

Hand Washing: A Proposed Scoring Scale to Grade the Level of Practice of Mothers in the Community

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Abstract

History of hand washing as an intervention to reduce morbidity and mortality in hospitals dates back to early 1800's and the practise has yielded good results. Increasing evidence suggesting that hand washing significantly reduced the risk of respiratory tract infections and diarrhoeal diseases, lead to the promotion of hand washing in homes as a public health intervention of choice with well documented impact. Simple indicators of hand washing compliance need to be developed and validated to enable evaluation of the impact of the interventions to promote hand washing in the community. Majority of tools that have been developed for evaluating hand hygiene practices are only suited for health care facilities. Presented is a scoring scale developed to grade the level of hand washing practise of mothers.

Mothers who consented to take part in a study were asked to say the instances when they washed their hands during the day. The responses were documented and subsequently entered into Microsoft access database. The various answers provided by the mothers were weighted by the investigator against the backdrop of likelihood of transmission of pathogens to assign categories and scores, and a scoring scale developed.

The instances of hand washing put forward by the mothers in the data from which this scoring scale is derived corresponded largely to the recommendation by CDC on when hands should be washed. The scale was able to clearly separate the mothers into distinct grades of hand washing practise; poor, fair and good based on the answers they provided.

This scoring scale is useful in evaluating the effectiveness of public health interventions to promote hand washing.

Keywords: Hand Washing; Community; Practice; Scoring Scale; Grades

List of abbreviations: CDC: Centers for Disease Control and Prevention

Introduction

Hand washing or hand hygiene is the act of cleaning one's hands for the purpose of removing soil, dirt, microorganisms, or any unwanted substances usually achieved by using soap, water and a vigorous rubbing action of the hands together. Washing of hands is often a part of cultural or religious rituals. History of hand washing as an intervention to reduce morbidity and mortality in hospitals dates back to early 1800's [1-3]. Since then, emphasis has been on encouraging and improving the practise of hand washing in hospitals and health care facilities with good results [4-11].

With the benefits of hand washing in hospitals established, emphasis shifted to hand washing in the community as an intervention which can be harnessed alongside other measures such as routine vaccinations aimed at tackling childhood morbidity and mortality from infections. Increasing evidence suggested that hand washing could significantly reduce the risk of respiratory tract infections and diarrhoeal diseases [12-16]. Curtis and Caimcross in a systematic review, projected that interventions to promote hand washing might save a million lives per annum and suggested that the promotion of hand washing with soap in homes in developing countries should become a public health intervention of choice [16]. A subsequent systemic review by Fewtrell *et al.* concluded that hand washing if practiced widely could cut the number of child deaths from diarrhoea and pneumonia by almost fifty percent and one-quarter respectively [17]. This emerging trend of evidence led to the world health community adopting the promotion of hand washing as an effective public health intervention in the fight against the common childhood infections via mass awareness and

educational campaigns aimed at improving hand washing practise; the CDC recommended instances that hands should be washed (Table 1) [18] and The Global Hand washing day, celebrated on October 15 annually, was founded in 2008. The resultant impact of hand washing in homes in reducing the spread of infection and prevention of mortality is well documented [19-22].

Hands should be washed:
• Before, during, and after preparing food
• Before eating food
• Before and after caring for someone who is sick
• Before and after treating a cut or wound
• After using the toilet
• After changing diapers or cleaning up a child who has used the toilet
• After blowing your nose, coughing, or sneezing
• After touching an animal or animal waste
• After handling pet food or pet treats
• After touching garbage

Table 1: CDC Recommendations for hand washing

Tools for Assessing Hand Washing

Community interventions such as mass awareness or educational campaigns aimed at improving hand washing practise of mothers require an objective assessment and documentation of the level of hand washing practise of the target communities' pre and post intervention to enable evaluation of the impact of the interventions. Curtis and Caimcross in their systematic review opined that simple indicators of hand washing compliance (in the community) need to be developed and validated [16]. Various tools have been developed for evaluating hand hygiene practice. Majority of these are only suited for health care facilities and require a lot of technicalities that make them unsuitable for community application [9-11,23-27].

A simple and reproducible scoring scale which grades the level of hand washing practice of the mothers and can be applied to a target population pre and post campaigns to assess the impact of the intervention in the community would be a very useful tool. To the best knowledge of the author no such scoring scale has been published.

Presented here is an initial, and a modified version of a scoring scale developed by the author. The original scoring scale was developed to investigate the effect of hand washing practise of mothers on the risk of the children getting rotavirus diarrhoea. Deaths from ARI and diarrhoea occur more in children under five years old and especially infants. This vulnerable group are dependent on their mothers or caregivers whose hygienic practise impacts on them hence the mothers being the target audience.

