

Knowledge and Hand Hygiene Behavior During Covid-19 Pandemic in Adolescents of Rawalpindi, Pakistan: A Call for Policymaking in Health Literacy

ABSTRACT

Background and Objectives: The concept of health literacy shaping attitudes and behaviours is critical in preventing and controlling person-to-person transmission in the spread of infectious diseases. Health literacy is a determinant of health; it impacts the effective use of health behaviour by empowering individuals and communities to prevent epidemics like Coronavirus and Monkeypox. The study aims to assess the association between health-protective behavior and health literacy for preventing the spread of the Coronavirus during the pandemic in adolescents of Rawalpindi, Pakistan.

Materials and Methods: A cross-sectional descriptive study was conducted in public and private schools of Rawalpindi, 387 middle and high school students. Multiple linear regression was used to find the association between the main explanatory variable, health literacy and the outcome variables, health knowledge and health behaviour. The study was conducted in ten different sessions, each requiring one hour from 1st August to 31st October 2021, the self-administered questionnaire was used as a data collection tool, and a total of 387 participants took part in the study. Data were entered and analysed using SPSS Version 27.

Results: Multiple linear regression analyses showed a significant association between health literacy and health knowledge ($\beta = 0.04$, 95% CI = 0.005–0.069, $p = 0.023$), and between health literacy and health behaviour ($\beta = 0.07$, 95% CI = 0.048–0.099, $p < 0.001$).

Conclusion: Health literacy is significantly associated with increased hand hygiene knowledge and behaviour. Government should prioritise health literacy policy and practice and make it more sustainable, effective, and integral using the multi-level targeted approach for the national educational sector.

Paper Type: Research Article

Keywords: Adolescents, Behaviour, COVID-19, Education., Hand Hygiene, Health Promotion.

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Hina Shan

* Assistant Professor, Department of Public Health, National University of Medical Sciences (NUMS). Pakistan. corresponding) hina.shan@numspak.edu.pk

Uzma Hassan

Professor & Head of Department, Department of Public Health, National University of Medical Sciences (NUMS). Pakistan

Rubab Zulfiqar

MPH Trainee, AFGMI, National University of Medical Sciences (NUMS). Pakistan

Tamkeen Nishat Jaffry

Associate Professor, Department of Public Health, National University of Medical Sciences (NUMS). Pakistan

Maryam Shan

Associate Professor, Department of Anatomy, Quetta Institute of Medical Sciences (NUMS). Pakistan

Saadia Maqbool

Assistant Professor, Department of Public Health, Akhtar Saeed Medical & Dental College. Pakistan

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Introduction

The Covid-19 Pandemic has become an addition to the list of public health challenges and microbial threats to humankind (1). The emerging and re-emerging infectious diseases are becoming a serious health risk with the rapid increase in population growth, urbanization, and alterations of the environment (1-2). Advances in medical science and life-saving measures play an important part, but reliance on drugs, vaccines and diagnostics alone is not enough to tackle the frequently occurring infectious diseases (4). Non-pharmaceutical interventions like practising respiratory hygiene, ensuring social distancing, avoiding touching faces, and wearing face masks are effective preventive measures with considerable impact on the course of an infectious disease epidemic (3-4).

To stay safe and protected from infectious diseases with respiratory transmission like Covid-19, adequate information on protective measures is important, as providing good advice helps in effective understanding and decision making an individual's health and the health of others (4-5). The concept of Health Literacy as a 'Social Vaccine' plays a critical role in the prevention and control of person-to-person transmission in the spread of infectious diseases (5).

Adolescents are one important target group as they socialise and engage in close peer groups and are involved in outdoor activities that contract the virus and are prone to spread it. The rapid person-to-person transmission of coronavirus makes the protective measures more crucial, especially for an independent age group like adolescents, who should be made responsible for their own health behaviours (6-8). Behavioural compliance may be of particular importance for this group, the use of health knowledge is impacted by Health Literacy (HL), and HL can influence the effective use of health knowledge

by empowering the youth in combatting future outbreaks or epidemics(8-10). Adolescent Health Literacy in relation to infectious diseases is under-researched in adolescents of the Eastern Mediterranean region, especially in Pakistan. The wide availability of information to prevent coronavirus is communicated in different mediums the evidence-based communication is imminent.

