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Differences of Hand Hygiene and its Correlates among School going Children in Rural and Urban Area of Karnataka, India

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Abstract

Background: School children are the agents of change as the health behaviors they adopt during childhood are retained later in life. Hand washing facilities must be available both in homes and in the schools of children for effective hand hygiene practices thereby preventing diseases. Promoting and sustaining appropriate hygiene behaviors among school children remains a major challenge in schools. Very few studies have tried to explore the differences in hand hygiene in two different settings like urban and rural.

Objective: To study the differences of hand hygiene and its correlates among school going children in rural and urban area of Karnataka, India.

Methods: A cross sectional and descriptive study was undertaken on school children studying in grades 5th to 8th from the selected schools. 625 school students were enrolled in the study from 6 schools randomly selected from urban and rural area of Raichur District, Karnataka, India. Data was collected through school records, interview and clinical examination.

Findings: 625 students participated in the study that comprised 36% girls and 64% boys. 280 students were selected from urban schools and 345 from rural schools. Availability of place and soap were the significant barriers for hand washing behavior in homes and schools. Use of soap for hand washing was unsatisfactory. The significant differences of hand hygiene practices can be attributed to lower knowledge of hand hygiene among rural students, non-availability of place and soap for hand wash.

Conclusion: Sustaining hand hygiene remains a major challenge in schools. The hand hygiene practices are contingent upon availability of sufficient resources like place, water and soap in schools and homes consistently. Hence hand washing facilities and latrines that include adequate amounts of soap and water, are essential in promoting hygiene. Our findings highlight the need for

more intensive efforts to promote proper hand washing behaviors.

Keywords: Hand hygiene; Practices; Correlates; Rural; Urban; School children

Introduction

Hand hygiene is a better option for disease prevention than any single vaccine. It is also essential to the public health mission of reducing the transmission of diseases and their consequences. Good hand washing practice is a prerequisite to a child's survival [1]. Poor knowledge, attitudes and practice of hand washing has long term negative consequences for a child's overall development. Hand washing with soap is among the most effective and inexpensive ways to prevent diarrheal diseases and pneumonia, which together are responsible for the majority of child deaths globally each year. But this life saving intervention is seldom practiced and not promoted always in developing countries like India. The simple act of washing hands with soap can cut the risk of diarrhea by almost half, and respiratory tract infection by a third. The recent studies [2,3] have shown 42-50% reduction in the incidence of diarrhea and 30% reduction in respiratory infections possibly through hand washing. The prevalence of hand hygiene ranged from 16% in Kolkata [4] to 34% in Kerala [5] from previous studies done in India. New studies suggest that hand washing promotion in schools can play a role in reducing absenteeism among primary school children. There is often a significant discrepancy between hand washing knowledge and practices among the school children in rural and urban area in India. Previous study [6] showed that 36.2% of students used soap and water for hand washing where as 63.8% of students used only water for hand washing. In another study by Dongre et al. [7] showed that the prevalence of intestinal parasitic infection was significantly high among children having poor hand washing practices (OR=8.3; 95% CI: 2.5-29.1). Facilitators or barriers for hand hygiene among school children may be different than for caregivers. The literature search reveals that many studies regarding hygiene practices among school

children have been done. But very few studies have tried to explore the differences in hand hygiene in two different settings like urban and rural. Further there are no studies from this part of India on hand hygiene practices. Hence the present study was undertaken among students from rural and urban background to study the difference of hand hygiene and its correlates.

