



*Original article*

## Hand washing Knowledge and Practice among mothers of under-five children in coastal Karnataka, India – A cross-sectional study

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### ABSTRACT

Washing one's hands with soap following critical moments like after toilet use, after cleaning a child's bottom and before handling food is an important barrier to the transmission of pathogens causing diarrhea and acute respiratory infections (ARI). The present study aimed at determining the knowledge and practice of hand washing among the mothers of under-five children attending the anganwadis in Udupi taluk and to identify the factors associated with hand washing practice. A cross-sectional study was undertaken between October and November 2013 to cover 14 anganwadis in Udupi taluk. Convenient sampling was used to select 90 mothers who were interviewed about their knowledge and practice of hand washing at key junctures. Majority of the mothers (96.7%) knew the importance of hand washing for preventing diseases and the critical moments where hand washing with soap (HWWS) was crucial like after defecation (96.66%), after cleaning child's bottom (91.11%) and before handling food (83.33%). The practice of HWWS was high for occasions like after defecation (90%) and after cleaning child's bottom (87.8%) but low for events like before cooking (31.1%) and before feeding child (38.9%). Mother's education, location of wash area and soap availability were all associated with HWWS practice. There was gap between the knowledge and practice of HWWS before cooking, eating or feeding the child compared to other critical times. Providing information about benefits of hand washing in anganwadis and using social marketing approaches to adopt hand washing behaviors among the mothers may have lasting impact on children's health.

**KEYWORDS:** Anganwadis, critical moments, hand washing with soap (HWWS)

### INTRODUCTION

Developing countries have been disproportionately weighed down by the burden of infectious diseases. Globally 1.7 million deaths occur annually mainly due to diarrhea attributed to unsafe water, sanitation and hygiene among children under-five and virtually all these deaths occur in developing countries. [1] Diarrheal disease results in a substantial burden on the health system, household and nutritional status of children. [2] Acute Respiratory infections (ARI) and diarrhea are the two major childhood killers accounting for 18% and 15% respectively of all under-five childhood deaths globally. [3]

Washing one's hands with soap is an important barrier to the transmission of pathogens causing ARI or diarrhea and has been cited as one of the most cost-effective health intervention within the financial reach of all countries and communities. [4] Many studies have shown that hand washing with soap (HWWS) can significantly reduce the burden of both the diseases with diarrheal incidence rates coming down by 47% [5,6] and a 23% reduction in respiratory tract infections. [7] This could contribute

significantly towards achieving the Millennium Development Goal (MDG) 4 concerned with reducing under-five mortality. Yet, despite its lifesaving potential, handwashing with soap is seldom practiced. The observed rates of hand washing with soap (HWWS) at key junctures vary from 2 to 35% across the globe. [8]

Traditionally open defecation is still practiced by certain communities in India and 44% of the mothers dispose their child's faeces in the open leading to high risk of microbial contamination of water. [9] In community settings good hand washing practice is rare and the behaviors related to hand washing practices are private and difficult to change.

The present study was done to ascertain the knowledge and practice of hand washing in domestic settings among the mothers of under-five children attending the anganwadi centres of Udupi taluk, Karnataka. A secondary objective was formulated to identify the factors associated with HWWS after defecation and cleaning up a child.

## MATERIALS AND METHODS

The urban and rural areas of Udupi taluk, which is one of the three sub-divisions of Udupi district in coastal Karnataka, formed the study settings. A descriptive cross-sectional study of mothers of the under-five children attending anganwadi centres in Udupi taluk was carried out between October and November 2013. Fourteen anganwadis were conveniently selected out of the total anganwadis in Udupi taluk and 90 mothers were then selected conveniently due to feasibility reasons. The mothers were explained about the purpose and utility of the survey and informed oral consent was obtained from each participant. Mothers who had more than one child enrolled in the anganwadi centre were also considered as one unit.

A total of 90 women were interviewed to assess the knowledge and practice of handwashing following the five key events. An interviewer administered pre-designed semi-structured questionnaire was used to collect data regarding the socio-demographic profile, knowledge and practice of handwashing in the local language. The study tool was developed following a meticulous appraisal of literature and validated by expert review. The handwashing practice of mothers after the five critical moments i.e, after defecation, after cleaning child's bottom who had defecated, before cooking, before eating and before feeding child were assessed. According to the WHO, proper handwashing was defined as washing hands with soap and water (HWWS) thoroughly following the five critical moments.