Materials and Methods

A Cross-Sectional study was carried out from 1st August to 31st October 2021 after obtaining NUMS-IRB & EC Certificate Ref No. 06 / R&D / 2021 / ORIC-06. The sample size was calculated using a World Health Organization (WHO) sample size calculator with assumptions of knowledge regarding hand hygiene at 57%, Confidence level of 95% and 5% Absolute precision required. The sample size of 342 was inflated to 400 for no response, and finally, 387 participants took part in the study. The non-probability, convenience sampling enrolled students from middle & high school (7-12 grade) from local public and private schools of Rawalpindi with the inclusion criteria: students aged 12 to 18 years studying in middle or high school who understand, read, and write the English language; voluntary participation and agreeing to informed written and verbal consent. Exclusion criteria were for students below the age of 12 and over 18 years, who do not understand, read, or write the English language and are not willing to sign written consent, deny, or withdraw informed consent.

The questionnaire consisted of four parts, socioeconomic and history of infection with coronavirus characteristics, health literacy for school-aged children, health-protective knowledge and behaviour (including hand hygiene, respiratory etiquette, social distancing), sources of information on Covid-19 and protective measures related to it.

A brief, theory-based, validated instrument, “The Health Literacy for school-aged Children HLSAC” based on the conceptualization of health literacy developed by Paakkari and Paakkari, was used (8,10-12). The pretested closed-ended questionnaire has been acquired by contacting the Olli Paakkari, Faculty of Health Sciences University of Jyväskylä, Finland.

This is a designed, validated, structured, pre-tested questionnaire for adolescents and has been used in school-based studies for ages 10-19 years. Though in our study, only 12 years to 18 years were requested to participate. Also, the Principal Investigator, while drafting the proposal, discussed the feasibility and the questionnaire in detail with the school faculty and principals of the teaching institutions of Rawalpindi where the study was being conducted, and they, after discussing the feasibility with the teacher’s assured that no problem whatsoever in assimilation or interpretation of questionnaire on students’ part (aged 12-18 years) would be faced. The instrument consists of ten items, two items from each of five predetermined theoretical components: theoretical knowledge (1, 5), practical knowledge (4, 7), critical thinking (3, 9), self-awareness (8, 10) and citizenship (2, 6)- (Paakkari et al. 2018). A sum score was generated from the responses to the ten items ranging from 1 (not at all true) to 4 (absolutely true). Each subject was given self-administered health literacy and prevention questionnaire after taking an informed verbal and written consent, requiring approximately 15 minutes to complete. The HL scores were summed up for all the individual respondents against the ten-item statement tool. Guidelines for coding are as follows; a sum score should be generated from the responses to the ten items ranging from 1 (not at all true) to 4 (absolutely true). The levels of HL are classified in such a way as

to fall into three groups: “low” (score 10-25), “moderate” (score 26-35), and “high” (score 36-40). (Paakkari et al. 2018).

Data were entered and analysed using SPSS Version 27. Descriptive statistics like frequency/ counts (n) and percentages (%) were used for the categorical variables, and mean and standard deviation (SD) for continuous variables. Crude differences between demographic groups (sex, age, school, Covid-19 infection) in terms of health literacy, handwashing knowledge, handwashing behaviour, and social distancing were analysed using the Mann–Whitney U tests. A simple linear regression with two separate models was carried out to check the association of covariates of interest like age, sex, school and Covid Status. Followed by multiple linear regression analyses for association between HL and health knowledge and behaviour after adjusting for the covariates sex, age and level of education.

Results

Four hundred and fifty participants were requested to be part of the study, and only voluntary participants agreeing to written consent were enrolled. A total of 387 participants, including 221 (57.1%) females and 166 (42.9%) males with a mean age of 15.8 ± 1.50 , were included in the study. Socio-economic characteristics of participants were recorded, including sex; age; enrolment in public/private school; grade of study, living place (home, hostel etc.); paternal and maternal level of education; head of household’s occupation and monthly income (Table 1).

