

Handwashing practices among the caregivers of under five children in rural and urban areas of Moradabad, India: a community based study

Samreen Khan¹, Vishwanath Kumar², Neha Priya¹, Sachin Singh Yadav¹

¹Department of Community Medicine, Teerthankar Mahaveer Medical College and Research Centre, Teerthankar Mahaveer University, Moradabad, Uttar Pradesh, India.

²Department of Anaesthesiology, Teerthankar Mahaveer Medical College and Research Centre, Teerthankar Mahaveer University, Moradabad, Uttar Pradesh, India.

Correspondence to: Samreen Khan, E-mail: drsamreen2k4@gmail.com

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Abstract

Background: Handwashing is listed as one of the single most effective public health intervention which directly and indirectly decreases the mortality among young children by eliminating over 90% of infections. But, unfortunately, the knowledge and practice of hand washing in the community appeared to be poor even today. The present study was carried out to study the handwashing practices of care givers, which could be a critical factor in the development of disease in the young ones.

Objective: (i) To study the handwashing practices among caregivers of children under 5 years of age; (ii) To assess and compare the handwashing practices according to the area of residence (Urban/ Rural).

Material and Methods: A community based knowledge, attitude and practices (KAP) cross-sectional study in the registered field practice areas of both urban and rural field practice areas of Department of Community Medicine, Teerthankar Mahaveer Medical College and Research Centre, Moradabad. The survey was carried out on 200 study participants using a self-designed and pre-tested questionnaire. Descriptive statistics as well as simple proportion were calculated with SPSS 20.0.

Result: According to maximum number of participants, hand washing was important. As opposed to the maximum number of people who used soap and water in urban areas, majority in rural areas used plain water for handwashing before preparing food and before feeding their children.

Conclusion: There is a need to raise awareness among care givers of under five children who should maintain a high standard of cleanliness at all times to prevent infections.

KEY WORDS: Care givers, handwashing, hygiene, preschool children, rural, urban

Introduction

The care that children receive has powerful effects on their survival, growth, and development.^[1] Of late, care has received substantial attention since the relation between a

country's per capita income and nutritional status of children has gained considerable significance. Intervention studies have consistently demonstrated that communities which received intensive hand washing promotion especially among the care-givers have less childhood diarrhea and respiratory disease.^[2-4] Unfortunately, the knowledge and practice of handwashing in the community appears to be poor even today.^[5] According to UNICEF, rates of handwashing around the world are low. Observed rates of handwashing with soap at critical moments i.e., before handling food and after using the toilet - range from 0% to 34%.^[6,7] The 3 most frequently reported methods of measuring hand hygiene compliance are direct observation, self-reporting by health care workers, and indirect calculation based on the product usage.^[8]

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Defining Care Practices and Resources for Care

Care refers to the behaviors and practices of caregivers to provide the food, health care, stimulation, and emotional support necessary for children's healthy survival, growth, and development. These practices translate food security and health care resources into wellbeing of the child. Not only the practices themselves, but also the ways they are performed: in terms of affection and responsiveness to the child, are critical to a child's survival, growth and development.^[9]

There is strong evidence that handwashing with soap is more effective than washing with water only to reduce the effect of microbes.^[10-12] One must ideally wash their hands for about 30–60 s following all the steps of handwashing.^[5]

Materials and Methods

Study Setting

The study is set at urban and rural field practice area of Teerthankar Mahaveer Medical College and Research Centre. Data was collected by house to house visits.

Study design

It is a cross-sectional community based study.

Study duration

Three months from 1st January 2016 to 31st March 2016.

Sample size

The Literature review reveals that the prevalence of handwashing practices among care givers of under five children varies from 0% to 86% (Table 6). According to UNICEF, rates of handwashing before handling food and after using the toilet - range from 0% to 34%.^[6] The sample size was calculated assuming the prevalence of 33% among the care givers. This is supported by various studies.^[3-18]

According to the formula $n = Z^2 P(1-P)/e^2$ where: Z = level of confidence: 95% (1.96), P = Prevalence of the variable under study and e = margin of error. With $P = 33%$, $e = 10%$ and non-response rate of 10%, sample size was calculated as 96.4. The sample size of 100 care givers in each of the rural and urban areas was taken. Finally, a total sample of 200 caregivers of under five children were taken in the present study.

