

Maternal Health Literacy and Hand Hygiene Practices among Caregivers of Children under Five: A Cross-Sectional Study in India

ABSTRACT

Background and Objectives: Children under five are dependent on caregiver's hand washing and their health literacy for their health and well-being attention to which was reinforced during COVID-19. A caregiver's hands can act as primordial prevention for children under five. The current study aimed to assess caregiver's health literacy and WHO-five moments of hand hygiene in a uni-center of a developing country.

Materials and Methods: To explore the practice and attitude of WHO-Five Moments of hand washing and caregiver's health literacy using the Maternal Health Literacy (MaHeLi) survey a cross-sectional study was conducted at a single centre at a developing country among 418 caregivers of children under five. The analysis and reporting of variables utilized descriptive, univariate, paired t-test, and multivariate analysis methods.

Results: Caregivers' handwashing practices were significantly associated with education level and socioeconomic status (P -value ≤ 0.001). A positive correlation (P -value = 0.003) was observed between health literacy and handwashing practices, with caregivers demonstrating better hygiene practices after caregiving activities than before (P -value ≤ 0.001). Although most participants reported moderate levels of handwashing, only a small percentage practices optimum handwashing before or after child care. Caregivers with lower health literacy were less likely to perform adequate hand hygiene.

Conclusion: Our study suggests that caregivers with higher health literacy demonstrated better hand hygiene practices. Enhancing health literacy and promoting handwashing education, especially in paediatric care settings and at community, could help improve hygiene practices among caregivers. These findings reflect the need for healthcare providers and policymakers to consider targeted interventions on developing health literacy and hand hygiene practices to reduce infections in children under five.

Paper Type: Research Article

Keywords: Caregivers, Child, Hand washing, Health Literacy, Health Policy, Health Promotion.

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Introduction

Globally, hand washing is of critical importance in the prevention of disease transmission and the enhancement of patient safety in a variety of settings, such as households, healthcare facilities, and public spaces (1, 2). International guidelines consistently recommend handwashing with soap as the primary method for hand washing (2, 3). Hand washing implementation levels vary with factors such as country income level and funding structure influencing practices (2, 4). The World Health Organization emphasizes the critical role of hand washing in controlling healthcare-associated infections and lists it as a key practice for patient safety (5, 6). Despite ongoing efforts to improve hand washing compliance, challenges persist globally, highlighting the need for effective multimodal strategies that encompass system changes, training, monitoring, reminders, and safety culture enhancements (7–9). Global handwashing rates are low, with only 19% washing with soap after contact with excreta (10). A global study showed high rates of infrequent handwashing before eating (6.4%) and after toilet use (10.8%) in low-income countries (11). In India, about 60% of schoolchildren believe handwashing can prevent infections (12), while in South Ethiopia, only 27.1% of mothers wash hands after using the latrine (13).

Community acquired infections like respiratory tract infections and gastroenteritis, are prevalent causes of hospitalization among children (14). Overall, socioeconomic factors, environmental stressors, and disruptions in healthcare systems contribute to the heightened

vulnerability of the paediatric population to infections in the community during the current high burden of communicable disease (15).

Washing hands with soap and water for 15 seconds can reduce bacteria by approximately 90% and nearly 99.9%, respectively, when performed correctly (16). To prevent the spread of infectious diseases, it is not only essential for healthcare workers but for the community and caregivers to wash their hands (17–19). Therefore, promoting and maintaining proper hand washing practices among caregivers can benefit both children and the community at large. Implementing five-moment handwashing in children faces challenges due to limited resources, low-intensity campaigns, community influence, insufficient intervention techniques, and the need for effective educational activities to improve hygiene behaviour (20–23).

Health literacy is defined as the ability to obtain, process, and understand basic health information and services needed to make appropriate health decisions (24, 25). Low health literacy negatively affects health behaviours and outcomes (26). Individuals with low health literacy are less likely to engage in preventive health behaviours, follow medical advice, and manage chronic conditions effectively (27, 28).