The data was analyzed using SPSS version 15.00 (SPSS Inc, Chicago, Illinois, USA). Descriptives (frequency, percentage, mean, standard deviation, median and interquartile range) were reported to explore the socio-demographic profile, knowledge and handwashing practice among the respondents. Chi-square test was used to find out the association between socio-demographic variables on handwashing practice following the critical moments. Statistical significance was considered at p-values less than 0.05.

## RESULTS

### *Socio-demographic characteristics*

The mean age of the mothers was  $30.34 \pm 4.86$  years and the median monthly household income was INR 10,000 (IQR=[2000; 60000]). More than a third of mothers (70%) were in the age group of 26 – 35 years and nearly half (54.4%) of them had completed high school and above education. Most of the respondents were housewives (73.3%) and belonged to Hindu religion (90%). Nearly half of the respondents (53.3%) lived in a joint family setup. Almost all of them had toilets (96.7%) in their homes and the major source of water was well water (63.3%). Majority of the mothers (98.9%) had a designated wash area after toilet use and 90% had soap at the wash area.(Table 1)

**Table 1: Socio-demographic characteristics of the respondents (n=90)**

INDICATOR	n (%)
<b>Age of the mothers (years)</b>	
≤25	13 (14.4)
26-35	63 (70)
>35	14(15.6)
<b>Per capita monthly income (in INR)</b>	
≤1000	18 (20)
1001-2000	36 (40)
2001-3000	24 (26.7)
>3000	12 (13.3)
<b>Education</b>	
Illiterate	9 (10)
Primary (1 <sup>st</sup> -5 <sup>th</sup> std)	10 (11.1)
Secondary (6 <sup>th</sup> -9 <sup>th</sup> std)	22 (24.4)
High school (10 <sup>th</sup> and above)	49 (54.4)
<b>Occupation</b>	
House wife	66 (73.3)
Domestic help	8 (8.9)
Others	16 (17.8)
<b>Religion</b>	
Hindu	81 (90)
Muslim	5 (5.6)
Christian	4 (4.4)
<b>Family type</b>	
Nuclear	42 (46.7)
Joint	48 (53.3)
<b>Toilet status</b>	
Yes	87 (96.7)
No	3 (3.3)

<b>Status of wash area</b>	
Yes	89 (98.9)
No	1 (1.1)
<b>Soap availability</b>	
Yes	81 (90)
No	9 (10)

### Knowledge on handwashing

Almost all the respondents (96.7%) stated that handwashing was important for the prevention of communicable diseases and majority of them maintained that handwashing with water alone was not sufficient to prevent diseases (82.2%). More than half of the mothers opined that proper handwashing could prevent diarrhea (58.9%) and ARI

(51.1%). Only 15.6% of the respondents could not name any disease that could be prevented by handwashing. The major benefits of handwashing as identified by the respondents were to maintain cleanliness (45.6%) and remain healthy (42.2%). Most of the mothers opined that the prime sources of handwashing information were their families (55.6%) followed by schooling (24.4%) and media (23.3%). (Table 2)

**Table 2: Knowledge of handwashing among the respondents (n=90)**

INDICATORS	n (%)
<b>Important for prevention of communicable diseases</b>	
a) Yes	87 (96.7)
b) No	1 (1.1)
c) Don't know	2 (2.2)
<b>Diseases that can be prevented by handwashing *</b>	
a) Diarrhoea	37 (58.9)
b) Acute respiratory infections	46 (51.1)
c) Worm infestations	9 (10)
d) Allergy and other diseases	29 (32.2)
e) Don't know	14 (15.6)
<b>Critical moments where HWWS is crucial*</b>	
a) After defecation	87 (96.66)
b) After cleaning child who has defecated	82 (91.11)
c) Before food preparation	75 (83.33)
d) Before eating	77 (85.56)
e) Before feeding child	81 (90)
<b>Benefits of handwashing*</b>	
a) Remain healthy	38 (42.2)
b) Prevent diseases	33 (36.7)
c) Maintain cleanliness	41 (45.6)
<b>Washing hands with water alone to prevent diseases</b>	
a) Yes	15 (16.7)
b) No	74 (82.2)
C) Don't know	1 (1.1)
<b>Source of handwashing knowledge*</b>	
a) Family	50 (55.6)
b) Schooling	22 (24.4)
c) Health personnel	17 (18.9)
d) Media	21 (23.3)

