-free environment. **Conclusion:** We urge the healthcare professionals and policymakers to target improving health literacy of the masses and to disseminate HH-related information that will help in management of infectious diseases such as COVID-19.

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## 1. Introduction

According to the World Health Organization (WHO), five million children of age  $\leq 5$  die every year because of essentially avoidable reasons (1). Even though evidence-based medications and preventive measures are accessible,

years of use, misuse and overuse of medicines and preventive measures have led to the emergence of drug-resistance and therapeutic failure (2, 3). Additionally, the associated host and environmental factors also result in poor response to the drug therapy (4, 5). Finally, the cost associated with therapeutic failure is another important variable that creates inconvenience for the healthcare systems and societies around the globe while managing diseases in children especially those aged less than five years (6, 7).

However, the WHO also reports that such unwarranted deaths are avoidable through simple preventative measures such as hand hygiene (HH) and appropriate sanitation (8). Within this context, the relationship between HH and a reduction of infectious illnesses is well documented in the

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literature (9-11). Martinez et al in their school-based study confirmed that promoting HH among children resulted in a 36% decrease in school absenteeism predicting 0.13 episodes/child/academic year (12). Similarly, The Nyando Integrated Child Health and Education offered a specialized niche intervention to the students in Kenya. Teachers promoted health in classrooms, handwashing stations were installed, drinking water was made available and the students were asked to actively take part in the program. Significant reductions in acute respiratory cases were reported and there was an improvement in hygiene-related knowledge among the students (13). In addition to the soaps and hand-drying material, Talat et al provided school-specific events managed by healthcare professionals (nurses). The results were encouraging as a reduction of 40% in influenza, 30% in diarrhea, and 67% in conjunctivitis cases was reported (14). Concluding, employing simple preventive measures such as HH helps in reducing disease frequency among children and must be employed as a primary measure by healthcare professionals and representatives of civil societies and local government while dealing with communicable diseases at the communal level. Nevertheless, Willmott and colleagues in their meta-analysis concluded that much of the hygiene-related research is focused on children's behavior and attitude towards HH, and their parents or caregivers are given the least attention (15). This seems to be reasonably true as through extensive literature review limited information was extracted especially from a developing country like Pakistan. The scarcity of literature was an important reason for the researchers to conduct the present study.

Hand hygiene received exceptional attention during the COVID-19. Based on the international recommendations, HH became a key component of COVID prevention strategies around the globe (16). Despite efforts to promote HH, it was seen that the rates of access to HH facilities still are stubbornly low, especially in the developing world. Like other developing countries, Pakistan too was faced with various hygiene-related issues. The International Monetary Fund ranked Pakistan amongst the top three when it comes to access to safe water (17). Among diseases, 80% of the diseases are waterborne in Pakistan and unsafe water and poor sanitation are linked to unnecessary medical expenditure that is estimated at 500 million US dollars (17). Even though the United Nations Children's Fund (UNICEF) mentioned considerable development in terms of hygiene in Pakistan,  $\leq 25$  million people still exercise open defecation. Stunted growth because of poor hygiene affects nearly 38% of the children in Pakistan (18). In addition to the COVID-19, the country is faced with an increased frequency of waterborne diseases such as hepatitis, typhoid, cholera, and malaria that are linked to unhygienic practices in Pakistan (19).

In line with what is reported, parents' knowledge and practices of HH are of essential importance (20). Nevertheless, when it comes to critical care, child fostering, and capacity development, mothers have the most important role to play (21). A well-versed and educated mother has a positive impact on a child health and education (22-24). Mothers' knowledge and education become remarkably important when childcare of neonates, infants, and toddlers is taken into consideration (25). Thus, it is theorized that mothers with an adequate understanding of hygiene and especially HH are capable of satisfactory childcare and their children are least susceptible to hand-based transmitted diseases such as the COVID-19. Correlating, our experience with pediatrics and their mothers working in a public

healthcare institute has revealed significant gaps about child health issues in the mothers' knowledge of HH. For that reason, the current study was designed that aimed to assess HH-related knowledge and the predictors of hand hygiene mothers of children under five years of age in Quetta city, Pakistan. Furthermore, we were also interested in finding whether the COVID-19 has heightened mother's knowledge and practices of HH.