The World Health Organization (WHO) advocates for the implementation of a multimodal hand washing strategy 8. The Sustainable Development Goal (SDG) 3 aims to improve children's well-being and reduce under-five child deaths by 10 million by 2030 (29). Effective hand washing practices by

parents and healthcare workers are critical to achieving this goal.

Mother are the first caregiver to a child and hence its health literacy is vital for the child's health. A systematic review indicate that caregiver's knowledge, health promotion activities and their literacy levels significantly influences children's handwashing practices (30). Handwashing practices were significantly associated with mothers' level of education, with good handwashing practice being more common among mothers with higher education levels (31, 32). Maternal literacy also correlates with better access to hygiene resources and the capacity to create a healthy home environment (33). Studies suggest that literate mothers are more proactive in obtaining soap and maintaining handwashing stations 13.

Understanding different hand washing practices can assist in developing customized strategies to promote and maintain effective hand washing. Caregiver's established health literacy could be facilitator to hand washing practices. Health literacy affects interpretation of guidelines, recognizing the importance of hand hygiene, and consistently practicing it in routine, could act as a key factor in promoting effective hand hygiene behaviour. While existing research highlights the general impact of health literacy on health outcomes, there is a lack of specific studies focusing on its effect on hand washing practices among caregivers in paediatric outpatient departments. This study investigated levels and correlation between caregiver's health literacy and WHO-five moments of hand hygiene in a uni-center of a developing country like India. The study was planned at referral centre catering to

diversified geographical region with better literacy levels compared with the neighbouring districts. As per National family health survey 2019-2021 approximately 9-12% children under five experienced diarrhoeal disease in urban regions which is lower than rural regions. The study examined hand hygiene practices based on the WHO's five moments of hand hygiene, focusing on opportunities before and after providing care in the hospital providing care to both urban and rural regions. It also assessed maternal health literacy using the Maternal Health Literacy Index (MaHeLi), a validated tool that measures a mother's ability to access, understand, compare, and apply health information (34).

Materials and Methods

A cross-sectional study (35) was conducted in a paediatric outpatient department (OPD) situated within the women and child block of a tertiary care teaching hospital situated in the coastal area of South Karnataka, catering to a population of 1.2 million people.

The study used questionnaire based survey among caregivers of the paediatric population under the age of five who visited the healthcare facility for vaccination. The caregivers who denied participation or did not sign the consent form, or who did not directly provide care to patients were excluded.

Inclusion criteria

1. All the caregivers of the paediatric population visit a healthcare facility for vaccination
2. Caregivers of the paediatric population under the age of 5.
3. Only caregivers visiting the outpatient department of the healthcare facility.

Exclusion criteria

1. Unwilling participants and or not signed the consent form 2. Individuals who were not providing direct care to patients.

Assuming 50% of caregivers wash their hands properly and have enough health literacy, the estimated sample size was 384 with a 95% confidence interval and 5% margin of error. In order to adjust for non-responders or incomplete responses, 10% additional numbers were added in the estimated sample size leading to a sample of 418 (36).

A convenience sampling technique used to identify eligible caregivers, who were requested for participation. Survey information was provided, and consent to participate was requested. After consenting, they responded to the questionnaire.

The exposure variables considered in the study encompassed various aspects, such as the caregiver's relationship with the child, age group, the number of children, state, district, language, family structure (joint/nuclear), and the highest level of education of either parent or socioeconomic status. The frequency of hand washing practice was considered the independent variable, while health literacy, family structure, and language were identified as potential effect modifiers.

We adopted hand washing questionnaires from the WHO five moments of hand washing and modified them as per the requirements of the study 1. The first part of the questionnaire included demographic information about the respondents, such as their relationship with the child, age, number of children, level of education, and socioeconomic status, and the second part included the main skeleton, which consisted

of statements and the response scale. We used 5-point Likert scale questionnaire ranging between "Always and Never." The expected responses for Likert scale-based questions are 0 - never, 1- rarely, 2 sometimes, 3- often, and 4- always.