Health Protective Behaviour During Covid-19

Information regarding Coronavirus was gathered, and out of the total 387, 40 (12.9%) reported contracting COVID-19, followed by 29 (72.5%) out of 40 staying at home but not quarantined or isolated. Isolation at home was reported by

Table 1: Socio-economic Characteristics of the Participants

Variable	Number. (%)	
Sex	Female	221 (57.1)
	Male	166 (42.9)
Age Mean age 15.8 ± 1.50	13-14 years	71 (18.3)
	15-16 years	161 (41.6)
	17-18 years	155 (40.1)
Enrolled in private or government school	Private	185 (47.8)
	Government	202 (52.2)
Student's living place	With Parents	366 (94.6)
	Hostel/Dormitory	11 (2.8)
	Others/Guardians	10 (2.6)
Father's educational level	Primary School	68 (17.6)
	Secondary School	133 (34.4)
	High School	67 (17.3)
	Bachelor's and above	119 (30.7)
Mother's educational level	Primary School	101 (26.1)
	Secondary School	128 (33.1)
	High School	84 (21.7)
	Bachelor's and above	61 (15.8)
	Not answered	13 (3.4)
Parent's/guardian's occupation or source of income	Government employees	102 (26.3)
	Private employees	193 (50.0)
	Housewives, jobless, retired etc.	65 (16.7)
	Not answered	27 (7.0)
What is your parent's/guardian's total monthly household income in Rupees (PKR) before Tax?	< 30000 PKR	18 (4.7)
	> 30001- < 65000 PKR	35 (9.0)
	> 65001 PKR	23 (5.9)
	Not answered	311 (80.4)

10 (2.6%), and 1(0.3%) reported isolation other than at home.

The health behaviour included health protective practices, which were recalled including handwashing with soap and anti-bacterial agent, physical and respiratory hygiene and social distancing. The practice of washing hands with soap and anti-bacterial agents was reported to be practised by 376 (97.2%) respondents.

Correct identification by 372 (96.1%) and 381 (98.4%) respondents on agreeing to the true meaning of physical distancing and respiratory hygiene. The identical response was shown in limiting the number of social contacts and spending time with fewer friends than usual due to COVID-19 Pandemic 261 (67.4%). Staying home more than usual to avoid contact and maintain social distance were identified by 346 (89.4%).

Health Literacy

The Health Literacy (HL) scores were summed from the responses of the ten items ranging from 1 (not at all true) to 4 (absolutely true)

and generated sum levels of Health Literacy categorized into three groups low moderate and high (Table 2).

Table 2: Count of Health Literacy Measures in Adolescents from Schools of Rawalpindi, Pakistan

	Statements	not at all true n (%)	not quite true n (%)	Somewhat true n (%)	Absolutely true n (%)
1	I have good information about health	13 (3.4)	64 (16.5)	209 (54.0)	101 (26.1)
2	When necessary, I am able to give ideas on how to improve health in my immediate surroundings (e.g., a nearby place or area, family, friends)	35 (9.0)	116 (30.0)	210 (54.3)	26 (6.7)
3	I can compare health-related information from different sources	35 (9.0)	116 (30.0)	210 (54.3)	26 (6.7)
4	I can follow the instructions given to me by healthcare personnel (e.g., nurse, doctor)	15 (3.9)	98 (25.3)	216 (55.8)	58 (15.0)
5	I can easily give examples of things that promote health	35 (9.0)	116 (30.0)	210 (54.3)	26 (6.7)
6	I can judge how my own actions affect the surrounding natural environment	13 (3.4)	64 (16.5)	209 (54.0)	101 (26.1)
7	When necessary, I find health-related information that is easy for me to understand	17 (4.4)	60 (15.5)	216 (55.8)	94 (24.3)
8	I can judge how my behaviour affects my health	77 (19.9)	71(18.3)	174 (45.0)	65 (16.8)
9	I can usually figure out if some health-related information is right or wrong	14 (3.6)	64 (16.5)	221(57.1)	88 (22.7)
10	I can give reasons for the choices I make regarding my health	15 (3.9)	97 (25.1)	223 (57.6)	52 (13.4)
Mean of 28.02 and Standard deviation of 6.363					
A sum score was generated from the responses to the ten items		Frequency (N)		Percentage (%)	
"Low" (score 10-25)		96		24.8	
"Moderate" (score 26-35)		242		62.5	
"High" (score 36-40)		49		12.7	
Total		387		100	
Out of the ten theoretical component statements comprising the health Literacy Tool the theoretical knowledge is covered with statements 1 & 5, practical knowledge by statements 4 and 7, critical thinking by 3 and 9, self-awareness by 8 and 10 and citizenship by 2 and 6 by (Paakkari & Paakkari 2012).					