Sampling technique

Systematic random sampling with population proportion to size method was used. A list of registered households in which at least one child under five years of age was present, was prepared and used for random selection.

Study tool used

The data was collected on a self-designed and semi-structured questionnaire. House to house survey was conducted and data was collected by interviewing the mothers

or the primary care giver of the child after taking an informed and written consent. Apart from the knowledge and practice questions pertaining to handwashing, scoring of the steps of hand washing was done by observing the steps of hand washing while the study subjects performed it in front of the interviewer.

Observations of different aspects of handwashing were done as per International Scientific Forum on Home Hygiene (IFH) guidelines,^[14] such as material used for handwashing, time of handwashing (stopwatch was used), seven steps of hand-washing as given by WHO,^[16] and hand washing mainly after defecation.

Statistics

Data was analysed using statistical package for social sciences (SPSS) version 23.0 (IBM, Chicago, USA). Descriptive statistics as well as simple proportion were calculated for the data. Chi-square and Fisher Exact test were applied wherever applicable. The value of $p < 0.05$ was considered as significant for this study.

Results

Socio-demographic profile of the study participants

Mothers formed the majority of care givers in both urban and rural areas. Almost half of the participants (54%) in the urban areas and maximum number in rural areas were in the age group of 26–30 years. Source of water is through municipal supply in the house of 68% participants in urban population whereas 45% in rural areas relied on shared (public) taps/ hand-pumps outside their homes (Table 1).

Knowledge and attitudes regarding handwashing practices

According to maximum number of participants, handwashing was important. Majority in both areas got the knowledge from television which was the main source of information. Half of the participants said soap should be used for washing hands. In the rural areas, a considerable number (33%) were of the view that ash, mud or soil can also be used as cleaning material. Majority of the participants (84%) in urban settings said towel for drying their hands after washing whereas in rural areas, only 26% said so. The others showed a rag/cloth which was infrequently cleaned (<3 times/ week) which they used. Majority of the participants in both areas said they washed their hands for 20 s or more. These urban-rural differences were found to be statistically significant (Table 2).

Handwashing practices

Over half of the participants (54%) washed their hands with soap and water after handling raw vegetables in urban areas whereas majority in rural areas used plain water. Majority of the families having non-vegetarian eating habits washed hands with soap and water in both areas after handling raw meat and meat products. Three-fourth (74%) of the

Table 1: Socio-Demographic profile of the study participants

	Urban areas (n = 100)	Rural areas (n = 100)
Care giver		
Mother	87	89
Siblings	1	5
Father	2	0
Grandmother	7	6
Others/ Nurses	3	0
Age of care giver		
<=20 years	11	23
21–25	21	25
26–30	50	33
>30	18	19
Educational Status		
Illiterate	1	43
Middle School Passed	5	27
High School Passed	7	17
Intermediate	10	9
Graduate and above	77	4
Religion		
Hindu	81	66
Muslim	12	29
Sikh	2	3
Others	5	2
Profession		
Housewife	84	72
Unskilled/ Semi-skilled	1	15
Skilled	8	8
Semi professional	4	4
Professional	3	1
Socio-economic Class*		
I	23	2
II	73	12
III	4	17
IV	0	34
V	0	35
Water Supply		
Municipal Water Supply	68	15
Personal Hand pump	17	38
Shared (Public Hand pump)	15	45
Other sources	0	2

*Modified B.G. Prasad classification (2016)

participants washed their hands with soap before preparing food in urban areas whereas maximum number in rural areas used plain water (55%). In rural areas, majority of people used soap only after defecation. Out of 23 families having domestic animals in urban places, majority of the participants (82.6%) washed their hands with soap and water as compared to only 44.4% in rural counterparts.

Sixty seven percent of the participants in urban areas washed their hand with soap and water before handling their

Table 2: Comparison of knowledge regarding handwashing according to area of residence

	Urban Areas	Rural Areas	p value
Importance of handwashing among the participants of the study	100	90	-
Source of information regarding handwashing			
Television	48	47	
Radio	10	35	
Internet	39	11	<.0001
Others	3	7	
Material used for handwashing			
Soap Bar	53	50	
Liquid Soap	47	17	
Others (ash, mud or any other material)	0	33	<.0001
Material used for drying hands after washing by the study participants			
Clean Towel (Washed at least thrice a week)	84	26	
Any rag/Cloth	12	38	<.0001
Daily wear clothes	4	36	
Duration of hand washing			
Less than 20 Seconds	8	25	
More than or Equal to 20 seconds	92	43	<.0001
Cannot recall	0	32	

babies. 53% in rural areas did not do so at all. 82% in urban areas washed their hands with soap and water before preparing food for their children and 79% before feeding their child. Majority in rural areas used plain water. All the participants washed their hands after defecation or changing nappies of their child as compared to only 85% in rural areas. Except for handling of raw meat or meat products, all these findings were found to be statistically significant (Table 3).