Material and Methods

The present cross-sectional and descriptive study was undertaken among school children studying in 5th to 8th class from Urban and Rural area of Raichur, Karnataka, India. The study was approved by the Institutional Ethics Committee. Permissions were obtained from respective schools after explaining the objectives of the study. A list of all schools to be enrolled in the study was prepared. Total 6 schools (3 Urban and 3 Rural) were selected randomly from the list. The study population was comprised of the school children studying in grades 5th to 8th from the selected schools. The sample was obtained by enrolling all the students present on the day of school visit and willing to participate in the study after informed consent from parent/caretaker. The total enrolment as per the register was 676 students. Out of this, 51 Students who remained absent during the survey period were excluded. The final sample size was 625 students (225 girls and 400 boys). Data was collected through school records, interview and clinical examination. Each student was interviewed using a pre-designed questionnaire in a class room specifically dedicated for this study. The questionnaire was initially drafted in English, translated to local language Kannada, and then pre-tested on 30 school children to assess the suitability with regards to duration, language appropriateness, content validity and question comprehensibility. A face-to-face interview was carried out with each of the participants at his or her School. The questionnaire collected information on socio-demographic characteristics, hand washing practices, availability and accessibility of hand washing facilities, such as clean water and soap in the schools and homes. Knowledge about importance of hand hygiene was also assessed. Data was entered in

Microsoft Excel spreadsheet and analyzed using Epi Info 7.2 statistical software. For quantitative data, mean and standard deviation were computed. For qualitative data, proportions were computed. Appropriate tests of significance like chi-square test were used. All statistical tests were two-tailed, and a p-value < 0.05 was considered statistically significant.

Results

625 students participated in the study with mean age \pm standard deviation (SD) of 11.2 ± 1.4 years and a range of 9-14.8 years. 64% of them were boys and 36% of them were girls. The students from selected schools in urban area were 280 (44.8%) and the remaining 345 were from rural area (55.2%). Majority of the students 50.8% were between 11-13 years of age. The predominant religion of students was Hindu in 86.9%, Muslim in 7.2% and remaining 5.9% were Buddhist and Christian. Majority of the students belonged to joint family (48.7%) and extended joint family (30.3%). The remaining 21% belonged to nuclear type of family.

Hand hygiene practices: Urban vs Rural area

In the present study, students in rural area reported a higher percentage (37.7%) of non availability of a place for hand wash inside the home as compared to only 17.9% in urban area. The same difference was statistically significant as shown in **Table 1**. Because of the intermittent water supply in the both area, most of the students had access to water stored in a container, particularly in rural area as reported by 82.9%. The 24x7 access to water for hand wash inside the home was significantly less (81.2%) among students in the study from rural area as compared to urban area (94.6%). Even students from rural area in this study had limited access to water than students from urban area and this difference was also significant. The availability of soap in the home for hand wash for rural students was significantly less as compared to urban students in the present study. The availability of soap in homes significantly differed among the two groups (χ^2 -10.7, $P < 0.01$).

Table 1 Determinants of hand hygiene among the participants by locality.

| Variable | Locality | | χ^2 | P value |
|--|------------|------------|----------|---------|
| | Urban (%) | Rural (%) | | |
| Place for hand wash inside home | | | | |
| Yes | 230 (82.1) | 215 (62.3) | 29.6 | <0.01** |
| No | 50 (17.9) | 130 (37.7) | | |
| Availability of water for hand wash in home | | | | |
| Always | 265 (94.6) | 280 (81.2) | 25.9 | <0.01** |
| Sometimes | 15 (5.4) | 60 (17.4) | | |
| Never | 0 (0.0) | 5 (1.4) | | |
| Availability of soap for hand wash in home | | | | |

| | | | | |
|--|------------|------------|-------|---------|
| Always | 220 (78.6) | 233 (67.5) | 10.7 | <0.01** |
| Sometimes | 44 (15.7) | 72 (20.9) | | |
| Never | 16 (5.7) | 40 (11.6) | | |
| Availability of water for hand wash in school | | | | |
| Always | 253 (90.4) | 311 (90.4) | 1.14 | >0.05 |
| Sometimes | 22 (7.9) | 30 (8.7) | | |
| Never | 5 (1.8) | 3 (0.9) | | |
| Availability of soap for hand wash in school | | | | |
| Always | 124(44.3) | 52 (15.1) | 116.2 | <0.01** |
| Sometimes | 86 (30.7) | 60 (17.4) | | |
| Never | 70 (25.0) | 233 (67.5) | | |
| *Significant, **Highly significant | | | | |

The students from rural area had a good access to a place for hand wash inside the school as reported by 97.1%. This can be attributed to the efforts of Government to upgrade the facilities more in rural area. 10.7% students from urban area in this study reported unavailability of a place for hand wash in the school is a concern. The availability of water was good in schools from urban as well as rural area and did not differ significantly in the present study. Majority, 67.5% students in rural area reported no access to soap as compared to only 25.0% students in urban area and this difference was found to be statistically significant in this study.