## 2. Study design and settings

This was a questionnaire-based, predictive analysis. The current study was conducted at Sandeman Provincial Hospital Quetta (SPHQ). Located in the center of Quetta city, the SPHQ is the oldest healthcare public institute that provides major healthcare facilities at a minimal cost (26). As the study focused on mothers of children under five years of age, the pediatric ward was targeted. The pediatric ward is specialized in nature and provides a range of services (from general care to ventilator services). The daily average turnover of patients visiting the pediatric ward is approximately one hundred. Therefore, targeting mothers for data collection was easier as compared to other hospitals of the city.

### 2.1 Study population and sampling criteria

Because of the unavailability of the precise study population, the Daniels' sampling formula with 50% proportional measurement was used. The sample calculated for the study is as under:

$$n = Z^2 \times p(1-p) / d^2$$

Where n = desired sample, Z = confidence interval, p = proportional measurement and d = margin of error

$$n = 1.96^2 \times 0.50(1 - 0.50) / 0.05^2$$

$$n = 0.9604 / 0.0025$$

$$n = 384$$

To avoid a loss to follow-up, 10% of drop-out was added to the calculated sample size. Four hundred and twenty-two mothers were conveniently approached by the research teams for data collection.

### 2.2 Inclusion and exclusion criteria

Mothers of children aged < 5 years attending pediatric department of SPHQ were targeted. Respondents familiar with Urdu (the national language of Pakistan) and providing verbal consent of participation were approached for data collection. Women not willing to take part, having issues communicating in the Urdu language, having mental disorders, and immigrants were excluded by the research team.

### 2.3 Study tool

In addition to the demographic variables, a questionnaire focusing on knowledge, attitude, and practice towards HH was constructed by the research team through extensive literature review and experience sharing (27-30). The questionnaire included three sections. Ten questions were related to knowledge towards HH, eight questions focused on attitude towards HH, and six questions were designed to highlight practices of HH.

**Table 1:** Demographic characteristics of study respondents**2.4 Face and content validity of the study tool**

The questionnaire was developed in English language and later translated into the Urdu language by standard translation protocols (31-33). Three independent and blind translators were hired by the research team for the translation of English into Urdu. The translated versions were later back translated from Urdu to English by another three independent and blind translators. The translated versions were presented in a formal meeting of the research team and were presented for cross-comparison and mutual consensus. After minor modifications, the questionnaire was rated valid to be used in the study.

The translated version was later subjected to reliability analysis in a pilot study. Thirty mothers attending the pediatric ward of SPHQ were approached. In addition to the questionnaire' adaptability and comprehensiveness, the respondents were given the freedom to express their views and statements about the questionnaire. Little modifications were seen, and the finalized version was again presented to the respondents for their final approval. Parallel, the questionnaire was also subjected to reliability analysis and was rated as acceptable with  $\alpha = 0.90$ . Once the reliability and validity of the developed tool were ensured it was made available for the main study. Data from the pilot phase was disposed of and not included in the finalized assessment.

**2.5 Data coding and analysis**

The data were rechecked, coded, and added to SPSS v 26.0. Based on the number of observations, the Kolmogorov-Smirnov test was used for normality assessment and non-parametric tests were used accordingly. Demographics and HH-related questions were initially classified through frequencies and percentages. Knowledge, attitude, and practices were extracted through means and standard deviations. The Mann-Whitney U test and the Jonckheere-Terpstra test were applied for the assessment of significant relationships (where applicable). The binary logistic regression analysis was used to find predictors of HH among respondents of the current study.

**2.6 Ethical approval**

The Institutional Review Board of Faculty of Pharmacy & Health Sciences, University of Bulochistan approved the study protocol (FoP&HS/IRB/25/23). Permission to conduct the study was also taken from the Medical Superintendent of Sandeman Provincial Hospital, Quetta. Verbal consent was obtained from the respondents. Before data collection, the respondents were informed about the research initiatives, the confidentiality of their responses, and their right to withdraw from the study.

