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Scaling up Rural Sanitation - A Descriptive Study to assess the Sanitary Conditions among People in Rural Area of Tamil Nadu

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ABSTRACT

In rural areas, open defecation; inadequate safe water; and poor personal hygiene increase chances of diarrheal diseases and helminth and hookworm infections. The study attempted to gauge the sanitary conditions and the standard of hygiene among the residents of Pulipakkam Village in Kancheepuram District, Tamil Nadu. Cross sectional descriptive study based among 126 randomly selected households was conducted in January to February 2019. Semi structured questionnaire was used to collect data the socio demographic information as well as information related to sanitation and hygiene behaviors. SPSS was used for descriptive analysis. Modified BG Prasad classification showed that among the 126 participants 38% belonged to middle class and 21% had education up to high school. Reportedly, 65% used toilets and 75.6% of them had separate toilets at home. Financial constraint (79.5%) was the principal reason why there were no toilets. Fifty eight point seven percent of the respondents relied on public taps as its primary source of drinking water. About 44 percent disposed of wastewater into open gutters and 33 percent disposed of it on the streets directly. Only 32.5% of the households practiced solid waste segregation and 50% disposed solid waste in dump site. The hand hygiene practices were suboptimal as 73.8% of them reported using soap after defecation where as 94.4% of them took daily bath. The possible sanitation and hygiene practices found in Pulipakkam Village are inadequate. Whenever behavioral change is to occur and the sanitation infrastructure of rural settings to be improved, targeted health education programs and enhancing community awareness are required.

INTRODUCTION

It is universally recognized that access to safe water, adequate sanitation and proper hygiene (WASH) is a fundamental human right and required public health. It is estimated that about 1,800 of each day's 2,000 child deaths due to diarrheal diseases are attributable directly to unsafe water, poor sanitation and inadequate hygiene, worldwide [1]. Across the various systematic reviews and meta-analyses that quantify the impact of the WASH interventions on diarrheal disease incidence, improvements in sanitation have been shown to reduce diarrheal disease by 32%–37% and this is a strong indicator of the very great health benefits of WASH interventions [2].

Despite the increasing awareness and the global efforts, the provision of sanitation is still a glaring problem in countries like India. In India, national estimates suggest nearly 53 percent of Indian households – approximately 600 million people – practised open defecation until early 2010s and of these, 69.3 per cent were in the rural areas [3]. As an open defecation contaminates water sources and spreads disease, it also threatens safety, privacy and dignity especially for women and children opened defecation.

In addition to being essential to preventing disease, adequate sanitation, safe drinking water and hygiene practices are important to improve overall quality of life, increase school attendance, decrease health care costs and stimulate socio-economic development [4]. In view of these multifarious benefits, the Government of India launched the Swachh Bharat Abhiyan (Clean India Mission) in 2014 with its impregnable resolve to eradicate open defecation and instil sanitary infrastructure in the whole country, more particularly in rural and vulnerable areas.

Although government schemes seem to have contributed very much to the improvements in rural households, actual adoption of sanitary practices at family level varies dramatically throughout regions. However, infrastructure availability does not equate to the consistent usage of it and many rural communities still have to overcome numerous barriers such as lack of awareness, traditional beliefs, financial limitations and spatial limitations. Consequently, micro level research is crucial to know the ground reality, evaluate the being of these public health interventions and the local challenges to progress.

Thus, in this context, the present study was taken up to assess the sanitary conditions, hygiene practices, and the associated socio demographic factors among resident of Pulipakkam Village of Chengalpattu Taluk of Kancheepuram District of Tamil Nadu. This research intends to collect grassroots level evidence through a descriptive community based survey to generate evidence to direct future health promotion strategies, policy decisions and community engagement programs geared towards improving rural sanitation outcome.

2. Review of Literature

Sanitation is an integral to public health and human dignity but it remains an unresolved question in many rural India. Although the Swachh Bharat Abhiyan at several national levels attempted to end the problem, such challenges persist and prevail more in economically backward areas. Water, sanitation and hygiene (WASH) have been widely accepted as important determinants of community level health and socio economic development at a global level. Although it is disproportionate, academic inquiry into WASH is poorly advanced. Revilla et al., [5] in a comprehensive review of the top 12 development journals between 2000 and 2020, have been able to solely identify 18,329 research papers which just deal with WASH related issues from out of the 18,329 research papers. There were most of them with efficiency and quality of service delivery issues on sanitation across geographies, very similar to how political and administrative structures shaped sanitation. The authors point to the need to conduct an urgent number of more case specific evaluations to inform and improve sanitation strategies.

With surge of the COVID-19 pandemic, the sanitation and hygiene returned to top of the global agenda, bringing into emphasis persisting vulnerabilities faced by the underserved populations. Kalpana et al. [6] examined the WASH situation in poor economically communities in the pandemic and found hand washing to be one of the most effective but unutilized protective way towards disease transmission. This was supported by Bedford et al. and Chu et al. [7][8] who pointed out that hand hygiene has become a fundamental way of preventing the virus from spreading during a public health emergency, furthering the role of sanitary infrastructure that is easily accessible for the public in public health emergencies.