\* Multiple responses

### Practice of handwashing

Majority of the mothers wash their hands with soap and water after defecation (90%) and after cleaning child's bottom (87.8%) but fewer women wash their hands before cooking (31.1%), before eating (33.3%) and before feeding the child (38.9%). The women who didn't wash their hands properly (used only water) after defecation (10%) and after

cleaning a child who has just defecated (12.2%) cited the absence of soap or water at the designated site of hand washing as the reason for not doing so. More than half (62.2%) of the respondents indicated that there were no barriers to hand washing but a quarter (25.6%) of the women stated that time shortage was the key reason for not washing hands properly. (Table 3)

**Table 3: Practice of handwashing among the respondents (n=90)**

Handwashing practices of mothers	With soap and water n (%)	With water only n (%)
After Defecation	81 (90)	9 (10)
After cleaning child who has defecated	79 (87.8)	11 (12.2)
Before cooking	28 (31.1)	62 (68.9)
Before eating	30 (33.3)	60 (66.7)
Before feeding child	35 (38.9)	55 (61.1)

***Determinants of hand washing***

Age, religion, type of family, household income and occupation were not associated with HWWS after defecation and after cleaning the child who had defecated. Likewise there was no link between type of house, toilet status, source of water in the house and presence of designated wash area after using toilet with HWWS practice following defecation or cleaning a child who had defecated.

However education of the mother was found to be associated with HWWS after defecation ( $p < 0.001$ ) and HWWS after cleaning child ( $p = 0.007$ ). Likewise location of the designated wash area was associated with HWWS after defecation ( $p = 0.018$ ) and HWWS after cleaning the child ( $p = 0.002$ ). Moreover presence of soap at the designated wash area was undoubtedly associated with HWWS after defecation ( $p < 0.001$ ) and HWWS after cleaning child's bottom ( $p < 0.001$ ). (Table 4)

**Table 4: Factors associated with handwashing practice (n=90)**

VARIABLE	HWWS after defecation	p-value	HWWS after cleaning child	p-value
<b>Age (years)</b> ≤25 26-35 >35	13 /13 54 /63 14/14	0.165	12/13 55/63 12/14	1.00
<b>Per capita household Income</b> ≤1000 1001-2000 2001-3000 >3000	14/18 32/36 23/24 12/12	0.214	14/18 31/36 22/24 12/12	0.336
<b>Education</b> Illiterate Primary Secondary High school and above	5/9 9/10 18/22 49/49	<0.001*	5/9 9/10 18/22 47/49	0.007*
<b>Occupation</b> Not working Working	60/66 21/24	0.696	58/66 21/24	1.00
<b>Soap availability</b> Yes No	1/9 81/90	<0.001*	78/81 1/9	<0.001*
<b>Location of wash area</b> Toilet Bathroom Outside	7/7 47/48 27/34	0.018*	7/7 47/48 25/34	0.002*

\*Fisher Exact Chi square Test (p-value)

## DISCUSSION

Majority of the respondents (98.7%) stated the importance of handwashing with respect to prevention of communicable diseases and only 16.7% opined that washing hands with water alone was sufficient. This was in contrast to a study from Tamil Nadu by Datta et al. [10] where 77.82% of the mothers felt that water alone was sufficient for proper handwashing and 83.41% thought that handwashing was important for disease prevention.

The awareness of critical moments where handwashing was considered crucial by the respondents varied from 96.7% (after defecation), 91.1% (after cleaning child), 90% (before feeding child), 85.6% (before eating) to 83.3% (before cooking). These results were contradictory to the fairly low awareness levels among the mothers from a study by Datta et al. [10] The differing education levels of the mothers from our study may possibly have contributed to the higher knowledge compared to the mothers from Tamil Nadu.

Majority of the respondents (90%) practiced HWWS after defecation and 87.8% after cleaning up a child in our study but findings from developing countries suggest that HWWS at key junctures such as after toilet use or cleaning up a child is uncommon and occurred on an average of only 17% and 13% of the occasions according to Scott et al. [11]

HWWS before cooking (31.1%), before eating (33.3%) and before feeding child (38.9%) was much lower than hand washing practice after defecation. This finding was similar to the results of a study from Bangladesh by Rabbi et al. [12]

Bivariate analysis showed mother's education was associated with HWWS after defecation and after cleaning child's bottom. Past studies have reported similar findings from Bangladesh by Rabbi et al. [12] and Luby et al. [13] and from Ghana by Scott et al. [11] However, an intervention study from Andhra Pradesh by Biran et al. [14] showed that none of the socio-economic characteristics were associated with safe hand washing and only availability of water was a predictor of safe handwashing at key occasions.

