# Knowledge and practice of handwashing among mothers of under five children in rural coastal South India

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## ABSTRACT

**Objectives:** To study the knowledge and practice of handwashing after critical moments among mothers of under five children and to recommend measures for improvement of handwashing practices based on the study findings **Methods:** A community based cross-sectional study was undertaken during February 2010 covering 28 villages around coastal South India. The EPI 30-cluster sampling method was used and 1898 mothers of under five children were interviewed about their knowledge and practice regarding handwashing after critical moments. **Results:** 83.41% mothers stated handwashing was important for prevention of communicable diseases. 77.82% opined that washing hands with only water was sufficient. 38.88% and 24.92% stated handwashing could prevent diarrhoea and ARI respectively. 80.08% mothers thought handwashing was crucial before eating meals; 56.90%, 41.73% and 40.73% respectively felt that it was important to wash hands after defeacation, before preparing food and feeding child. 73.18% mothers washed hands with soap and water after defeacation and 63.91% after cleaning the child who had defeacated. Majority wash their hands with only water before preparing food (71.86%) and feeding the child (67.39%). Mothers with per capita monthly family income of Rs.1001-2000 and more, education of 5-7 standard and above, belonging to a joint family and Christian background had better handwashing practices. However, daily labourer mothers were at highest risk of not washing hands at all critical moments. **Conclusion:** Knowledge and practice of handwashing is low among rural mothers. Hence there is a need to spread importance of proper and regular handwashing in rural areas through available evidence based BCC strategies and multiple dissemination channels.

**Key words:** Coastal South India, handwashing, mothers, under five children

## INTRODUCTION

Globally diarrhoea still kills more than two million young children every year, while most mothers in both developing and developed countries, fail to wash their hands adequately after faecal contact.[1] A recent meta analysis concluded that handwashing promotion interventions decrease diarrhea by a mean of 47%.[2] Various other studies have also highlighted that simple act of handwashing could prevent diarrhoea, ARI and skin infections.[3,4] However, the knowledge and practice of handwashing in the community appeared to be poor even today.[5] There is a need to address this issue globally for prevention and control of certain communicable diseases specially diarrhoea, ARI and others that takes a great toll every year, particularly affecting the young population of the country - the worst sufferers.[6] Young children cannot wash their own hands and therefore cannot interrupt the transfer of pathogens between their hands and their mouth. They might benefit from a lower rate of diarrheal pathogen transmission from parents who wash their hands more frequently with soap and water.[7]

Public health importance of handwashing has been reiterated time and again while neither health administrators nor caregivers considered handwashing as an important tool for prevention of communicable diseases. India has experienced poor handwashing practices over the years, yet much importance has not been given to this tool for prevention of communicable diseases as has been given to other methods like ORT, Standard case management of diarrhoea and ARI.[6] This study has been carried out to ascertain the knowledge and practice of handwashing after critical moments among mothers of under five children

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residing in rural coastal South India with a view to suggest remedial measures based on the study findings.

## OBJECTIVES

1. To study the knowledge and practice of handwashing after critical moments among mothers of under five children,
2. To recommend measures for improvement of handwashing practices based on the study findings.

## MATERIAL AND METHODS

**Study area:** The present community based cross-sectional study was undertaken during February, 2010 covering 22 villages of Villupuram district, 3 villages each of Pondicherry and Kanchipuram district, coastal South India under the field practice area of Department of Community Medicine of Pondicherry Institute of Medical Sciences.

**Data collection:** Data was collected using a pre-designed and pre-tested proforma where trained medical undergraduates and paramedical staff under the supervision of a faculty member collected data by house-to-house survey. Mothers of under five children were informed about utility of the survey and verbal consent was obtained in each instance. Mothers not willing to participate in the study, with speech and hearing impairment were excluded from the study. A mother was taken as a unit for study purpose and in case there were two under five children in the same house, it was considered as one unit. The EPI 30 cluster sampling method was used to carry out the survey; 30 such clusters with 60 mothers of under five children in each cluster were considered and a total of 1898 mothers were studied with two additional clusters from bigger villages considered during study design for non-response. Information regarding socio-demographic characteristics of mothers, their knowledge and practice regarding handwashing was collected. Handwashing practice by mothers was assessed after defeacation, before preparing food, before taking meals, before feeding the child, after cleaning child who has just defeacated, after urination and after routine work by mothers. However, proper handwashing was defined as handwashing with soap and water after all these critical moments.