We adopted the validated "Maternal Health Literacy (MaHeLi)" 34 questionnaire, which has a 5-point Likert scale, to assess the health literacy of the caregiver to measure the items that lie between "Strongly Agree" and "Strongly Disagree." The expected responses for the "Likert" scale-based questions are 0-strongly disagree, 1-disagree, 2-neutral, 3-agree, and 4-strongly agree.

Both questionnaires were translated into the Kannada language using a forward-backwards-forward process. Experts evaluated the Kannada and English questionnaires for their content and face validity. Pilot testing using this questionnaire was carried out. The questionnaire's validity and reliability for health literacy and hand washing practices reflected Cronbach's α values of 0.907 and 0.946, respectively.

The quantitative variables included age, number of children, frequency of hand washing practices, highest level of education, and socioeconomic status. These variables were analysed using descriptive statistics, with numerical values assigned for quantification. Continuous variables were analysed using the mean and standard deviation. Since variables were not normally distributed a non-parametric test to report the findings .i.e. Kruskal-wallis test, Dwass-Steel-Critchlow-Fligner test for pairwise comparisons. A chi-square test was performed to determine any effect of

demographic variables on health literacy levels and hand washing practices. Multivariate regression analysis was carried out to investigate effect of health literacy on caregiver's WHO five moments of handwashing. A non-parametric correlation test Spearman's rho was adopted to assess the strength and direction of a monotonic relationship between health literacy and hand washing practice and Kendall's Tau B was used for concordant and discordant pairs considering it to be less sensitive to outliers. We used Jamovi ver 2.3.26 for data analysis.

The Institutional Ethics Committee approved the study in October 2023 (IEC2:527/2023). The purpose of the research and the data collection method were explained to the participants, and their identities were kept confidential.

Results

The study included a total of 418 participants, with the majority of respondents were mothers (89.7%). The survey participants ranged in age from 23 to 26 years (54.5%), had more than one kid (61%), were native speakers of the Kannada language (98.6%), lived in a joint family structure (57.9%), had completed at least a secondary school or higher (76.8%), and were below the poverty line (49.5%) (Table 1).

Younger caregivers (aged <26 years) reported moderate hand-washing practices. The study showed that gender, number of children cared for, geographical region, and type of family structure had no significant impact on hand washing. Educational attainment (P -value \leq 0.001) and socioeconomic position (P -value \leq 0.001) significantly influenced hand washing

practices and health literacy among caregivers (Table 1).

Most caregivers (42.8–51.4%) responded sometimes washing their hands for most of the care activities involving before and after touching children and built environment surfaces. Caregiver hand washing before touching, delivering care, medical aid, food preparation, or removing protection ranges from 45% to 61%.

Comparison of hand washing practices before and after child care had a significant difference ($\chi^2=36.7$, P -value \leq 0.001) for hand washing after care activity. Significant differences in hand hygiene practices were found between inadequate and moderate practices ($W=3.568$, P -value=0.031) and inadequate to adequate practices ($W=8.392$, P -value \leq 0.001). The comparison between moderate and adequate hygiene levels was also statistically significant ($W=5.519$, P -value \leq 0.001) (Table 2).

Only 10.5% participants practice washing hands in adequately, and only 5.3% and 3.1% responded adequately washing their hands before or after caring for a child. Overall, 72% and 80% responded inadequate hand hygiene before and after any care activity respectively, 89.5% of the individuals had responded for moderate level of hand hygiene.

Very few caregivers had adequate health literacy (8.1%), and the majority had moderate (48.3%) and inadequate (43.5%) health literacy (Table 3).

A significant difference ($\chi^2=17.3$; P -value=0.041) was found between hand washing practices and health literacy levels.