Sources of information

Sources from which information on COVID-19 Pandemic-related protective health measures

were identified and television 288 (74.4), school and college 267 (69.0), Facebook 254 (65.5),

family \ friends 249 (64.3) were the highest sources of information.

Crude differences between demographic groups (sex, age, school, Covid-19 infection

status) in terms of health literacy, handwashing knowledge, handwashing behaviour, and social distancing were analysed using the Mann–Whitney U tests (Table 3).

Table 3: Comparison between subgroups with respect to health literacy, hand hygiene knowledge, and behaviour levels

Variables	Subgroups	Health Literacy		Hand Hygiene Knowledge		Hand Hygiene Behaviour	
		MEAN (SD*)	P-value	MEAN (SD*)	P-value	MEAN (SD*)	P-value
Sex	Male	25.6 (6.07)	≤.0001	12.9 (2.31)	≤.0001	4.56 (1.10)	≤.0001
	Female	29.8 (6.00)		13.9 (1.61)		6.85 (1.64)	
Age	13-14	28.5 (2.76)	≤.0001	13.2 (1.57)	≤.0001	4.85 (1.37)	≤.0001
	15-16	26.5 (6.87)		12.9 (2.41)		5.25 (1.64)	
	17-18	29.4 (6.68)		14.1 (1.45)		6.97 (1.62)	
School	Private	29.9 (6.23)	≤.0001	13.4 (1.80)	0.4371	6.30 (2.11)	≤.0001
	Public	26.3 (5.98)		13.5 (2.19)		5.47 (1.43)	
Covid-19 Infection**	No	27.8 (6.12)	0.0090	13.5 (1.98)	0.6123	5.73 (1.74)	0.0007
	Yes/ Suspected	29.5 (7.73)		13.3 (2.19)		6.78 (2.15)	

*SD Standard Deviation
 **Are you, or have you been, infected with the coronavirus?

Simple linear regression was carried out to check the association of covariates of interest (age, sex, school, Covid status) with the dependent variables of hand hygiene knowledge and hand hygiene behaviour. The covariates with p-value less than 0.2 were included in the adjusted model.

Health Knowledge:

Health knowledge was assessed using the following statements: 'I know when to wash my hands; 'I know how to wash my hands properly'; 'I find handwashing advice easy to understand, on the ordinal scale including strongly disagree, disagree, neither agree nor disagree; strongly agree

categories. The responses were scored and summed to be included as outcome variables of health knowledge. Furthermore, multiple linear regression analyses were used to assess the association between HL and hand hygiene knowledge ($\hat{\beta} = 0.04$, 95% CI = 0.005–0.069, p=). This indicated that, on average, an increase of one point in HL corresponded to an increase in hygiene knowledge of 0.04 points (Table-4).

Health Behaviour

Also, multiple linear regression analyses showed a significant association between HL and hand hygiene behaviour ($\hat{\beta} = 0.07$, 95% CI = 0.048–

0.099) after adjusting for the covariates age, sex, school and covid status. This indicated that, on average, an increase of one point in

Health Literacy corresponded to an increase in the health behaviour of 0.07 points. (Table -4)

Table-4: Linear regression model for hand hygiene knowledge and behaviour as dependent variable and health literacy as the independent variable.

Models	Beta $\hat{\beta}$	Sig	95% confidence interval for $\hat{\beta}$	
			Lower Bound	Upper Bound
a Association between HL and hand hygiene knowledge	0.04	0.023	0.005	0.069
b Association between HL and hand hygiene behaviour	0.07	< 0.0001	0.048	0.090

a Multiple linear regression analysis with control for gender and age.
b Multiple linear regression analysis with control for gender, age, school and covid status.

Discussion

SARS-CoV-2 and the very recent outbreak of Monkeypox are a wake-up call for us to prepare ourselves for nature's inevitable surprises. Practising hand hygiene, respiratory etiquette, and social distancing with public involvement at all levels not only proves effective in times of pandemic but adopting these behaviours helps significantly decrease in a lot many infectious diseases like influenza, enterovirus, and all-cause pneumonia and eventually epidemics just like the Monkeypox outbreak(2-3,13-14).

Social and environmental conditions play an important role in health and have emerged as a fundamental public health aspect. Literacy is considered to be directly or indirectly linked to health outcomes, and poor literacy is usually related to social determinants of health. People with low literacy are considered less likely to use preventive measures and services for communicable and non-communicable diseases, to be less receptive to health education messages (15-16).