**Data analysis:** The data were analysed using Epi_Info software package (Center for Disease Control and Prevention, Atlanta, Georgia, USA) version 6.04 and Statistical Package for the Social Sciences for Windows (SPSS Inc., Chicago, Illinois, USA) version 16.0. To compare data sets chi-square test was used and $P < 0.05$ was considered statistically significant. To calculate odds ratio (with 95% confidence interval) handwashing practice after critical moments were considered as dependent variable against mothers' per capita family income (Rs), education, occupation, religion and family type as independent variable.

## RESULTS

The mean age of mothers and per capita monthly income were 26.11 ± 4.21 years and INR. 935.15 ± 25.18 respectively. Most of the mothers were between 21-25 years age group (47.78%) and educated upto 8-12 years of schooling (51.90%). Majority of the respondent mothers were house wives (82.78%), belong to Hindu religion (89.15%) and have a nuclear family (68.39%). (Table 1)

## KNOWLEDGE OF HANDWASHING

83.41% mothers stated that handwashing was important in prevention of some or the other communicable diseases. However, 77.82% mothers felt that washing hands with only water was sufficient. Only 38.88% and 24.92% mothers knew that handwashing could prevent diarrhoea and ARI

**Table 1: Socio-demographic characteristics of mothers of under five years children (N = 1898)**

| Indicator | N (%) |
|---|---|
| **Age of mothers (yrs)** | |
| ≤ 20 | 85 (4.48) |
| 21-25 | 907 (47.78) |
| 26-30 | 697 (36.73) |
| ≥ 31 | 209 (11.01) |
| **Monthly per capita income (in rupees)** | |
| ≤ 500 | 739 (38.94) |
| 501-1000 | 746 (39.31) |
| 1001-2000 | 321 (16.91) |
| 2001-3000 | 39 (2.06) |
| ≥ 3001 | 53 (2.78) |
| **Education** | |
| Illiterate | 336 (17.70) |
| 1-4 std | 94 (4.95) |
| 5-7 std | 333 (17.55) |
| 8-12 std | 985 (51.90) |
| Graduate and above | 150 (7.90) |
| **Occupation of mothers** | |
| Housewife | 1571 (82.78) |
| Service | 42 (2.21) |
| Farmer | 64 (3.37) |
| Daily labourer | 142 (7.48) |
| Other | 79 (4.16) |
| **Religion** | |
| Hindu | 1692 (89.15) |
| Christian | 145 (7.64) |
| Muslim | 61 (3.21) |
| Others | -Nil- |
| **Family type** | |
| Nuclear | 1298 (68.39) |
| Joint | 600 (31.61) |

Note: Chi-square value for proportions was significant in all instances

among children respectively. 80.08% mothers were of the opinion that handwashing was crucial before eating meals. 56.90%, 41.73% and 40.73% thought that handwashing was important after defeacation, before preparing food and before feeding the child respectively. 15.96% and 21.97% mothers responded that handwashing was crucial after cleaning child who had just defeacated and after urination. (Table 2)

## PRACTICE OF HANDWASHING

Majority of mothers washed their hands properly (with soap and water) after defeacation (73.18%) and after cleaning child who had just defeacated (63.91%) which was much higher than prevailing knowledge. However, majority of mothers washed their hands with only water before preparing food (71.86%), before eating meals (76.98%), before feeding the child (67.39%), after urination (55.01%) and after daily routine work (63.01%). Only 20.92% and 29.98% mothers washed their hands with soap and water before preparing food and before feeding the child respectively. However, washing hands with ash and water after critical moments was not a common practice in the study area. (Table 3, Fig 1 and 2)

## DETERMINANTS OF HANDWASHING

Considering odds ratio (95% CI) it was observed that mothers with per capita family income of Rs. 1001-2000 and above and educational level of 5-7 standard and above were likely to have better handwashing practices. Daily labourer mothers were at higher risk of not washing hands properly after all critical moments (odds ratio more than 2). On the other hand Christian mothers and mothers belonging to joint families were likely to practice better hand washing. (Table 4)