Additionally, the lack of proper sanitation facilities further increases gender based vulnerabilities. Using over 74,000 women, Kayser et al. [9] examined how the risk of nonmarital sexual violence (NMSV) is affected by household level access to toilets in India. The analysis showed a statistically significant association between having no toilets and greater exposure to NMSV, which may also offer some protection to women with improved coverage of household toilets.

There has also been concern from international organizations and research commissions on the sluggish process of improvement of sanitation. Other notable authors such as the Lancet Commission [10] stressed the global sanitation shortfall, since the majority of the world's people still lack access to safe sanitation. The commission reframed WASH not just as a public health imperative, but as an equalities and social inclusion driver, striving to reimagine, cross disciplinary interventions that will help to rout in the achievements of SDG 6.

Sanitation poses no challenge unique to India. In a study carried out by Benjamin et al. [11] coping strategies available to households with limited access to the water and sanitation services in low income neighborhoods in Botswana were explored. It started by establishing that the study area comprises mostly of tenant households who were dissatisfied with the water supply and sanitation service provision leading to a result employing unsafe water sources such as common sources and utilizing pit latrines. They conclude that there is necessity of enacting policies to consider the household needs especially in the vulnerable groups.

Sanitation is further hindered by such factors as environmental and climate conditions across the world. In their report presented in 2021, Staatenet al. supported adaptiveresilient water systems. Interestingly, the report emphasized the rationale for inter-regional cooperation, reforms of institutions, and the context-based strategies for enhancing sanitation governance in changing environment.

Sarita D [13] concluded that from gender and spatial perspective, sanitation planning in informal settlement cannot be summed up to the construction of toilets only. She concluded that physical environment, privacy and exclusion in decision making are the biggest challenges faced by women in poor dwelling units. She said that gender should be given a crucial role in the design and use of sanitation facilities.

Children's health is definitely not left out as far as sanitation is concerned. According to the study by Mallick et al., [14] they focused on the level of access to sanitation and drinking water and its relationship with diarrhoea in children below the age of five years in India. In their research study the analysed revealed that their overall perception was that poor sanitation correlated with increased incidence of diarrheal diseases although this was modulated with socio-economic factors. This, the study suggested that coverage and sustainability be encouraged in as a way of tackling child morbidity and mortality.

Despite the aforementioned, there has been a slight advancement towards the desired goal. As stated by UNICEF in the report of the year 2019 [15], the availability of improved sanitation globally has risen from 61% to 71% in the period that comprises of the year 2000-2017. For rural area that had increased from 39% to 53%, the rectification of untreated surface water also reduced significantly. The report attributed the above enhancement to broad-based initiatives founded on community participation and equity especially for marginalised groups.

There is evidence that large-scale projects have made a positive difference in some of the areas it has been implemented. The World Bank's evaluation [16] of Total Sanitation and Sanitation Marketing initiative in East Java, Indonesia revealed that there was improvement in facilities because of increased toilet construction by 3% and decrease in diarrhoea cases among

children by 30%. These findings underscore a need of implementing the combined sanitation and awareness programs for the purpose of enhancing the quality and standards of life related to children's health.

India, on the other hand is an exception; it is a phenomenon which has frustrated some, failed others yet at the same time continued to thrive in its resistive environment. Following the economic liberalization and increase in education standards, a considerable portion of rural people in India remains defecate in the open. In his article, Coffey [17] went further in stating that, to eliminate open defecation in India, one cannot solely rely on basic parameters such as GDP, and water supply. However, this reasoning is not always perfect, but rather, it is a product of one's culture, social expectations, and design preferences that determine sanitation behavior, not to mention the fact that putting up costly infrastructure does not readily change the behavior of the people unless complemented with BCC.

Though there is a developing literature in sanitation and hygiene in several global and regional contexts, most of them are centred either on the urban informal settlements or, in other cases, they adopt a macro perspective in examining policies and infrastructures. Indeed, there is a lack of qualitative village-level research that looks at the detailed picture in rural areas especially in India and most western districts. Additionally, knowledge generated on socio-economic status, gender and awareness in relation to household sanitation practices is scarce. To address these concerns, the present study was planned in only Pulipakkam Village, located in Kancheepuram District, Tamil Nadu, which would provide policies tailored and implemented according to the local conditions as well as to upgrade community health promotion.

3. Materials and methods:

A community-based descriptive study was conducted among households of Pulipakkam village, Chengalpattu Taluk, Kancheepuram district, Tamil Nadu during January and February 2019. According to 2011 census[18], In Pulipakkam village there are 758 houses and the total population of this village is about 3,139; of which 1,503 are males and 1,636 are females. The Literacy rate is 76.11% (82.04% males and 70.66% females). The study population in our study was one adult respondent aged >18 years from each randomly selected households.

Sample size:In a study conducted in Thandalam village by Kuberan et al,[19]25% of the village population did not have access to the toilets. Taking this as prevalence with 8% absolute precision and 95% confidence level, and 5% non-response rate, sample size required for the study was 126 households.