Table 1. Hand washing and health literacy levels across various demographic characteristics of the participants

Demographi	Variables		Number (%)	Hand washing			Health Literacy			χ ² on Health Literacy		χ ² on Health Literacy		
	Group			Inadequate	Moderate	Adequate	Inadequate	Moderate	Adequate	Value	df	Value	df	p
Gender	Mother		375 (89.7)	339 (90.4)	25 (6.7)	11 (2.9)	162 (43.2)	184 (49.1)	29 (7.7)	3.478	2	1.231	2	0.54
	Father		43 (10.3)	35 (81.4)	6 (14.0)	2 (4.7)	20 (46.5)	18 (41.9)	5 (11.6)					
Age	18-22		3 (0.7)	97 (42.5)	113 (49.6)	18 (7.9)	49 (39.8)	66 (53.7)	8 (6.5)	10.427	8	10.031	8	0.263
	23-26		228 (54.5)	49 (39.8)	20 (35.7)	7 (12.5)	29 (51.8)	20 (35.7)	7 (12.5)					
	27-30		123 (29.4)	29 (51.8)	0 (0.0)	0 (0.0)	3 (100.0)	0 (0.0)	0 (0.0)					
	31-35		56 (13.4)	3 (100.0)	3 (37.5)	1 (12.5)	4 (50.0)	3 (37.5)	1 (12.5)					
Number of Children	Above 35		8 (1.9)	4 (50.0)	3 (37.5)	1 (12.5)	75 (46.0)	75 (46.0)	13 (8.0)	6.199	4	0.842	4	0.933
	1		163 (39)	142 (87.1)	13 (8.0)	8 (4.9)	103 (41.9)	123 (50.0)	20 (8.1)					
	2		246 (58.9)	224 (91.1)	18 (7.3)	4 (1.6)	4 (44.4)	4 (44.4)	1 (11.1)					
Location (State)	Karnataka		412 (98.6)	368 (89.3)	31 (7.5)	13 (3.2)	182 (44.2)	198 (48.1)	32 (7.8)	0.716	2	7.827	2	0.02
	Kerala		6 (1.4)	6 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	4 (66.7)	2 (33.3)					
Family	Joint		242 (57.9)	220 (90.9)	18 (7.4)	4 (1.7)	102 (42.1)	125 (51.7)	15 (6.2)	4.057	2	4.22	2	0.121
	Nuclear		176 (42.1)	154 (87.5)	13 (7.4)	9 (5.1)	80 (45.5)	77 (43.8)	19 (10.8)					
Education	Primary		90 (21.5)	83 (92.2)	6 (6.7)	1 (1.1)	50 (55.6)	38 (42.2)	2 (2.2)	24.457	6	49.849	6	< .001
	Secondary		244 (58.4)	220 (90.2)	21 (8.6)	3 (1.2)	103 (42.2)	128 (52.5)	13 (5.3)					
	University		77 (18.4)	64 (83.1)	4 (5.2)	9 (11.7)	22 (28.6)	36 (46.8)	19 (24.7)					
	Illiterate		7 (1.7)	7 (100.0)	0 (0.0)	0 (0.0)	7 (100.0)	0 (0.0)	0 (0.0)					
Socio-Economic Status	BPL		207 (49.5)	188 (90.8)	15 (7.2)	4 (1.9)	101 (48.8)	100 (48.3)	6 (2.9)	26.333	6	33.1	6	< .001
	Less than 5 Lakhs		130 (31.1)	119 (91.5)	8 (6.2)	3 (2.3)	51 (39.2)	68 (52.3)	11 (8.5)					
	5-10 Lakhs		64 (15.3)	56 (87.5)	6 (9.4)	2 (3.1)	25 (39.1)	28 (43.8)	11 (17.2)					
15 Lakhs		17 (4.1)	11 (64.7)	2 (11.8)	4 (23.5)	5 (29.4)	6 (35.3)	6 (35.3)						

Table 2. Practice of hand washing among caregivers before and after providing care to their child as per WHO five moments of hand washing