Number of children (<5 years) suffering from episodes of Acute Diarrhoeal Disease (ADD) or Acute Respiratory Infection (ARI) in past 6 weeks

Out of 20 children who fell sick in urban areas during past 6 weeks, majority (80%) suffered from diarrhoea. In rural areas, almost equal number suffered from both diseases (Table 4).

Scoring done according to the observed steps performed by the study participants to wash their hands

Almost half of the participants (46%) performed washing of palms and back of hand for their handwashing and took more than 20 s in urban areas. In rural areas only 12% did so. This rural or urban difference in handwashing score was found to be highly significant and value of $p < 0.001$ (Figure 1). However, on application of Fisher Exact probability test, no

Table 3: Comparison of handwashing practices according to area of residence

Hand washing Practices	Urban Areas			Rural Areas			p value (from chi square test)
	Water+ Soap	Plain Water	No Hand washing†	Water+ Soap	Plain Water	No Hand washing†	
Handwashing after handling raw vegetables (<i>n</i> = 100 in each)	54	43	3	12	71	17	<.0001
Handwashing after handling raw meat and meat products	38 (86.3%)	3 (6.8%)	3 (6.8%)	42 (75%)	10 (17.8%)	4 (7.1%)	0.2579
		<i>n</i> = 44			<i>n</i> = 56		
Handwashing before preparing food (<i>n</i> = 100 in each)	74	26	0	13	55	32	<.0001
Handwashing after using toilets for urination (<i>n</i> = 100 in each)	72	20	8	24	45	31	<.0001
Handwashing after using toilets for defecation (<i>n</i> = 100 in each)	94	5	1	54	25	21	<.0001
Handwashing after handling domestic animals	19 (82.6%)	4 (17.4%)	0 (0%)	12 (16.6%)	32 (44.4%)	28 (38.9%)	<.0001
		<i>n</i> = 23			<i>n</i> = 72		
Handwashing after returning from outside (<i>n</i> = 100 in each)	38	42	20	4	43	54	<.0001
Handwashing before handling the child (<i>n</i> = 100 in each)	67	32	1	10	37	53	<.0001
Handwashing before preparing food for the child (<i>n</i> = 100 in each)	82	16	2	12	62	26	<.0001
Handwashing before feeding the child (<i>n</i> = 100 in each)	79	19	2	27	48	5	<.0001
Handwashing after cleaning the child who has defecated or after changing nappies of their child (<i>n</i> = 100 in each)	98	1	1	85	8	7	‡ <i>p</i> = 0.003 (<i>p</i> < 0.05)

†use of ash, mud or any other material

‡Fisher exact probability test (two tailed)

Table 4: Occurrence of ARI/ADD^s in the under five children of the study participants during the past 6 weeks (*n* = 20 in urban areas and *n* = 43 in rural areas)

Illness during past 6 weeks	Urban Areas	Rural Areas
ADD	16 (80%)	21 (48.8%)
ARI	4 (20%)	22 (51.1%)
TOTAL	20	43

For d.f. =1, the chi-square value reported is the Yates chi-square = 4.26 (corrected for continuity), *p* = 0.039

^sADD = Acute Diarrhoeal Disease; ARI = Acute Respiratory Infection

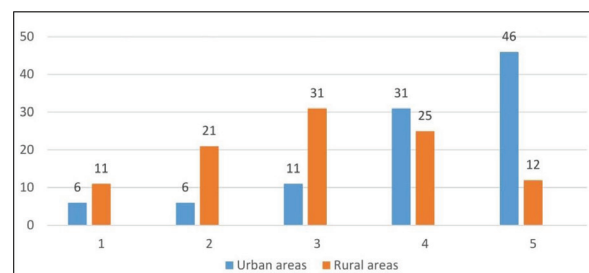


Figure 1: Scoring done according to the observed steps performed by the study participants to wash their hands (X axis: Hand washing score; Y axis: Number of study participants)

significant difference was found between handwashing score and number of cases of ADD or ARI found in urban and rural areas (Table 5).