The present study also showed an association between location of the designated place for handwashing and soap availability with the practice of HWWS after defecation and after cleaning the child who had defecated. In a study by Luby et al. [13] presence of water and soap at the designated place to wash hands were significantly associated with washing hands with soap after fecal contact. The study [13] emphasized that the presence of soap was a marker of the handwashing intent of the household resident.

The present study had some limitations. The results of our study cannot be generalized. The knowledge and practice questions on hand washing could have invoked socially desirable responses and this is a limitation of most community based studies. In addition HWWS at different critical times was not physically verified which is a drawback of our study.

## CONCLUSION

This study showed that the knowledge and practice of HWWS at key junctures like after toilet use and cleaning up a child among the mothers of the children attending the anganwadis in Udipi taluk was high. Education of mother, location of wash area and presence of soap at the designated place for hand wash were associated with the practice of HWWS on critical occasions. The practice of HWWS before cooking or feeding the child was low compared to the other critical moments. The knowledge gap among the mothers regarding the benefits of handwashing in reducing diarrhoeal and ARI episodes of the children could be tackled by intensive health education activities. Innovative social marketing approaches may possibly help in adoption of hygienic handwashing behaviors among the mothers indirectly impacting the health of children.

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## REFERENCES

1. Boschi-Pinto C, Velebit L, Shibuya K. Estimating child mortality due to diarrhoea in developing countries. *Bull World Health Organ* 2008; 86: 710-7.
2. Bateman M, McGahey C. Child diarrhea prevention. [serial on internet] *Global HealthLink*. 2001 Sep-Oct; 9, 16. [cited 2014 June 20] Available from <http://www.popline.org/node/236656>
3. Preventing disease through healthy environments [homepage on internet]- World Health Organization. 2006 [cited 2014 June 20] Available from [http://www.who.int/quantifying\\_ehimpacts/publications/preventingdisease.pdf](http://www.who.int/quantifying_ehimpacts/publications/preventingdisease.pdf)
4. UNICEF WCARO- [monograph on internet] Overview- Handwashing [cited 2014 June 27] Available from [http://www.unicef.org/wcaro/english/overview\\_4553.html](http://www.unicef.org/wcaro/english/overview_4553.html)
5. Curtis V, Cairncross S. Effect of washing hands with soap on diarrhoea risk in the community: a systematic review. *Lancet Infectious Diseases* 2003;3:275-281.
6. Luby S, Agboatwalla M, Feikin D, Painter J, Billhimer W, Altamirano A, et al. Effect of handwashing on child health: a randomised controlled trial. *The Lancet* 2005;366(9481):225-233.
7. Rabie T, Curtis V. Evidence that handwashing prevents respiratory tract infection: a systematic review. *Trop Med and Int Health* 2006;11(3):1-10.

8. Scott B, Curtis V, Rabie T. Protecting children from diarrhoea and acute respiratory infections: the role of handwashing promotion in water and sanitation programmes. WHO Regional Health Forum 2003;7(1):42-47.
9. UNICEF India - Water, environment and sanitation [homepage on internet] - Water.[cited 2014 June 27]Available from <http://www.unicef.org/india/wes.html>
10. Datta SS, Singh Z, Boratne AV, Senthilvel V, Bazroy J, Dimri D. Knowledge and practice of handwashing among the mothers of under five children in rural coastal South India. Int. J. Med. Public health 2011 Jan; 1 (1): 33-38
11. Scott BE, Lawson DW, Curtis V. Hard to handle: understanding mothers' hand washing behavior in Ghana. Health Policy and Planning 2007; 22: 216-222
12. Rabbi SE, Dey NC. Exploring the gap between hand washing knowledge and practices in Bangladesh: a cross-sectional study. BMC Public Health 2013;13:89
13. Luby SP, Halder AK, Tronchet C, Akhter S, Bhuiya A, Johnston RB. Household characteristics associated with handwashing with in rural Bangladesh. Am J Trop Med Hyg. 2009 Nov; 81(5):882-7
14. Biran A, Schmidt WP, Wright R, Jones T, Seshadri M, Isaac P et al. The effect of a soap promotion and hygiene education campaign on handwashing behavior in rural India: a cluster randomized trial. Trop Med and Int Health 2009 Oct; 14(10): 1303-1314

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