The practice of washing hands before eating in this study was universal as reported by majority of the students in both rural and urban area. The correlates of hand hygiene practices among the participants by locality are shown in **Table 2**. The practice of washing hands after defecation or using toilet significantly differed among the students from urban and rural area in the study as more 7.2% students from rural area did

not wash hands after defecation. Only water was used by 32.5% students in rural area as compared to 25.0% in urban area, which was statistically significant. The reason may be that the availability and access to soap for hand wash was less (67.5%) among the students from rural area in this study. Availability and access to water was good in both the areas. Only 15.1% rural students reported that soap was always available in the school for hand wash. In the present study, this difference in availability of soap for hand wash was significant between the students from urban and rural areas. With regards to the knowledge about the importance of hand hygiene, a significantly higher number of students from rural area were unaware that washing hands with soap always prevents the spread of infections in this study. The findings are depicted in **Table 2**. Less knowledge among rural students in the study area must have contributed to less hand washing with soap.

Table 2 Correlates of Hand Hygiene practices among the participants by locality.

| Variable | Locality | | χ^2 | P value |
|---|------------|------------|----------|---------|
| | Urban (%) | Rural (%) | | |
| Did you wash hands before eating? | | | | |
| Yes | 278 (99.3) | 340 (98.6) | 0.75 | >0.05 |
| No | 2 (0.7) | 5 (1.4) | | |
| In last 7 days how often did you wash hands before eating at school? | | | | |
| Never | 286 (97.6) | 375 (97.9) | 6.41 | > 0.05 |
| Rarely/Sometimes | – | – | | |
| Always | 7 (2.4) | 8 (2.1) | | |
| Hand wash after defecation | | | | |
| Yes | 270 (96.4) | 320 (92.8) | 3.94 | <0.05* |
| No | 10 (3.6) | 25 (7.2) | | |

| | | | | |
|---|------------|------------|---------------------------|---------|
| Material used for hand washing | | | | |
| Only water | 70 (25.0) | 112 (32.5) | 4.17 | <0.05* |
| Water & Soap | 210 (75.0) | 233 (67.5) | | |
| Frequencies of hand wash after using toilet/latrines in past 7 days | | | | |
| Never | 210 (75.0) | 276 (80.0) | 10.3 | <0.01** |
| Rarely/Sometimes | 48 (17.1) | 61 (17.7) | | |
| Always | 22 (7.9) | 8 (2.3) | | |
| Knowledge with regards to hand washing always prevents spread of infection | | | | |
| Yes | 250 (89.3) | 221 (64.1) | 61.6 | <0.01** |
| No | 10 (3.6) | 10 (2.9) | | |
| Don't Know | 20 (7.1) | 114 (33.0) | | |
| History of passing worms in stool/ pain in abdomen | | | | |
| Yes | 36 (12.9) | 72 (20.9) | 6.94 | <0.01** |
| No | 244 (87.1) | 273(79.1) | | |
| Absence from school due to GI problem OR respiratory illness in last 1 month | | | | |
| Yes | 30 (10.7) | 65 (18.8) | 7.91 | <0.01** |
| No | 250 (89.3) | 280 (81.2) | | |
| BMI for age | | | | |
| Under nutrition (<5th %ile) | 52 (18.6) | 127 (36.8) | 25.1 | <0.01** |
| Normal (>5th %ile) | 228 (81.4) | 218 (63.2) | (Odd's ratio-1.4(1.2-1.6) | |
| *Significant, **Highly significant. | | | | |

A significantly higher number of students (20.9%) from rural area gave a history of passing worms in stool or pain in abdomen as compared to 12.9% in urban area in the study. The reason might be low awareness about the importance of hand hygiene and lesser hand washing practices with soap. The impact of lower hand hygiene practices among rural students in this study was noted on their attendance and nutritional status. School absenteeism was higher (18.8%) among the rural students which might be due to gastrointestinal problems or respiratory illnesses than urban students (10.7%) and this difference was statistically significant. 36.8% of the students from rural area in the study were undernourished as compared to 18.6% students in urban area as per Body Mass Index (BMI) for age. This difference was also statistically significant.