**Table 2: Knowledge of handwashing among mothers of under five years children (N = 1898)**

| Indicator | N (%) |
|---|---|
| **Important for prevention of communicable diseases** | |
| a) Yes | 1583 (83.41) |
| b) No | 131 (6.90) |
| c) Don't know | 184 (9.69) |
| Total | 1898 (100) |
| **Sufficient to wash hands with water alone** | |
| a) Yes | 1477 (77.82) |
| b) No | 317 (16.70) |
| c) Don't know | 104 (5.48) |
| Total | 1898 (100) |
| **Benefits of handwashing** * | |
| a) Prevention of diarrhoea | 738 (38.88) |
| b) Prevention of ARI | 473 (24.92) |
| c) Prevention of intestinal worm | 243 (12.80) |
| d) Prevention of skin and eye infection | 207 (10.91) |
| e) Others | 312 (16.44) |
| **Critical moments where handwashing is crucial** * | |
| a) After defeacation | 1080 (56.90) |
| b) After cleaning child who has defeacated | 303 (15.96) |
| c) After using toilet for urination | 417 (21.97) |
| d) Before preparing food | 792 (41.73) |
| e) Before eating meals | 1520 (80.08) |
| f) Before feeding children | 773 (40.73) |
| g) After routine work | 723 (38.09) |
| h) Others | 72 (3.79) |

Note: * Multiple responses
Chi-square value was highly significant (< 0.001) in all instances

**Table 3: Practice of handwashing among mothers of under five years children (N = 1898)**

| Handwashing practices of mothers | With soap and water N (%) | With ash and water N (%) | With only water N (%) | Don't wash usually N (%) |
|---|---|---|---|---|
| After defecation | 1389 (73.18) | 13 (0.69) | 488 (25.71) | 8 (0.42) |
| After cleaning child who has defecated | 1213 (63.91) | 4 (0.21) | 649 (34.19) | 32 (1.69) |
| After using toilet for urination | 558 (29.40) | 23 (1.21) | 1044 (55.01) | 273 (14.38) |
| After routine work | 326 (17.18) | 17 (0.89) | 1196 (63.01) | 359 (18.92) |
| Before preparing food | 397 (20.92) | 15 (0.79) | 1364 (71.86) | 122 (6.43) |
| Before eating meals | 407 (21.44) | 9 (0.47) | 1461 (76.98) | 21 (1.11) |
| Before feeding child | 569 (29.98) | 8 (0.42) | 1279 (67.39) | 42 (2.21) |