**3. Results**

The demographic characteristics of the study respondents are presented in **Table 1**. Four hundred and seventeen women took part in the study with a response rate of 98.8%. The cohort was dominated by the age group of 28-37 years (183, 43.9%). Most of the respondents were married (328, 77.9%) and one hundred and fifty-four (36.9%) had matric (secondary school certification) levels of education. Almost 85% were stay-at-home parents with 57.1% having rural residencies.

Characteristics	Frequency	Percentage
<b>Age group (years)</b>		
18-27	176	42.2
28-37	183	43.9
>37	58	13.9
<b>Education</b>		
Religious education	120	28.7
Matric	154	36.9
Intermediate	90	21.5
Bachelors	53	12.7
<b>Marital status</b>		
Married	328	77.9
Divorced	64	15.3
Widow	25	5.99
<b>Family type</b>		
Nuclear	35	8.4
Joint	382	91.6
<b>Occupation</b>		
Housewife	352	84.4
Public employee	35	8.3
Private employee	30	7.1
<b>Income*</b>		
None	352	84.4
< 20,000	41	9.8
> 20,00	24	6.4
<b>Number of children</b>		
1-3	251	60.2
4-6	130	31.2
>6	36	8.6
<b>Locality</b>		
Urban	179	42.9
Rural	238	57.1

**3.1 Assessment of knowledge of hand hygiene**

The knowledge of HH among the study respondents is presented in **Table 2**. The responses were offered in a dichotomous (Yes / No) format. Ten items were presented, and 1 mark was given to every correct answer while zero was given to the wrong answer. The responses were later categorized as "good and poor knowledge" of HH.

Most of the respondents (86.3%) were aware of the term HH and 66.9% knew about the time needed for hand washing. Sixty-five percent often washed their hands with soap or other material but 70% had no idea that ash, mud, or sand can be used for HH. Almost half of the respondents perceived their hands as clean when there was no visible dirt available. Approximately 20% denied that bacteria, diarrhea, and infectious diseases cannot transfer from hands to nose and mouth as shown in **Table 2**.

**Table 2:** Knowledge of hand hygiene

Knowledge of hand hygiene questions	Yes		No	
	N	%	N	%
Have you ever heard about hand washing?	360	86.3	57	13.7
Do you know how much time is required for hand washing?	279	66.9	138	33.1
Do you wash your hands frequently with soap or other detergents at the appropriate time?	271	65.0	146	35.0
Do you know if ash, mud, or/and sand can replace soap if not available?	125	30.0	292	70.0
Do you think your hands as clean when there is no visible dirt?	224	53.7	193	46.3
Bacteria can spread from the hands to the nose and mouth?	352	84.4	65	16.6
Unwashed hands can cause diarrhea and related disease.	340	81.5	77	18.6
Proper hand washing can prevent infectious diseases?	342	82.0	75	18.0
Washing hands with both water and soap is helpful.	360	86.3	57	13.7
It is enough to wash hands with water alone?	320	76.7	97	23.3

Note: Knowledge was assessed by giving 1 to the correct answer and 0 to the wrong answer. The scale measured knowledge from a maximum of 10 to a minimum of 0. Scores < 7 were taken as poor and 7-10 as good knowledge of hand hygiene. The mean knowledge score was  $7.54 \pm 0.218$  showing good knowledge of hand hygiene

### 3.2 Attitude toward hand hygiene

Eight questions were asked about the attitude towards HH. Attitude was divided into positive and negative by giving 1 mark to the positive one. The attitude score ranged from a maximum of eight to a minimum of zero. Overall, a positive attitude was reported among the respondents. Nearly 90% of the women agreed of washing hands with soap after the

toilet and agreed that hand washing is necessary before and after having meals. Hand hygiene was taken as a habit in personal routine by 80% of the respondents. On the contrary, a negative attitude was reported for two questions. The respondents that they do not have enough knowledge about HH (62%) and 36% claimed that it is difficult to perform HH in emergencies. The detailed responses are presented in **Table 3**.

