

Sanitation and Hygiene Knowledge, Attitude and Practices in Urban Setting of Bangalore: A Cross-Sectional Study

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Abstract

Background and objective: Unsafe drinking water, poor hygienic conditions and improper disposal of human excreta and refuse is one of the prime concerns in India. Sanitation and hygiene practices are heavily influenced by people's knowledge and attitude towards it. Present study was conducted to obtain baseline information on existing knowledge, attitude and practices of sanitation and hygiene in urban setting of Bangalore, India.

Methods: A cross-sectional study was undertaken among 480 households in Hegganhalli locality of Bangalore city from January 2016 to December 2016. Systematic random sampling technique was applied to obtain the desired sample size. Information on socio-demographic characteristics and existing knowledge, attitude and practices regarding sanitation and hygiene was gathered by using pretested, semi-structured questionnaire. SPSS 15.0 software was used for data analysis.

Results: The data on knowledge revealed that 88.3% respondents attributed sanitation and hygiene to hand hygiene followed by safe disposal of faeces (57.7%). Majority of respondents had adequate knowledge about sanitation and hygiene. Study found a significant association between knowledge and socio-economic status ($\chi^2=8.40$, $p=0.01$). The data on practices revealed that, 55.6% respondents were not following any methods of drinking water treatment. Only 11% respondents clean their water storage containers daily and 53.8% dispose solid waste daily. Significant association was found between sanitation and hygiene practices and socio-economic status ($\chi^2=18.31$, $p=0.001$), and family size ($\chi^2=13.00$, $p=0.01$).

Interpretation and conclusion: The finding of the study lead us to conclude that existing knowledge of respondents regarding sanitation and hygiene was satisfactory but there was a clear gap between knowledge and actual practices. Hence, implementation of an effective behavior change communication strategy is a prerequisite to translate knowledge into actual practice.

Keywords: Sanitation and hygiene; Knowledge; Attitude; Practices; Bangalore

Introduction

Sanitation is one of the basic determinants of quality of life and human development index [1]. It is a fundamental requirement to ensure safe health, environment and the overall wellbeing of the society. Unless proper, functional sanitation facilities are in use complemented with the right types of hygiene behaviours, communities will be vulnerable to recurrent incidences of water and sanitation related diseases [2].

Studies revealed that, three key hygiene practices i.e. safe disposal of faeces, hand washing with soap at critical times along with safe treatment and storage of drinking water are the most effective ways in reducing water borne disease prevalence. Safe storage and treatment of water at point of use brings about approximately 30 to 50% reduction, hand washing with soap over 40% reduction and safe disposal of feces approximately 30% reduction in prevalence of water borne diseases [3].

Sanitation and hygiene practices are heavily influenced by people's knowledge and attitudes towards it. Baseline data to reflect current sanitation, hygiene behavior and practices in Bangalore is very scarce. The lack of appropriate information on knowledge and practices of sanitation and hygiene is an impediment to identify priority needs. Knowledge, Attitudes, and Practices (KAP) study is seen as the most viable way of obtaining updated information on hygiene behaviour and practices in the community. Thus, present study was conducted to obtain baseline information on the existing knowledge, attitude and practices in relation to sanitation and hygiene in target population.

Materials and Methods

Study design and setting

This was a cross-sectional study conducted in Hegganhalli locality (BBMP Ward no.71) of Bangalore city from January 2016 to December 2016. According to census report 2011 [4], study area (BBMP Ward no. 71) had a population of 66000 comprising of 54% males and 46% females. There were about 18000 households with average family size of four. Present study covered 2.8% of the population in the project area.

Sample size and sampling techniques: Sample size was estimated as 461 (~480) households (by assuming 95% confidence level, 5% margin of error and design effect of 1.2 for using other than Simple random sampling for a conservative estimate of knowledge of 50% on sanitation and hygiene with a response rate of 80%). The computation of optimum households sample size was based on the formula below [5]:

$$N = [Z^2 P(1-P)] / d^2 \times d_{eff} / R$$

All the households in this area constituted the sampling frame. Household information was taken from the 2011 Census report. Systematic random sampling technique was applied to obtain the desired sample size. The sampling interval (k) was calculated as $k = N/n$. The total households in this locality are about 18000; so, k (18000/500) comes out to be 36. The sampling was started by selecting a house from the list at random and then every kth house in sampling frame was selected till the sample size was achieved.