Materials and Methods

Design

This was a prospective cross-sectional study. Data was obtained from mothers who consented to take part in a study on rotavirus disease in children after due clearance from the Ethics Committee of the Royal Victoria Teaching Hospital, Banjul. The full study titled "Paediatric rotavirus disease in The Gambia: A hospital-based sentinel study" was reported as a dissertation for the award of fellowship of the West African college of physicians in the faculty of paediatrics, with extracts published in the Annals of Biomedical Sciences [28].

Sample Size

The minimum sample size for the study was estimated using the formula: [29]

$$n = Z^2 \times P (1-P) / d^2$$

n = minimum sample size, Z = standardised normal deviation, set at 1.96, which corresponds to the 95% confidence level, P = Best estimate of target population (*total hospitalisations*) prevalence (10%) [30], d = Tolerable error margin which is a measure of precision. 0.05 is used. The minimum sample size calculated using the above formula was 138.

Sampling and Data Collection

Convenient sampling was used. The mothers whose children were admitted with acute diarrhoea were approached for enrolment and those who gave consent were consecutively recruited and interviewed over the study period. The socio demographic details of the mothers were documented, their social economic class assigned using the scale by Oyedeji [31]. Mothers were asked to say the instances when they washed their hands during the day and their responses were documented in a questionnaire. The rationale for asking open non leading question is based on the thinking that a mother is likely to recall the routine that she practices at home.

The data obtained was entered into a computer Microsoft access database. A double check entry approach was utilized to ensure the accuracy and reliability of the data entered. The data was analysed using the SPSS version 11.01 for Windows statistical tool. Continuous variable estimates were expressed as mean (+ SD) or median, while categorical variables were expressed as proportions, ratios and percentages. Statistical significance level was set at $p < 0.05$.

Development of the Scale

The answers proffered by the respondents on the instances when they washed their hands were cross checked for variety and similar instances grouped together. Codes were assigned for each specific type of instance mentioned, while nonspecific instances were grouped together and a frequency table generated. Table 2 shows the various different occasions of hand washing mentioned and the frequency amongst respondents.

Occasion of hand washing	Frequency amongst respondents	% n=172
After using the Toilet	113	65.7
After changing baby's soiled nappy	9	5.2
After cleaning child after defecation	56	32.6
Before preparing child's food	34	19.8
Before feeding child	34	19.8
Before breast feeding.	23	13.4
Before cooking general meals	75	43.6
Before eating	100	58.1
After eating	69	40.1
After working domestic chores (cleaning home, washing clothes)	11	6.4
Non-specific answer for example: when hands are dirty; before praying ; after touching something dirty; on return from market.	28	16.3

Table 2: Frequency of various occasions of hand washing amongst the mothers

To assign the instances into major and minor categories, each instance was weighted against the backdrop of faecal - oral transmission of pathogens either from the mother / caregiver or the child. The major items were those in which there is increased likelihood of contamination of the hands with faecal matter (Group A) or contamination of oral cavity with harmful bacteria or viruses on hands (Group B). These groups of major instances are important in the spread of diarrhoeal diseases which was the focus of the study. Instances that did not have high likelihood of faeco oral transmission of pathogens to the child, but generally contributed to improved hand hygiene were assigned as minor items. The scoring scale table was subsequently created (Table 3).

		Hand washing item(s)	Score
MAJOR (Maximum score of 4 points)	A	After using the Toilet and / or After changing baby's soiled nappy or cleaning child after defecation	2
	B	Before preparing child's food and / or before feeding child, / before breast feeding.	2
MINOR (Maximum score of 2 points)	(1 point per instance)		
	A	Before cooking general meals.	1
	B	Before eating	1
	C	After eating	1
	D	After working/ domestic chores	1
E	Non-specific answer for example "when hands are dirty"	0	

Table 3: Scoring Scale for Level of Hand washing Practice of Mothers

Allocation of Scores to Items and Grading

The scale includes two groups of major instances (A and B) and a list of minor instances. A score of 2 points is given for each major instance to a maximum of 4 points, and a score of 1 point for each minor instance mentioned, to a maximum of two points. The total maximum score obtainable is 6 (Table 3).

A 3-level classification of performance was considered to be suitable and would provide enough demarcation for sensitivity of comparison between levels. The terms *Poor*, *Fair* and *Good* levels of hand washing was adopted as grades. The total maximum score obtainable from the table was then split into 3 to arrive at the incremental value of 2 points between levels. Applying the split value, up to 2 point was the lowest level (poor), the next two points (score 3 and 4) fair level and the last 2 points was Good.