**Table 3:** Attitude toward hand hygiene

Questions	Yes		No	
	N	%	N	%
Do we need to wash our hands with soap after going to the toilet?	392	94.0	25	6.0
Do we need to wash our hands both before and after eating meals?	392	94.0	25	6.0
I must keep my nails short and clean for good hand hygiene.	385	92.3	32	7.7
Hand towels should not be shared.	129	30.9	288	69.1
I must teach my children how to wash their hands properly.	276	66.2	141	33.8
Do I have enough knowledge about hand hygiene?	158	37.9	259	62.1
Emergencies and other priorities make hand hygiene more difficult at times?	150	36.0	267	64.0
Hand hygiene is assumed as a habit in my personal life.	341	81.7	76	18.3

Note: Attitude was assessed by giving 1 to the correct answer and 0 to the wrong answer. The scale measured attitude from a maximum of 8 to a minimum of 0. Scores < 6 were taken as negative and 6-8 as a positive attitude towards hand hygiene. The mean attitude score was  $6.1 \pm 0.35$  showing a positive attitude toward hand hygiene.

### 3.3 Practice of hand hygiene among study respondents

There were six practice questions that were asked. The score was categorized as good and poor practices. Most of the respondents (90%) washed their hands after a toilet, reminded their children to wash their hands too, and always

washed their hands after handling raw materials like vegetables and fruits. However, nearly 40% did not wash their hands after interacting with a sick person and 36% did not wipe their hands until they were dry as shown in **Table 4**.

**Table 4:** Practice of hand hygiene

Questions	Yes		No	
	N	%	N	%
I wash my hands with soap after going to the toilet.	381	91.4	36	8.6
I always remind the children to wash their hands before and after eating a meal.	338	81.1	79	18.9
I wash my hands after interacting with children/ sick people.	252	60.4	165	39.6
I always wash my hands before and after handling raw materials such as vegetables/fruits et.	370	88.7	47	11.3
I wipe my hands until dry.	266	63.8	151	36.2
Washing hands with soap is routine practice.	305	73.1	112	26.9

Note: Practice was assessed by giving 1 to the correct answer and 0 to the wrong answer. The scale measured practice from a maximum of 6 to a minimum of 0. Scores < 4 were taken as poor and 4-6 as good practice of hand hygiene. The mean practice score was  $4.2 \pm 0.54$  showing good practice of hand hygiene

### 3.4 Association between the demographic variables and knowledge of hand hygiene

The Mann-Whitney U and Jonckheere-Terpstra tests were used to find the relationship between the demographic

variables and knowledge of HH. The significant values were set at  $p < 0.05$ . Educational level was significantly associated with most questions and test interpretation revealed a moderate positive trend ( $\tau = 0.32 - 0.41$ ) towards higher education for all statements for the research questionnaire.

**Table 5:** Association between the demographic variables and knowledge of hand hygiene

Items in questionnaire	P-value							
	Age**	Education**	Marital Status**	Family type*	Occupation**	Income**	Children**	Locality*
1.	0.056	0.344	0.214	0.052	0.855	0.445	0.214	0.265
2.	0.255	0.129	0.114	0.333	0.557	0.100	0.335	0.960
3.	0.684	0.001	0.359	0.643	0.295	0.210	0.984	0.200
4.	0.144	0.001	0.007	0.084	0.447	0.288	0.359	0.012
5.	0.214	0.004	0.255	0.777	0.500	0.541	0.221	0.001
6.	0.356	0.002	0.350	0.266	0.658	0.663	0.097	0.001
7.	0.228	0.003	0.227	0.622	0.147	0.988	0.235	0.012
8.	0.088	0.001	0.368	0.200	0.288	0.247	0.188	0.009
9.	0.980	0.091	0.078	0.912	0.088	0.248	0.257	0.553
10.	0.229	0.861	0.100	0.634	0.901	0.118	0.361	0.137

\*Mann-Whitney U test, \*\* Jonckheere-Terpstra test

### 3.5 Association between the demographic variables and attitude of hand hygiene

Items 4, 6, and 7 of the questionnaire (attitude section) were significantly associated with educational status

( $p < 0.05$ ). The trend interpretation again showed that respondents with higher education status did agree more with the statements when compared with their counterparts ( $\tau = 0.3 - 0.48$ ). No significant association was reported for other variables.