Discussion

Hand washing facilities must be available both in homes and in the schools of children for effective hand hygiene practices thereby preventing diseases. Promoting and sustaining appropriate hygiene behaviors among school children for better quality of health in their future remains a major challenge in schools. Hand washing is the most important hygiene behavior that provides a great health advantage by

blocking the transmission of pathogens [8]. The availability of place for hand wash in homes and schools of students in rural area was less as noted than in urban area students in the present study. Similarly in the present study, the availability of soap for hand wash in homes and schools was less as reported by students in rural area. Only 15.1% rural students in the study reported that soap was always available for hand wash in schools. Non availability of both place for hand washing and soap in schools was the major determinant of poor hand hygiene among rural students. This was asked as the data on water availability, soap provision, presence of toilets or latrines was not available for all schools. Also the actual ground situation was different. Moreover the availability of water and soap varied daily and was noted by responses as always, sometimes and never. Similarly soap usage was suboptimal as has been seen in other studies from other countries [6,9]. Higher usage of soap for handwash was reported as 81.1% by a study done in Delhi [10].

The present study revealed that the burden of under nutrition (36.8%) was higher amongst the school children in rural area which may be due to poor hand hygiene practice and low awareness of the importance of hand hygiene. The level of knowledge regarding hand hygiene was not satisfactory and it was lower among students from rural area in the study. Hence school based health education programs

should be undertaken to improve hand hygiene among them. Studies in India and abroad have also demonstrated similar improvements in student's knowledge and practices with regard to hand washing [11-13]. The correlates of hand hygiene practices when studied for students from urban and rural background in this study revealed the differences in availability of place and soap for hand wash inside homes and schools. Similarly previous studies [14,15] have also cited inadequate resources for hand hygiene. A study among Colombian school children revealed that with the availability of water and soap in schools, the students were three times more likely to wash hands before eating or after using the toilet [14]. A UNICEF study conducted in Ethiopia found that less than one-third of schools had water points and only 5% had hand washing facilities, none of which had soap [16]. Even if knowledge of hygiene exists, lack of appropriate resources may negatively affect proper hand washing practices. The knowledge regarding the hand hygiene in this study was lower among the students from rural area. This may be the reason for poor hand hygiene behavior among them and the difference was found to be statistically significant. We found that the other health conditions did not differ much between two populations. Poor hand hygiene among students from rural area in this study could have been due to higher prevalence of under nutrition, history of passing worms or pain in abdomen and school absenteeism in last 1 month.

Conclusion

School children are the agents of change as the health behaviors they adopt during childhood are retained later in life. However to promote hand hygiene among them will be adequate provision of resources like water and soap. To promote hand washing, hand washing-facilities must be easily accessible and available at all times with the right materials necessary to make the process a success. The schools should take an initiative for provision of soap in the toilets all the year round in the study area. The provision of safe water, sanitation facilities and good hygiene education will improve the health of the children in the schools studied. There is a need to promote behavioral change by hygiene education especially among students from rural area.

Health education has the potential to significantly alter the behavior of students and their outlook towards hand hygiene. But the hand hygiene practices are contingent upon availability of sufficient resources like place, water and soap in schools and homes consistently. Hence hand washing facilities and latrines that include adequate amounts of soap and water, are essential in promoting hygiene. If hand hygiene programs implement the important interventions like health education and availability of necessary resources, will result in decreased risk of disease, malnutrition leading to an increase in the school attendance.

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