Chi-square value was highly significant (< 0.001) in all instances

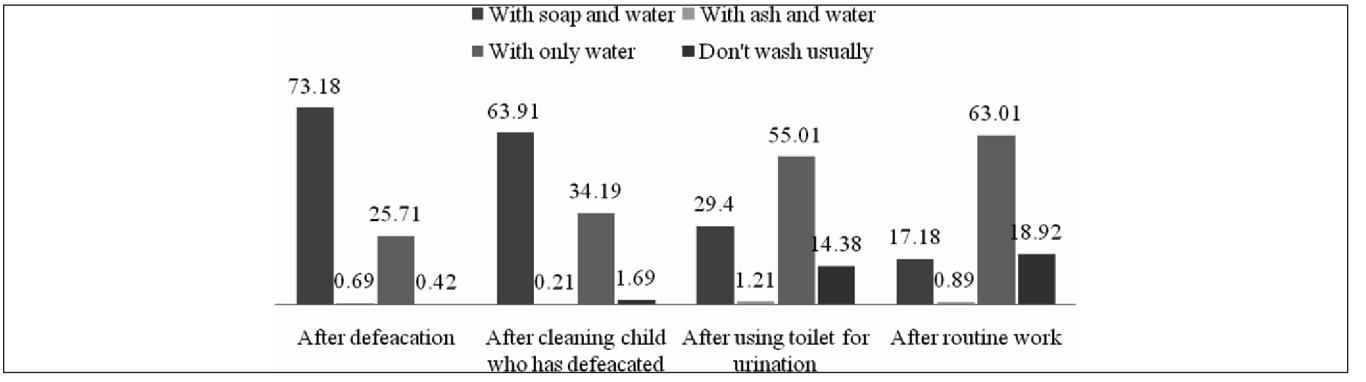


**Figure 1:** Handwashing practices of mothers after toilet use

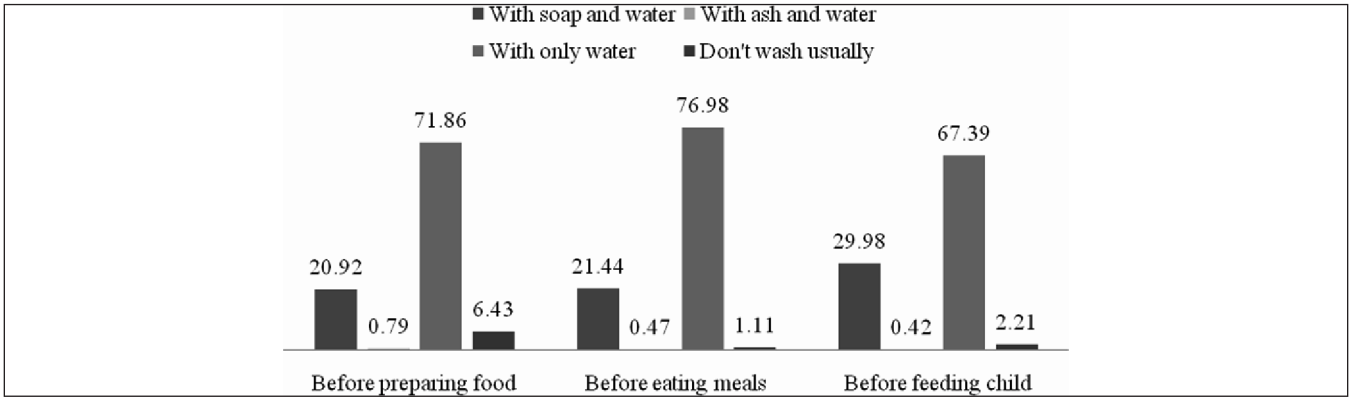


**Figure 2:** Handwashing of mothers related to feeding practices

**Table 4: Determinants of handwashing (with soap and water) among mothers of under five years children**

| Characteristics | Total (N = 1898) | After defeacation (N = 1389) | | After cleaning child who has defecated (N = 1213) | | Before preparing food (N = 397) | | Before feeding child (N = 569) | |
|---|---|---|---|---|---|---|---|---|---|
| | | N (%) | OR | N (%) | OR | N (%) | OR | N (%) | OR |
| **Monthly per capita income** | | | | | | | | | |
| ≤ 500 | 739 | 512 (69.28) | 1 | 444 (60.08) | 1 | 150 (20.29) | 1 | 205 (27.74) | 1 |
| 501-1000 | 746 | 539 (72.25) | 0.87 | 464 (62.19) | 0.91 | 141 (18.90) | 1.09 | 208 (27.88) | 0.99 |
| 1001-2000 | 321 | 251 (78.19) | **0.63** | 225 (70.09) | **0.64** | 71 (22.12) | 0.90 | 113 (35.20) | **0.71** |
| 2001-3000 | 39 | 36 (92.31) | **0.19** | 33 (84.62) | **0.27** | 12 (30.77) | 0.57 | 14 (35.89) | 0.69 |
| ≥ 3001 | 53 | 51 (96.23) | **0.09** | 47 (88.68) | **0.19** | 23 (43.39) | **0.33** | 29 (54.72) | **0.32** |
| **Education** | | | | | | | | | |
| Illiterate | 336 | 183 (54.46) | 1 | 136 (40.48) | 1 | 50 (14.88) | 1 | 66 (19.64) | 1 |
| 1-4 std | 94 | 57 (60.64) | 0.78 | 50 (53.19) | **0.60** | 21 (22.34) | 0.61 | 25 (26.59) | 0.67 |
| 5-7 std | 333 | 253 (75.98) | **0.38** | 215 (84.98) | **0.12** | 51 (15.32) | 0.97 | 72 (21.62) | 0.89 |
| 8-12 std | 985 | 759 (77.06) | **0.36** | 688 (90.65) | **0.29** | 220 (22.34) | **0.61** | 325 (32.99) | **0.50** |
| Graduate and above | 150 | 137 (91.33) | **0.11** | 124 (90.51) | **0.14** | 55 (36.67) | **0.30** | 81 (54) | **0.21** |
| **Occupation of mothers** | | | | | | | | | |
| Housewife | 1571 | 1169 (74.41) | 1 | 1028 (65.44) | 1 | 343 (21.83) | 1 | 476 (30.29) | 1 |
| Service | 42 | 32 (76.19) | 0.91 | 22 (52.38) | 1.72 | 13 (30.95) | 0.62 | 18 (42.86) | 0.58 |
| Farmer | 64 | 43 (67.19) | 1.42 | 40 (62.5) | 1.14 | 13 (20.31) | 1.10 | 21 (32.81) | 0.89 |
| Daily labourer | 142 | 78 (54.93) | **2.39** | 62 (43.66) | **2.44** | 14 (9.86) | **2.55** | 23 (16.19) | **2.25** |
| Other | 79 | 67 (84.81) | 0.52 | 61 (77.22) | **0.56** | 14 (17.72) | 1.30 | 31 (39.24) | 0.67 |
| **Religion** | | | | | | | | | |
| Hindu | 1692 | 1212 (71.63) | 1 | 1061 (62.71) | 1 | 333 (19.68) | 1 | 491 (29.02) | 1 |
| Christian | 145 | 132 (91.03) | **0.25** | 116 (80) | **0.42** | 51 (35.17) | **0.45** | 55 (37.93) | **0.67** |
| Muslim | 61 | 45 (73.77) | 0.90 | 36 (59.02) | 1.17 | 13 (21.31) | 0.90 | 23 (37.71) | 0.68 |
| **Family type** | | | | | | | | | |
| Nuclear | 1298 | 920 (70.88) | 1 | 808 (62.25) | 1 | 254 (19.57) | 1 | 362 (27.89) | 1 |
| Joint | 600 | 469 (78.17) | **0.68** | 405 (67.5) | **0.79** | 143 (23.8) | **0.78** | 207 (34.5) | **0.73** |