**Table 6:** Association between the demographic variables and attitude of hand hygiene

Items in questionnaire	P-value							
	Age**	Education**	Marital Status**	Family type*	Occupation**	Income**	Children**	Locality*
1.	0.110	0.215	0.228	0.942	0.540	0.147	0.322	0.174
2.	0.148	0.514	0.656	0.158	0.418	0.451	0.102	0.076
3.	0.220	0.288	0.412	0.125	0.105	0.185	0.400	0.226
4.	0.259	0.004	0.211	0.947	0.477	0.200	0.457	0.894
5.	0.341	0.225	0.100	0.494	0.682	0.327	0.229	0.913
6.	0.330	0.001	0.090	0.924	0.219	0.800	0.080	0.517
7.	0.339	0.020	0.332	0.880	0.733	0.087	0.155	0.623
8.	0.541	0.884	0.417	0.529	0.085	0.227	0.367	0.059

\*Mann-Whitney U test, \*\* Jonckheere-Terpstra test

### 3.6 Association between the demographic variables and practices toward hand hygiene

As reported earlier, educational status was again significantly associated with three items of the

questionnaire. The trend interpretation again showed that respondents with higher education status did agree more with the statements when compared with their counterparts ( $\tau = 0.35 - 0.44$ ). No significant association was reported for other variables.



**Table 7:** Association between the demographic variables and practices toward hand hygiene

Items in questionnaire	P-value							
	Age**	Education**	Marital Status**	Family type*	Occupation**	Income**	Children**	Locality*
1.	0.214	0.244	0.300	0.989	0.144	0.211	0.244	0.214
2.	0.141	0.001	0.250	0.236	0.106	0.580	0.550	0.451
3.	0.228	0.023	0.411	0.505	0.241	0.577	0.211	0.661
4.	0.300	0.004	0.247	0.100	0.288	0.299	0.354	0.713
5.	0.157	0.258	0.559	0.326	0.318	0.477	0.388	0.513
6.	0.133	0.227	0.088	0.524	0.299	0.100	0.177	0.515

\*Mann-Whitney U test, \*\* Jonckheere-Terpstra test

### 3.7 Predictive analysis

Binary logistic regression was used to find the predictors of knowledge, attitude, and practices toward HH. The model had eight independent variables and all predictors were statistically significant ( $\chi^2 = 18.5$ ,  $p < 0.001$ ,  $DF = 4$ ) indicating that the model was able to distinguish between respondents who had good knowledge, attitude, and practices (and vice versa).

predictor of knowledge, attitude, and practice was education with significant OR of 2.5, 1.6, and 1.5, respectively.

### 4. Discussion

The importance of HH is well-established and documented in the literature (34-37). The role of HH in limiting infections and prevention and control is also justified (38, 39). Although HH is of imperative importance, the role played by HH in limiting infections among children is of utmost significance. As newborns, infants and children are dependent on their mothers, it is important that mothers must have good knowledge of HH and carry a positive attitude and practice towards HH. As HH is linked with reduced infection control (40, 41), it can shape as an essential preventive measure in resource-deprived areas and areas with constrained financial sources while combating infectious diseases.

UNICEF initiated the "Hand Hygiene for All" program that was aimed at sustainable and universal HH (42). Special attention was given to the Balochistan province because of poor infrastructure and limited availability of resources compared to the other provinces of Pakistan (43-45). In addition to the introduction to the WASH program, the availability, and accessibility of HH facilities and services were ensured. However, the breakthrough of the program was a dedicated focus on sustainably changed behavior and positively reinforced social norms regarding HH (46). The program focused on mass educational policies regarding HH in healthcare institutes, schools, and communities and we believe that the information dispersed was helpful in creating awareness of HH and developing positive attitudes and practices.