Moments of hand washing practices	Never	Rarely	Sometimes	Often	Always	Mean Score	Standard deviation
How often do you practice hand washing both before and after having contact with your child.	6 (1.4)	104 (24.9)	231 (55.3)	60 (14.4)	17 (4.1)	5.8	1.4
How often do you practice hand washing after touching only surfaces.	11 (2.6)	96 (23.0)	255 (61.0)	39 (9.3)	17 (4.1)		
Before: Touching the child	10 (2.4)	129 (30.9)	217 (51.9)	49 (11.7)	13 (3.1)	11.4	2.8
Before: Providing personal care activities.	22 (5.3)	129 (30.9)	208 (49.8)	44 (10.5)	15 (3.6)		
Before: Applying ointment on the wound.	18 (4.3)	112 (26.8)	200 (47.8)	75 (17.9)	13 (3.1)		
Before: Preparing food or medication.	20 (4.8)	102 (24.4)	188 (45.0)	94 (22.5)	14 (3.3)		
After: Removing any material offering protection.	13 (3.1)	137 (32.8)	210 (50.2)	49 (11.7)	9 (2.2)	16.2	3.7
After: Handling any body fluids, clearing excreta, cleaning any contaminated surface or soiled material.	10 (2.4)	163 (39.0)	179 (42.8)	56 (13.4)	10 (2.4)		
After: Touching the child	23 (5.5)	131 (31.3)	215 (51.4)	42 (10.0)	7 (1.7)		
After: Providing personal care activities	27 (6.5)	142 (34.0)	212 (50.7)	28 (6.7)	9 (2.2)		
After: An activity involving physical contact with the child's immediate environment	28 (6.7)	155 (37.1)	199 (47.6)	29 (6.9)	7 (1.7)	16.2	3.7
After: Other contact surfaces or inanimate objects	25 (6.0)	142 (34.0)	198 (47.4)	43 (10.3)	10 (2.4)		

Table 3. Health literacy among child caregivers on MaHeLi

Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Frequencies of I know find health information	39 (9.3)	137 (32.8)	113 (27.0)	115 (27.5)	14 (3.3)
Frequencies of I under importance of getting correct information	117 (28.0)	101 (24.2)	170 (40.7)	30 (7.2)	-
I access to more than one source of information.	42 (10.0)	155 (37.1)	123 (29.4)	79 (18.9)	19 (4.5)
I.economic resources to access the information	57 (13.6)	153 (36.6)	112 (26.8)	96 (23.0)	-
Frequencies of There is someone to avail .the health information w	225 (53.8)	97 (23.2)	96 (23.0)	-	-
Frequencies of All the information is available .I am familiar with	63 (15.1)	156 (37.3)	97 (23.2)	82 (19.6)	20 (4.8)
Frequencies of .I take initiative to seek for health information	61 (14.6)	172 (41.1)	119 (28.5)	57 (13.6)	9 (2.2)
Frequencies of understand the language. health information is given	217 (51.9)	137 (32.8)	64 (15.3)	-	-
Frequencies of .explain with ease health information received to others.	208 (49.8)	139 (33.3)	71 (17.0)	-	-
Frequencies of .I can identify and interpret symptoms of health risk	213 (51.0)	141 (33.7)	61 (14.6)	3 (0.7)	-
Frequencies of .able to follow written health instructions	54 (12.9)	170 (40.7)	125 (29.9)	69 (16.5)	-
Frequencies of .what to expect during pregnancy and postnatal period	54 (12.9)	155 (37.1)	127 (30.4)	79 (18.9)	3 (0.7)
.discern pregnancy-related myths from accurate health inform.	56 (13.4)	149 (35.6)	130 (31.1)	78 (18.7)	5 (1.2)
Frequencies of .easy to recall health information previously received	56 (13.4)	143 (34.2)	136 (32.5)	78 (18.7)	5 (1.2)
Frequencies of .Confident that I can independently follow health record	53 (12.7)	164 (39.2)	136 (32.5)	62 (14.8)	3 (0.7)
Frequencies of .my input into the planning for the care of the child is value	54 (12.9)	165 (39.5)	133 (31.8)	63 (15.1)	3 (0.7)
Frequencies of .rely my health concerns to the people around me.	54 (12.9)	157 (37.6)	132 (31.6)	75 (17.9)	0(0)
Frequencies of .use the health information to monitor and self-regulate.	56 (13.4)	145 (34.7)	136 (32.5)	81 (19.4)	0(0)
Frequencies of .remained active in social gatherings as I did before the pregnancy	56 (13.4)	133 (31.8)	144 (34.4)	82 (19.6)	3 (0.7)
Frequencies of .ability to take care of my health and that of the child.	61 (14.6)	131 (31.3)	136 (32.5)	87 (20.8)	3 (0.7)