- *Good* level of hygienic practice: Score of 5 points and above with two major instances
- *Fair* level of hygienic practice: Score of 3 points to 4 points with one major instance
- *Poor* level of hygienic practice: Score of 2 points and below

Validity & Reliability

To assess the performance of the scale, it was applied to the study population. Each respondent's level of hand washing was assessed by scoring each instance mentioned according to the table and using the total score to grade the level of hygienic practice.

Results

170 mothers responded. Age range 15 to 42 years, Mean age 27.8 years, Median age 25 years. 97.9% belong to the higher social economic class using the scale by Oyedeji (20.5% class 3, 43.2% class 4 and 34.2% class 5).

Answers provided to the question of instances of hand washing and the frequency of positive responses for each specific instance of hand washing is shown in Table 2.

Performance of the Scoring Scale

When applied to the study population, the initial scale was able to clearly separate the mothers into Good [81 (47%)], Fair [65 (38%)], and Poor [25 (15%)] grades based on the answers they provided (Figure 1).

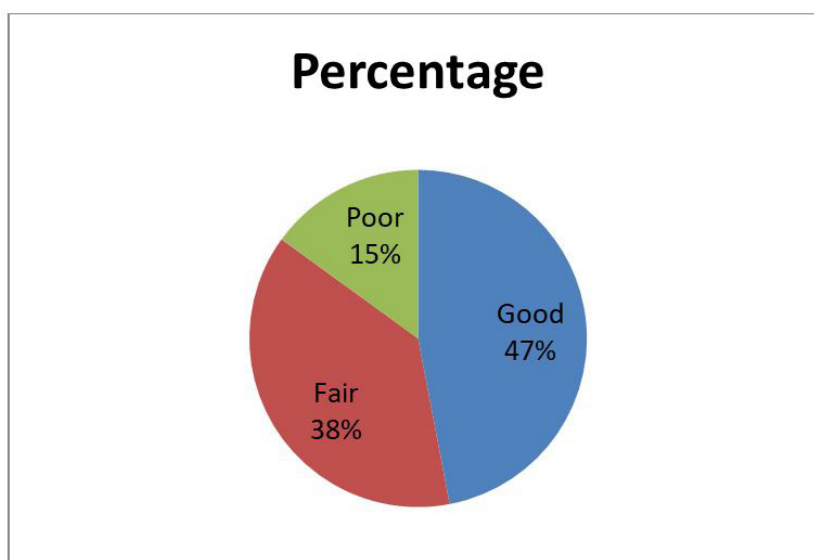


Figure 1: Grades of hand washing practise using the Scoring scale

Discussion

A similar approach was used by Omotade OO and colleagues who documented instances of hand washing practice by mothers [32]. They found hand washing behaviours after cleaning a child who has just defecated and after disposal of faeces were observed in 29.3% of respondents, while hand washing before feeding the child occurred in 12.4% of observations [32]. This is similar to the response from the mothers in this study which showed 32.6% of the respondents washed their hands after cleaning their child who just defecated, and 13.4% washed their hands before breastfeeding the child. However, a slightly higher percentage (19.8%) washed their hands before feeding the child in this study.

The instances of hand washing put forward by the mothers in the data from which this scoring scale is derived as shown in Table 2, correspond largely to the recommendation by CDC on when hands should be washed in Table 1. These are key times when germs are likely to get on hands and can easily infect the individual or be spread to others. It is worth noting that in the rotavirus study none of the mothers mentioned washing hands after blowing the nose, coughing, or sneezing into hands as recommended by the CDC. This is probably because it is not a culture to wash hands after sneezing or coughing with hands covering the mouth / nostrils as the hands do may not appear dirty afterwards. Hence the need to create awareness on the importance of hand washing after sneezing / coughing with hands covering the mouth. This is significant as respiratory infections are spread this way via contamination by respiratory droplets (Table 3).

When applied to the study population, the scale was able to clearly group the mothers into the distinct grades of hand washing practice based on the answers they provided (Figure 1). This scoring scale is a simple tool that can document the level of practice of hand washing in the target community and hence reveal the success or otherwise of an intervention to promote hand washing behaviour.

The obvious limitation of this scoring scale is that it does not evaluate the technique and effectiveness of the hand washing activity in decontaminating the hand. However, the culture of hand washing has to be first promoted and established before education on the appropriate technique for effective microbial decontamination of the hands.

Conclusion

This scoring scale which captures the important moments in which hand washing ought to be practised by care givers as recommended by the CDC can document and grade the level of hand washing practise in homes or communities and may be useful in evaluating the effectiveness of public health interventions to promote hand washing.

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