Ministry of Health and UNDP Innovation - AccLab Pakistan came up with the novel idea of replacing regular mobile

ringtones with a health message focusing on social distancing and HH (47). According to Gallup Pakistan's Coronavirus Tracker Wave 3 - 5, the health message was able to create a positive impact on COVID-related knowledge, perception, and behaviors in the population of Pakistan to a much-valued extent (47). Parallel, Muslim Aid Pakistan also launched the '#WashHandsBeatCorona' through which accurate emphasis was given on personal and HH during COVID-19 (48). Equivalent to what is reported, local Non-Governmental Organizations, healthcare authorities, civil societies, and religious groups have played a key role in publicizing preventive measures against COVID-19 in Pakistan and that resulted in better knowledge of HH which is evident from the results of the current study (49).

Shifting our concerns to the knowledge of HH, although a good understanding of HH among respondents was reported, certain areas of improvement were also highlighted. The applicable time needed for hand washing, the material used for hand washing other than soap, and transmission of diseases were the areas that needed improvement in terms of understanding. In terms of association, the Jonckheere test reported a significant, moderate positive trend from low educational level to higher educational level ( $\tau = 0.345 - 0.505$ ) for the items related to education. The regression analysis also found education as a predictor of good knowledge ( $p = 0.010$ ,  $OR = 2.500$ ) interpreting 2.5 times increase of HH-related knowledge if education is improved to times one. As a matter of fact, the relationship between education and disease or condition-related knowledge is well explained in the literature. Almost all of the current study reports reported positive correlations between maternal education and HH practices (50). Maternal knowledge of HH was one factor that significantly related to diarrhea among mothers of children under five years of age with AOR of 0.49 (51). Ilyas et al also attributed a lack of knowledge to infrequent HH practices among their study respondents (52). College-attending mothers were again reported to have better HH knowledge with AOR of 4.93 by Wolde and colleagues from Ethiopia (53). Another study from Gujrat, Pakistan revealed mothers' knowledge, attitude, and practices regarding HH having a significant impact on child health (54). Consequently, a better educational status does guarantee a better approach to healthcare and methods of prevention and care and that is clear from the published literature.

current study findings were compared with the reported literature. Higher education was related to a better attitude and practice toward HH in a study reported from Osogbo,

Osun State, Nigeria (55). Sah and colleagues also reported that (knowledge and practice) among mothers were influenced by their education level (56). One more study from Northwest Ethiopia identified mothers attaining college and above (AOR = 4.93) as one predictive factor of good attitude and practice towards HH (53). On the contrary, Divya et al reported poor practice regarding HH that was independent of association with other factors (57). Similarly, although Rajalakshmi and associates described good knowledge of HH among mothers, neutral attitude, and practice towards HH were identified that needed immediate promotion at the communal level (58). So, the possible explanation for these conflicting results is discussed consequently.

broader context, basic education and health literacy are two different phenomena and it is not wise to hypothesize that higher educational levels can generate good health literacy. Higher educational levels may complement attaining health literacy and people attending college degrees can obtain more health benefits from higher education, uncertainty remains about the impact of education on health (60). Our suggestions are supported by Castro and Musgrove who discussed education as cumulative within a particular discipline that improves the state of obliviousness. Health literacy on the other hand maintains or reinstates health that is not cumulative as the problem can occur again and again (59). The authors also defined differences between school-based education and health literacy as intrinsic and independent of the choice made by society while choosing education over medical care (59). Therefore, based on the above discussion we conclude that while getting an education is primal, policymakers and healthcare professionals must engage in improving and promoting health literacy that will supply medical-related information to the individual and the society in adopting preventive and manageable measures against disease-related treatment and management.

## 5. Conclusion

The current study was aimed at assessing the HH-based knowledge, attitude, and practices among mothers of children under five years of age especially after the COVID-19. The study managed to highlight good HH among mothers, however; certain areas of improvement were also found. Such limitations are related to a lack of health literacy that needs to be addressed as early as possible. We must bear in mind that children <5 years of age are extremely vulnerable to diseases, particularly infectious diseases. As the frequency of infectious diseases is high in this cohort, adequate HH ensures preventive measures against the disease that provides a surety of a disease-free environment and a productive member of society in the future.