Discussion

The present study showed similar trend as many of the previously conducted studies in India and Bangladesh.^[9, 16-18] The study by Shukla and Agarwal^[19] showed that in the caregivers visiting the immunization clinic in an urban hospital, handwashing practices were followed when cleaning child who had defecated (38.7%), before preparing meal (37.0%), and before feeding child (24.5%). Similar finding were shown by Vujcic *et al.*^[20] who reported that handwashing was practiced by 34% after defecation and 35% after cleaning up a child. The present study showed much better figures as, after defecation 94% in

urban, 54% in rural, and after cleaning up a child, 98% in urban, 85% in rural were washing hands with soap and water.

The study done by Algur and Yadavannavar,^[16] 7% used ash and 10% used soil to wash their hands after defecation in the rural areas of Bijapur, India. In the rural areas covered by the present study, 33% were of the view that ash, mud or soil can also be used as cleaning material and it was practiced by 17% after defecation and 5% after cleaning the child. We have included use of ash, soil and other materials in "No handwashing" in Table 3. Table 6 illustrates the comparison of findings of the present study with similar studies in the developing countries of the world.

Majority (77%) of the respondents of this study followed two steps for handwashing as compared to study done by Ray *et al.*^[9] where 72% were performing three steps. The present study shows that larger number of cases of ADD and ARI are seen with those study participants in whom the hand washing score is less (<3), although it was not found to be significant. This may be due to the small number of cases of ADD and ARI found. The systematic review by Rabie and Curtis^[22] in 2000 showed coherent and significant pattern of impact of hand cleansing on ARI infection.

Table 5: Association between handwashing score and number of cases of ADD/ARI

Prevalence of ADD/ARI	Hand washing Score	
	> = 3	<3
Number of cases of ADD		
Urban	3	13
Rural	4	17
<i>p</i> value = 0.658 (one tailed Fisher exact probability test)		
Number of cases of ARI		
Urban	1	3
Rural	4	18
<i>p</i> value = 0.599 (one tailed Fisher exact probability test)		

Conclusion

In the present study, washing hands was important for all the respondents as it prevents spread of germs and diseases and maintains personal hygiene of an individual. Majority of the respondents washed their hands with soap and water before handling raw vegetables, meat and meat products, after using toilets, before preparing food for their

Table 6: Observed Rates of handwashing with soap around the World

Setting	Handwashing with soap prevalence	Reference
Moradabad, India	After defecation 94% in urban, 54% in rural, after cleaning up a child 98% in urban, 85% in rural	Present study
Lucknow, India (urban)	After cleaning child who had defecated (38.7%), before preparing meal (37.0%) and before feeding child (24.5%)	Shukla and Agarwal ^[19]
Haryana, India	86% washed their hands both before and after meals, 20.5% said that they wash their hands after coming from outside	Panda and Vashisht ^[11]
Kerala State, India	After defecation 34 %, after cleaning up a child 35%	Vujcic <i>et al.</i> ^[20]
Bijapur, India (rural)	38% used soap, 45% used water only, 7% used ash and 10% used soil to wash their hands after defecation	Algur and Yadavannavar ^[18]
Bangladesh (rural)	33% of caregivers and 14% of all persons observed washed both hands with soap after defecation	Haldar <i>et al.</i> ^[3]
Pune, Maharashtra, India	After cleaning up a child 0%, after using a toilet 18%	Biran ^[21]
Kolkata, India (slums)	After defecation 16%	Sircar <i>et al.</i> ^[12]
Nigeria (rural)	After cleaning up a child 10%	Omotade <i>et al.</i> ^[23]
Lima, Peru (shanty town)	After defecation 12% (soap use 'rare')	Gilman <i>et al.</i> ^[24]

**All prevalences are observed, except Sircar *et al.*,^[12] which used soap measurements

child, following defecation or after changing nappies of their child and after handling domestic animals in urban areas. However, a lot especially in rural settings were using plain water or substances other than soap for cleaning hands like ash, mud or soil etc. which can act as a potential source of infection. There is a need to raise awareness of proper method of hand washing in the community. All the steps of the hand washing should be emphasized for successful prevention from various diseases.

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