Nutbeam distinguishes between functional, interactive, and critical health literacy and his remarkable 3-tiered concept of health literacy states that added advanced skills result in greater

autonomy and personal empowerment, leading to better decisions and behaviour for improved health (16-17). According to Sørensen et al. "Health literacy is linked to literacy, knowledge and motivation and represents the ability to find, understand, appraise and apply health information to make decisions regarding health care, disease prevention and health promotion"(18). According to Vamos S et al., health literacy contributes to health equity and is an asset that supports a wide range of health actions contributing to improve health and well-being and also to prevent manage ill-health" and can help us achieve health equity (19).

Health literacy has emerged as an important health policy-making focus. Though children and adolescents are targeted, there remain gaps where more work needs to be done to address child-focused policies and current knowledge gaps. During a pandemic, timely information on infectiousness, transmissibility, and easy access to information, especially in the age of digital technology, is a privilege of today's youth (20). Adolescents use social media and other digital platforms for multiple reasons and health-seeking information is one of them. In

our study adolescent reported television(74.4%), educational institutes (69.0%), Facebook (65.5%) and family (64.3%) as highest sources of information. In a study done by Riiser K et al., eighty-six percent of participants reported television and eighty-one percent of family members were reported to be the source of pandemic-related information, while 58.6% also reported reading newspapers for information (21). In a recent qualitative study conducted in Germany by Loer AK et al., trustworthy sources of information were reported from parents, schools, and a few established media²⁰. Timely and accurate information that is tailored to various age groups must be available so that it is accurately perceived and influence behaviour in times of pandemic²⁰. The same study by Loer AK et al. also highlighted that the adolescent age group play an important and responsible role in limiting the spread of the virus (20). The findings stressed the need to address health literacy interventions with a focus on the cognitive and behavioural aspects of health literacy in dealing with spreading threats such as the COVID-19 pandemic (20).

In a study conducted by Riiser K et al. the mean score for handwashing knowledge and behaviour was 14.1 (1.6%) and 11.9 (2.6%), which was low in our study for health knowledge, 13.4 (1.96%) and quite low in health behaviour 5.70 (1.37%) (21).

With regards to handwashing behaviour, 54.2% of the girls and 46.9% of the boys reported reminding others to wash their hands (agree/ completely agree), 72.3% of the girls and 66.7% of the boys agreed or completely agreed that they washed their hands before socialising, and 88.9% of the girls and 80.8% of the boys agreed or completely agreed that they washed their hands after socializing.

The participating adolescents in our study

were well informed about protective advice regarding hand washing (78.6%), physical distancing(96.1%), respiratory hygiene (75.5) and limiting social contacts (67.4).

Over the years, health literacy has appeared as a crucial health policy-making emphasis, and it's time to address health literacy interventions with a focus on the cognitive and behavioural aspects in dealing with spreading threats such as the COVID-19 pandemic in the Eastern Mediterranean Region. In Pakistan, children and adolescents are targeted, but there remain gaps where more work needs to be done to address child-focused policies and current knowledge gaps. Fact because adolescents socialize in close peer groups, behavioural compliance is of utmost importance at a young age. School curriculum and education material should be tailored to the prevention of diseases and promotion of health to be able to respond to future outbreaks. Adolescents are inclined to use digital platforms and various social media platforms for multiple reasons, and health-seeking information is one of them. Authentic evidence-based information customized to various age groups must be available to influence their behaviour. Education focusing on content and context can improve literacy and work as a 'Social Vaccine'. Health literacy is a determinant of health, it impacts the effective use of health behaviour by empowering individuals and communities to prevent epidemics like Coronavirus and Monkeypox (22-23). Health literacy has become a crucial health policy-making target and is considered critical for guiding interventions in public health that lead to advancement in global health(22-24).

The limitation of the study is the recruitment strategy which resulted in a sample that is less representative of boys and also adolescents from families with lower educational levels or rural populations, thus affecting the generalizability

of Pakistani adolescents in general with regard to the prevalence of health literacy and health knowledge and behaviour.

Conclusion

Health Literacy is directly associated with increased hand hygiene knowledge and behaviour. Government should prioritise health literacy policy and practice and make it more sustainable, effective, and integral using a multi-level targeted approach for the national educational sector.

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Conflicts of Interests: No potential conflict of interest was reported by the author.

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