Significant differences were seen between inadequate-adequate ($W=5.621$, $P\text{-value}\leq 0.001$) and moderate-adequate ($W=4.981$, $P\text{-value}\leq 0.001$) health literacy levels and hand hygiene practices. A weak

positive correlation ($P\text{-value}\leq 0.003$) was found between health literacy and hand washing among participants however, hand washing before and after care activities was positively correlated (Figure 1).

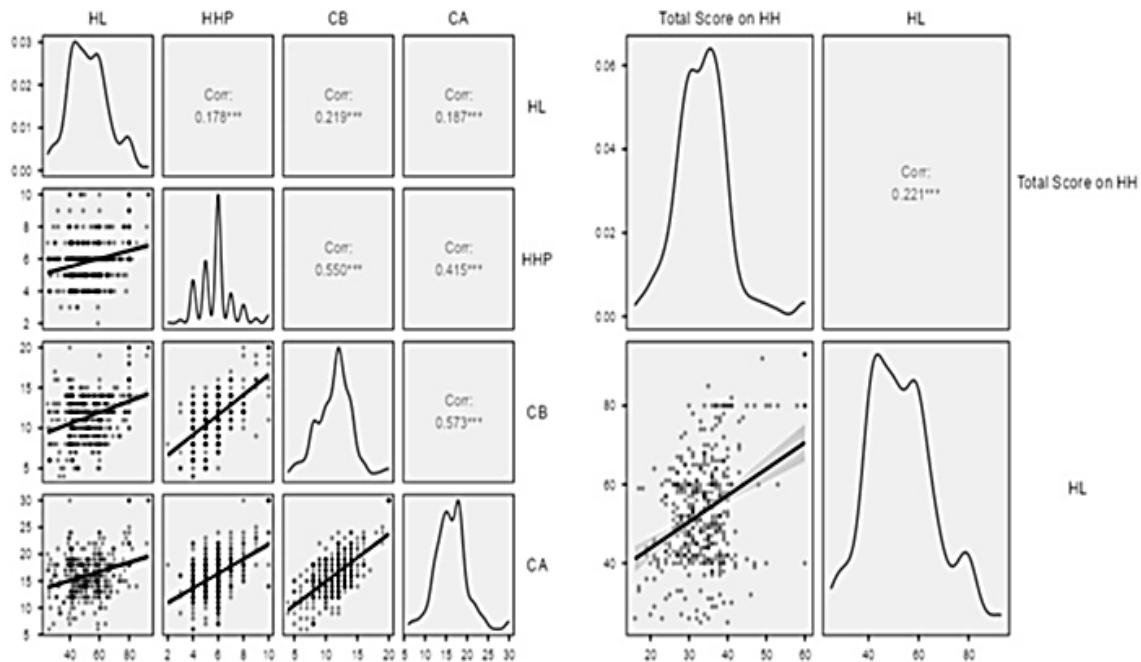


Fig.1: Correlations between health literacy and hand washing practices overall, in the general population, and before and after care activities

The ordinal logistic regression ($\chi^2=14.344$, $df= 2$, $P\text{-value}\leq 0.001$) showed that health literacy strongly predicted hand hygiene levels. The pseudo- R^2 values for health literacy for hand hygiene habits were poor, with McFadden's R^2 at 0.043, Cox & Snell R^2 at 0.011, and Nagelkerke R^2 at 0.049.