Ethics and consent procedure

The study was started following approval of the study protocol by the Institutional Ethics Committee, NIUM, Bangalore vide IEC No: NIUM/IEC/2014-15/016/TST/02. Formal permission was taken from the concerned authorities in the selected locality. An informed written consent was obtained from all the participants. The objectives of the research were explained in simple language and participants were also provided with an information sheet containing the research objectives, data collection method, role of participants, personal and community benefits, as well as any possible harm to the participant. They were given enough time to go through the study details mentioned in the information sheet. They were also given opportunity to ask any question concerning the study. Respondents were informed that they could choose to or not to participate in the study. Only after they agreed to participate in the study, they were asked to sign the informed consent form. Illiterate respondents were explained about purpose of study and then their thumb impression was taken. Mentally challenged persons and those who refused to give consent were excluded from the study. The respondents were informed that all responses would be noted down but would be kept confidential at all times. Strict confidentiality was maintained in data handling.

Method of data collection

Data was collected from individual households in the selected locality through house to house survey. Survey was carried out in morning as well as evening hours to get maximum number of study subjects at home. Efforts were made to interview the head of the household. Before interviews were conducted, the investigator asked prospective respondents; whether they are head of the household, if not then their relationship with the head of the household was enquired. If respondents were minors, they were asked to summon a person of maturity age; if anyone was not present in the house at the time, the investigator moved on to find other respondents. Selected households were followed up at least twice in case of unavailability of the respondent on the first visit. A respondent who could not be contacted even after the second attempt was counted as a non-responder. In case of more than one household (family) living in a single house, one was randomly selected.

Data collection tool

The participants were requested to give 20-30 minutes of their time for completion of questionnaire. The questionnaire was designed in English, translated into the local language-kannada, and pre-tested for any translation errors. Questionnaire consisted of three sections:

Section-1: Contained demographic variables such as house number, name, age, sex, income of the family, religion, education, occupation, marital status, family size etc.

Section-2: Comprised of questions to assess the knowledge and attitude of sanitation and hygiene such as understanding of sanitation and hygiene, perception on critical times for hand washing, perception on sign of lack of sanitation and hygiene, perception on ways to maintain good sanitation etc.

Section-3: Comprised of questions to assess the self-reported practices regarding sanitation and hygiene like water treatment practices, water storage practices, hand washing practices, means of solid waste disposal, frequency of solid waste disposal etc.

There were 10 multiple choice questions for each section. A score of "1" (one) was given for correct response and "0" (zero) score was given for wrong or don't know response. Knowledge score was arbitrarily classified as adequate knowledge (>7/10) and inadequate knowledge (<7/10). Similarly practices score was also labeled as good (>7/10), fair (7-5/10) and poor (<5/10).

Operational definitions

Knowledge: Information that the target population has about the sanitation and hygiene-related issues.

Attitude: Attitude is the way a person views something or tends to behave towards it. In context of the present study, attitude refers to what the target population feels or believes about the sanitation and hygiene-related issues

Practice: Refers to the ways in which people demonstrate their knowledge and attitudes through their actions.

Data processing and analysis: All narrative data was collected under three pre-determined broad categories: Demographic data, knowledge and attitude of sanitation and hygiene and practices of sanitation and hygiene. In order to ensure the quality of the data, each completed questionnaire was manually checked before it was tabulated in Microsoft Excel 2007. The data was analyzed using the statistical software namely SAS 9.2, SPSS 15.0, Stata 10.1, MedCalc 9.0.1, Systat 12.0 and R environment ver.2.11.1 and Microsoft word and Excel have been used to generate graphs, tables. Chi-square/Fisher Exact test have been used to find the significance of study parameters on categorical scale between two or more groups, non-parametric setting for qualitative data analysis [6].

Discussion

Numerous similar studies have been conducted nationally and internationally on the knowledge and practices regarding sanitation and hygiene in the past 7-14. In our study, average age of the respondents was 35.4 (SD=11.9) and majority of them were females (68.1%, n=327) with an average family size of 3.9 (SD=1.2). Among total respondents, 60% (n=288) were Hindus. Majority of the respondents were from upper lower class and 57.6% (n=276) (Table 1). These finding are in concordance with the census report of 20114.