## 6. Recommendations

Promotion and dissemination of health education are lacking in the healthcare system of Pakistan. Therefore, it is recommended that mass population-based educational programs must be offered to the public, preferably in the local languages focused on the local preventable issues and patterns. Secondly, policymakers and healthcare professionals must ensure continuous medical education to the parents or caregivers regarding HH-related education, techniques, and methods. In resource-deprived areas, the availability of HH-related material is to be ensured and the

civil societies or the local NGOs engaged in sanitary, and hygiene must be supported by the government to provide basic HH-related facilities.

## Limitations

The biggest limitation of the study is its descriptive nature. Because of financial constraints, the actual hand-washing practice was not observed, and the results were dependent upon the remembrance of the mothers. This would have resulted in social desirability bias, but maximum efforts were offered to ensure the extraction of complete information from the respondents. Cross-sectional studies are always subjected to recall bias which may have miscalculated the significance of the actual HH-related practices.

Normally, the association between

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### COVID-19 ونظافة اليدين: هل أدى الوباء إلى زيادة وعي الأمهات في مدينة كويتا ، باكستان؟

#### الخلاصة:

**المقدمة:** تعد نظافة اليدين أحد الإجراءات الوقائية البسيطة والفعالة من حيث التكلفة ضد كوفيد 19 في هذا السياق ، يعتبر نظافة اليدين مهماً بشكل خاص r لأمهات الأطفال دون سن الخامسة الذين يمكن أن يعرضوا أطفالهم للفيروس بسبب اتصالهم المباشر . أن هذه الظاهرة لم يتم الإبلاغ عنها في العالم النامي . **الطريقة:** لذلك كنا مهتمين بتقييم ما إذا كان كوفيد 19 قد أثر على معرفة وممارسة نظافة اليدين وتسلط الضوء على محددات نظافة اليدين بين أمهات الأطفال دون سن الخامسة . كان هذا التحليل التنبئي المقطعي القائم على الاستبيان. تم استهداف أربعمائة وسبعة عشر أمًا لأطفال دون سن الخامسة يزورون مؤسسة رعاية صحية عامة لجمع البيانات باستخدام استبيان منظم تم التحقق منه مسبقاً . تم ترميز البيانات وتحليلها بواسطة الحزمة الإحصائية للعلوم الاجتماعية (SPSS) الإصدار 26. متبوعاً بالتحليل الوصفي ، تم استخدام الانحدار اللوجستي الثنائي للعثور على تنبؤات المعرفة والمواقف والممارسات تجاه HH لجميع التحليلات . على الرغم من الإبلاغ عن نظرة ثقافية حول HH ، فقد لوحظت أيضًا بعض المفاهيم الخاطئة . **النتائج:** ارتبط المستوى التعليمي بشكل كبير مع عناصر المعرفة والموقف والممارسة وكشف اختبار Jonckheere-Terpstra عن اتجاه إيجابي معتدل ( $\tau = 0.3 - 0.5$ ) نحو التعليم العالي . يحتوي نموذج الانحدار اللوجستي الثنائي على ثمانية متغيرات مستقلة وكانت جميع المتنبئين ذات دلالة إحصائية ( $x^2 = 18.5$ ) ،  $p < 0.001$  ،  $SDF = 4$ ) . أقوى مؤشر على المعرفة والمواقف والممارسة هو التعليم مع نسبة أرجحية كبيرة 2.5 و 1.6 و 1.5 على التوالي . نجحت الدراسة في تسليط الضوء على الأسرة الجيدة بين الأمهات ؛ بعض القيود لوحظت . ترتبط هذه القيود بنقص التنظف الصحي الذي يحتاج إلى معالجة في أقرب وقت ممكن . يتضمن HH الملائم تدابير وقائية استثنائية ضد كوفيد 19 التي توفر ضماناً لبيئة خالية من الأمراض . **الاستنتاج:** نحن المتخصصين في الرعاية الصحية وصانعي السياسات على استهداف تحسين محو الأمية الصحية للجماهير ونشر المعلومات المتعلقة بـ HH التي ستساعد في إدارة الأمراض المعدية مثل COVID-19 .

الكلمات المفتاحية: نظافة اليدين ، الأمهات ، الأطفال دون سن 5 سنوات ، كوفيد 19