Study shows caregivers with low health literacy have decreased probability of practicing proper hand hygiene compared to those with high health literacy (Estimate=-1.880, $P\text{-value}\leq 0.001$, $OR=0.153$, 95% CI [0.060, 0.394]). Caregivers with medium health literacy showed decreased odds of practicing adequate hand hygiene levels

compared to those with high health literacy (Estimate=-1.612, $P\text{-value}\leq 0.001$, $OR=0.200$, 95% CI [0.083, 0.496]). Multivariate analysis found no correlation between demographics and hand washing practices or health literacy, except for caregiver education level ($P\text{-value}\leq 0.001$).

Note. H_a is a positive correlation; Note. * $P\text{-value}\leq 0.05$, ** $P\text{-value}\leq 0.01$, *** $P\text{-value}\leq 0.001$, one-tailed

HL: health literacy; HHP: hand washing process; CB: hand washing before care activity; CA: hand washing after care activity.

Discussion

The majority of the responders were young, as they were of reproductive age; since the study setting was based on one district of Karnataka, they were Kannada language speakers. In India, a joint family structure is still preferred over a nuclear structure; hence, the majority of the study participants had joint families. In low-income settings, a lack of access to necessities such as water and soap amplifies the challenges faced in maintaining proper hand washing, leading to increased health risks, particularly in vulnerable populations (37).

Previous research has shown that health education, parents practicing good handwashing, increased parent–child bonding, and spending more time together affect caregivers' hand washing practices (38). However, our study revealed that gender, age, number of children, and type of family structure did not affect health literacy among caregivers.

Family structure plays a significant role in hand washing practices, and global and Indian studies have shown that individuals in joint family structures tend to have better hand washing practices than do those in nuclear families (38–41). This could be attributed to the collective responsibility and shared values within joint families, leading to greater awareness and adherence to hand washing protocols. Additionally, the presence of multiple family members in joint households may create a social norm that emphasizes the importance of hand washing, influencing behaviour positively.

Health literacy has emerged as a pivotal factor influencing hand washing practices. Our findings that higher education and

socioeconomic status are associated with better hand washing practices supporting a positive correlation between health education and hand washing practices among older adults (42). This highlights the importance of integrating health literacy into public health interventions to promote effective hand washing practices.

The development of children's hand washing relies on parent–child interactions and shared time, which families often find in joint family structures. A lack of awareness, interest, and delayed habit formation (43) in younger age groups towards hand washing are the contributors reported towards moderate hand washing levels among caregivers (44).

Based on various research papers, it is evident that individuals with higher education levels such as tertiary education, practice better hand washing practices (45, 46). Higher level of education is associated with increased knowledge of hand washing (45, 47) but certainly have weak evidence on hand washing practices (48).

There is a universal need for increased awareness, perception and attitude towards handwashing before care activities (38, 49). One of the studies in Coastal Karnataka 9 highlighted disparities between observed and reported hand washing practices among healthcare workers, underscoring a gap that is also evident among caregivers. Similarly, research in northwest Ethiopia 33 revealed that inadequate handwashing practices among mothers significantly impacted the health of children under five years of age, emphasizing the need for targeted hygiene education. These findings suggest that despite awareness campaigns, there remains

a critical need for enhanced training and consistent reinforcement of proper hand washing practices among caregivers.

While the WHO's five-moments of hand washing have been widely adopted, some reviews have questioned the strong scientific foundation of this framework, suggesting that it is based more on consensus than on robust scientific evidence ¹. However, this approach was pilot tested in various countries and settings, showing significant improvements in hand washing compliance and knowledge across different professional categories (50). Its application for designing the intervention was carried out and found to be effective in various countries (51). For example, findings from a qualitative assessment of a hand washing poster in rural Uganda included a well-received poster, and participants reported compliance with the moments for hand washing, demonstrating its acceptability in preventing community-acquired newborn infections.