According to census report, Hegganhalli (BBMP ward no.71) has a population of 66000 comprising about 18000 households with an average family size of four. Hinduism is a majority religion with 78.7% followers.

Variables	Frequency	Percent	Mean ± SD
Age (Years)			
20-30	212	44.1	35.4 ± 11.9
31-40	138	28.8	
41-50	73	15.2	
51-60	44	9.2	
61-70	13	2.7	
Gender			
Male	153	31.9	-
Female	327	68.1	
Religion			
Hindu	288	60	-
Muslim	187	39	
Christian	5	1	
Family Size			
1-2	49	10.2	3.9 ± 1.2
3-5	382	79.6	
6-10	49	10.2	
Socio-economic Status			
Upper Lower	273	56.9	-
Lower Middle	178	37.1	
Upper Middle	29	6.0	

Table 1: Socio-demographic characteristic of respondents (N=480).

Knowledge and attitude on sanitation and hygiene

The present study revealed that respondents had adequate knowledge about sanitation and hygiene. Majority of respondents attributed sanitation and hygiene mostly as hand hygiene followed safe disposal of faeces. According to them good hygiene is a prerequisite to be healthy and free from diseases and majority of them perceived that hands should be washed prior to handling of food (Table 2). Our findings are supported by the study conducted by Joshi et al. [7] and Vivas et al. [8]. According to respondents, topmost ways to maintain good sanitation are cleaning of houses, proper disposal of garbage and wastewater and safe disposal of faeces (Table 2). These findings are in contrary to the other studies conducted by Reshma et al. [7,9,10]. Variations in findings may be due to different study settings and population. Present study revealed that there is no lack of understanding of people regarding sanitation and they did not confine it merely to disposal of faeces and construction of latrines. Considerably higher level of understanding regarding sanitation may

be attributed to increased awareness through electronic media along with social and educational background of participants.

*Variables	Frequency	Percentage
Understanding of sanitation and hygiene		
Hand hygiene/cleanliness	424	88.3
Safe disposal of faeces	277	57.7
Food hygiene/cleanliness	172	35.8
Clean/safe water	115	24.0
Disposal of solid waste	71	14.8
Don't know	44	9.2
Reasons for maintaining good hygiene		
Be healthy/free from sickness	452	94.2
Feel good	41	8.5
Don't know	22	4.6
Perception about critical times of hand washing		
Before handling food	444	92.5
After defecation	399	83.1
After weaning/changing the baby diapers	274	57.1
Don't know	18	3.7
Perception on ways to maintain good sanitation		
Clean house	446	92.9
Proper disposal of garbage and waste water	208	43.3
Safe disposal of faeces	159	33.1
Don't know	12	2.5
Perception on signs of lack of sanitation and hygiene		
Garbage and wastewater in surroundings	313	65.2
Bad/ foul smell in the environment	112	23.3
Animal faeces in surrounding	93	19.4
Don't know	50	10.4
*Variables are in multiple responses		

Table 2: Knowledge and attitude of respondents regarding sanitation and hygiene (N=480).

Sanitation and hygiene practices

In this study 55.6% (n=267) respondents did not follow any methods of water treatment (Table 3) because they felt that water was already cleaned/filtered and did not require additional treatment. This finding of our study is in concordance with the findings of the study conducted by Joshi et al. (75%) [7], Bhattacharya et al. (72%) [10] and Anjana et al. (45%) [11]. The little differences in findings can be attributed to the differences in characteristics of population under study. In addition, majority 84.2% (n=404) of respondents

reported that they clean their water storage containers on alternate days, followed by 11% (n=53) who cleaned them daily (Table 3). These findings are in contrast with the findings of the study conducted by Reshma et al. [9], who reported that majority of the subjects (83.7%) clean water storing vessels daily. In our study area, respondents reported that, they stored water in cans (appx. 20 litre capacity), that was sufficient for two days. So they cleaned it only after the container got empty. The most common time for hand washing mentioned by 93.8% of the respondents was 'after defecation'. This was followed by hand washing 'before handling food' (92.9%). Only (48.7%) respondents reported that they washed their hands with soap and water (Table 3). The findings of our study are in contrary with the findings of Sah et al. [12] who reported that majority of respondents (95.3%) washed hands with soap and water.