## DISCUSSION

The main purpose of washing hands is to cleanse the hands of pathogens and chemicals which can cause personal harm or disease. Handwashing with soap removes transient potentially pathogenic organisms from hands and it is not sufficient to wash hands with only water after critical events like defeacation. If individuals wash their hands, they are less likely to transmit pathogens from their hands to their mouths. This mechanism benefits the person washing his/her hands and is not available to children.[8]

This study showed that majority of the respondent mothers had knowledge that washing hands was important for prevention of communicable diseases, but only 38.88% and 24.92% respectively believed that this practice could prevent diarrhoea and ARI among children, whereas 56.90% and 15.96% mothers respectively believed washing hands was crucial after defeacation and after cleaning the child who had just defeacated. 77.82% mothers also stated that handwashing with only water was sufficient after various critical moments.

In this study, 73.18% and 63.91% of respondent mothers respectively practiced handwashing with soap and water after defecation and after cleaning child who has defeacated, and only 20.92% washed hands with soap and water before preparing food. Study done by Ray et al (2009), among both urban and rural communities in Kolkata reported that 59% and 21.7% respondents washed their hands after defeacation and after cleaning babies feces respectively with soap and 64% practiced handwashing before preparation of food.[9] Scott et al (2003), reported from Kerala, India that prevalence of washing hands with soap and water after using a toilet and after cleaning up a child was only 34% and 35% respectively.[10]

Epidemiological evidence shows that the most important risk factors are behaviours that encourage human contact with faecal matter, including improper disposal of faeces and lack of handwashing after defecation, after handling faeces (including children's faeces), and before handling food.[11] Initiatives adopted by International Forum of Hygiene, Global Hygiene Council and World Health Organization and celebrations such as Global Handwashing Day (15 October) emphasises on various avenues which promote behaviour change towards improved handwashing practices. These may include improvement of water supply at the household or community level as well as hygiene promotion interventions. [12]

The practice of handwashing with soap has been prominent in the last few years on the international hygiene agenda. The guiding vision of Global Handwashing Day is a local and global culture of handwashing with soap. Although people around the world wash their hands with water, very few wash their hands with soap at critical moments (after using the toilet, after cleaning a child, and before handling food). Multimodal programmes for increasing hand hygiene compliance are now recommended as the most reliable, evidence-based method for ensuring sustainable improvement in handwashing practice.[13]

Hand hygiene improvement in health care has not been seen conventionally as a public health issue, though it does concern a health issue of significance to a subset of the population, especially under five children and their care givers. [14] In resource constraint country like India, in addition to application of other tested interventions worldwide towards improvement in handwashing practices; village level health workers such as anganwadi workers, ASHA under the aegis of NRHM and members of Panchayati Raj Institution (PRI) should also be motivated and supported who have better penetration among the rural communities towards promotion of BCC activities at village level to promote proper and regular hand washing practices.

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## CONCLUSION

Handwashing is an important practice to reduce the burden of childhood morbidity and mortality and various communicable diseases like diarrhoea, ARI etc. However, both knowledge and practice of proper handwashing after critical moments still remains low among rural mothers. This study reiterates the need to spread importance of proper and regular handwashing through available evidence based BCC strategies and multiple dissemination channels in rural areas.

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