Caregiver play a role similar to that of healthcare workers for their children; hence, these five moments of hand washing coined by the WHO should be rolled out to mothers or caregivers of vulnerable family members (52). Evidence from various countries highlighted a gap in hand washing practices before and after care activities among healthcare providers (53,54), but there is a dearth of evidence revealing a gap at five time points of hand washing (52,55). There is evidence on gaps in hand washing methods, but these gaps are not identifying the moments or instances requiring hand washing that could facilitate the design of targeted interventions (55). Community-based evidence indicates that poor hand

washing practices are associated with infectious diseases among children (12, 33, 56).

Health literacy has emerged as a crucial factor shaping preventive health behaviors, including hand washing practices. The literature underscores the positive correlation between health literacy and hand washing, emphasizing the importance of educating individuals to make well-informed health choices (49, 57). Limited health literacy can lead to reduced adoption of protective behaviors, including hand washing (28). Adequate health literacy is the key for better health behaviour how it could reduce the COVID-19 fear and its negative effect in Turkey (58).

Higher education and income levels are associated with better health literacy (59, 60) while health literacy mediates the relationship between socioeconomic status and health outcomes (61–63). Hand washing and health literacy are associated where the latter facilitate the practice of limiting the spread of infectious diseases (27, 49, 64).

Both health literacy and hand washing complement each other (57) for the prevention of communicable diseases, which are prevalent among children under five years of age. Caregivers do recognize the importance of hand washing, but there are gaps in their understanding of when and how to practice it effectively. Addressing low health literacy requires targeted interventions that consider the specific needs and challenges of affected populations. Designing and implementing health literacy interventions to improve hand washing practices among caregivers in pediatric settings is essential. Such interventions could

include educational programs, visual aids, and interactive tools to enhance understanding and compliance with hand washing protocols. Caregiver training and mass health promotional community-based activities for caregivers to understand when hand washing is required.

It is evident that handwashing and health literacy can act as primordial prevention. Despite this understanding, grim efforts are made by developing countries to empower caregivers. Health literacy reports and their effectiveness have been highlighted over the last two decades, but forefront actions and policy integration have been undertaken by very few countries. Governments should integrate health literacy and hand washing among caregivers as a national program to eradicate community-acquired infectious diseases in children under five. Paediatric outpatient departments can be utilized to empower caregivers on methods of infection prevention.

Although this study highlighted key gaps in health literacy and hand washing among parents, it has several notable limitations. The participant's sample represent single hospital in Coastal Karnataka, adopting cross-sectional study design, limits the generalizability of the findings to other geographic regions or healthcare settings. The reports are based on the recall of parents; the tool used to assess health literacy is for assessing mothers' health literacy. This study also highlights the need to develop a health literacy assessment tool for caregivers of vulnerable populations, such as children under the age of five years. The capacity to track changes or patterns over an extended period and hindering the

determination of causality require future longitudinal multicentre or multinational studies to assess the impact of developing health literacy and adopting WHO's five moments of hand washing to caregivers, and policy changes on child's health and communicable disease burden. Collaboration with healthcare professionals, policymakers, and community stakeholders is essential for identifying and addressing barriers to hand washing practices, particularly in resource-constrained settings.

Conclusion

Caregivers with higher levels of health literacy demonstrated better hand hygiene behaviours. There is need for targeted interventions and healthcare policies to enhance hand washing practices among caregivers in paediatric settings and in community. While the first attempt has been made to understand hand washing practices and health literacy among caregivers, there are still considerable gaps and challenges that need to be addressed. There is a need to prioritize tailored hand washing education and awareness campaigns for caregivers, focusing on handwashing before and after contact with children. Healthcare providers play a vital role in enhancing caregivers' health literacy, prioritizing health promotion behaviour and integrating support on handwashing practices to caregivers with varying levels of literacy should be explored. Healthcare providers and policymakers should consider integrating health literacy development and hand hygiene education into routine caregiving training to enhance overall child health.

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