Variables	Frequency	Percentage
Drinking water treatment practices		
No treatment	267	55.6
Boiling	68	14.1
Filtration	145	30.2
Frequency of cleaning of water container		
Daily	53	11
On alternate days	404	84.2
Weekly	23	4.8
*Key times for hand washing		
After defecation	450	93.8
Before handling food	446	92.9
Always when hands are dirty	315	65.6
After cleaning children	157	32.7
Agent used for hand washing		
Water and soap	234	48.7
Water only	246	51.3
Means of solid waste disposal		
Municipality van	380	79.2
Community dustbin	75	15.6
In open drain	25	5.2
Frequency of waste disposal		
Daily	258	53.8
On alternate days	219	45.6
Weekly	3	0.6
*some of the variables are in multiple responses		

Table 3: Sanitation and hygiene practices of respondents (N=480).

In our study, majority of the respondents reported that they dispose solid waste in municipality vans (Table 4) and among them 53.8%

reported that they dispose solid waste daily followed by 45.6% on alternate days. Present study findings are in contrary with the study conducted by Joshi et al. [7] who reported that 98% participants dispose their solid wastes in community dustbin. Variations in our findings from the previous study are due to different study settings. In our study area, municipality vans comes to collect the solid waste from the household thus, it was reported as the major mean of waste disposal by under study population.

Variables	Adequate Knowledge	Inadequate Knowledge	χ^2	df	P value
Age (years)					
<40	284	66	0.221	1	0.64
>40	103	27			
Gender					
Male	107	46	0.202	1	0.65
Female	222	105			
Religion					
Hindu	187	101	0.703	2	0.70
Muslim	118	69			
Christian	4	1			
Socio-economic status					
Upper Lower	181	92	8.400	2	0.01*
Lower Middle	96	82			
Upper Middle	21	8			

Table 4: Association of socio-demographic variables with sanitation and hygiene knowledge (N=480).

Association of socio-demographic variables with sanitation and hygiene knowledge and practices

Study found a significant association between sanitation and hygiene knowledge and socio-economic status ($\chi^2=8.400$, $p<0.01$); while no significant association was found with age ($\chi^2=0.221$, $p=0.64$) gender ($\chi^2=0.202$, $p=0.65$) and religion ($\chi^2=0.703$, $p=0.70$) (Table 5). Significant association was also found between sanitation and hygiene practices and socio-economic status ($\chi^2=18.314$, $p=0.001$), and family size ($\chi^2=13.007$, $p=0.01$). No significant association was found with age ($\chi^2=2.195$, $p=0.33$) and religion ($\chi^2=0.767$, $p=0.94$). Our findings are in accordance with the study conducted by Johnson et al. [13], Raihan et al. [14]. Johnson has reported that socioeconomic status has been identified as the main factor positively associated with improved sanitation.

Variables	Good practices	Fair practices	Poor practices	χ^2	df	P value
Age (years)						
<40	70	130	150	2.195	2	0.33
>40	25	40	65			

Religion						
Hindu	66	80	142	0.767	4	0.94
Muslim	39	51	97			
Christian	1	2	2			
Socio-economic status						
Upper Lower	61	69	143	18.314	4	0.001*
Lower Middle	46	70	62			
Upper Middle	9	12	8			
Family size						
1-2	15	23	11	13.007	4	0.01*
3-5	74	142	166			
6-10	7	14	28			

Table 5: Association of socio-demographic variables with sanitation and hygiene practices (N=480).

Study's limitation

Our study was limited to one geographical location. Hence, the result of the study cannot be generalized to entire city. Thus further studies can be conducted among multiple geographical locations so that results can be generalized to entire city.

Conclusion

An obvious conclusion that can be drawn from the data produced by the current study is that existing knowledge of respondents regarding sanitation and hygiene was satisfactory but there was a clear gap between knowledge and actual practice. Hence, there is a need for implementation of behavioral changes communication among community dwellers to translate the knowledge of people regarding sanitation and hygiene into actual practice. So, that they can learn to derive health benefits from these practices.

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