The Ethical clearance was obtained from Institutional Ethical Committee, KarpagaVinayaga Institute of Medical sciences & Research Centre, Maduranthagam. All the houses were numbered and for the study, households were selected randomly using random number tables generated from computer. After obtaining written informed consent, a semi-structured questionnaire which included socio-demographic details along with questions on sanitation and hygiene practices was administered to one adult participant in each household until sample size was met. In case the house was locked, the next household was included in the study. The data collected was entered in Microsoft Office Excel sheet and later analyzed using IBM SPSS version 20.

Statistical Analysis: Quantitative variable like age was summarized by Mean and Standard Deviation. Qualitative variables like Gender, SES, hygiene practices etc., was summarized by proportions/ percentage.

4. Results:

In this study, the age of the study subjects ranged from 18 to 80 years with mean 39.03 (SD±14.66). Majority of them 87(69%) of them were females, 29(23%) of them were not literate and 68(54.1%) of them were unemployed/homemaker by occupation. All of them were Hindu by religion and 48 (38%) of them belonged to Middle class according to Modified B G Prasad Classification on socio economic Status.[20] [Table 1] Only 53(42%) of them were aware about Swacch Bharat Movement.

In our study, out of 126 study participants, 44(35%) of them practiced open air defecation and of those who used toilet, 62(73.8%) of them had a separate toilet. Most of them 35(79.5%) stated that lack of money was the reason for not constructing the toilet. Among the study participants, 41(32.5%) of them segregated the wastes and 31(24.6%) disposed the wastes in public garbage bin. [Table 2]

Among 126 study subjects, 122(96.8%) of them used water after ablution and rest 4(3.2%) used leaves. After defecation, 93(73.8%) washed their hands with water and soap, 32(25.3%) of them washed with water alone and 1(0.7%) with water and ash. Majority of them i.e., 119(94.5%) took bath daily, 5(3.9%) on alternate days and 2(1.6%) weekly once.

Discussion:

In our study, majority of study subjects were females and homemakers which was similar in a study conducted by Pachori et al[21] in the rural area of Salem. This may be because study interview was conducted during day time and most of the men went to work.

In this study, 35% of the study participants practiced open air defecation and among people who used toilets, majority of them had a separate toilet at home which was similarly observed in the study by Anuradha et al [22]in a rural village in Tamil Nadu. The reason of open air defecation as given by study participants was unavailability of toilet because of lack of money. Our study revealed that only 42% of them were aware on Swacch Bharat Abhiyan and 65% of study participants defecate in the toilets. Whereas in a study by Swain et al [23] conducted in Madhya Pradesh and Uttar Pradesh, 24% of them were aware of Swacch Bharat and 54% used toilets. Many of the people are unaware that under Swachh Bharat Mission,[24]free toilets could be constructed at household level and community level and also that village health sanitation and nutrition committee[25] exists to address maternal and child health, family planning and sanitation, communicable diseases and health promotion, and nutrition. In our study 26% of them washed their hands with water alone or with ash after defecation as compared to 17% in a study by Kuberanet al [19] in Thandalam village, Chennai. This difference could be because of the literacy level among respondents.

Only few households in our study practiced segregation of wastes. This is contrast with the findings of study by Spandana et al [26]where 87.5% of them practiced segregation. The reason of this difference may be because of lack of awareness among people. In our study majority of households used drinking water from public taps and disposed waste water in open gutters which was similarly found in study by Kuberan et al [19]as both the studies were conducted in rural area of Tamil Nadu. Among 17 goals of Sustainable development Goal, [27]one of the goal is to maintain clean water and sanitation and World Health Organization's WASH (Water, Sanitation and Hygiene) Strategy (2018-2025) has also stressed the importance of the same so as to attain low burden of disease related to water and sanitation with Primary prevention. [28] Our study had some limitation. Since only one respondent from each household was selected, it was not possible to determine the hygiene status of other members of the family.

CONCLUSION

It highlights many sanitation and hygiene gaps of people of Pulipakkam Village such as open defecation, improper waste disposal and suboptimal hand hygiene. Even so, a majority of households indicated access to toilet and clean water sources; however, usage and hygiene behaviors were irregular due to the financial constraints, awareness and problems concerning the infrastructure. This unveils the fact that there is low awareness about the national initiatives like the Swachh Bharat Abhiyan with the need for intensified community engagement and public health education even more so. Grassroots level health promotion, enabling access to sanitation infrastructure, and roles in brooding behavior change at culturally sensitive and inclusive levels are essential in bringing any vagrant living in rural areas improvement in rural sanitation and public health.

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Tables:

Table 1: Distribution of study subjects by socio-demographic variables[N=126]

Variables	Frequency(n)	Percentage (%)
Age (years)		
<30	50	39.68
30-39	25	19.84
40-49	21	16.66
50-59	19	15.08
≥60	11	8.73
Gender		
Male	39	31
Female	87	69

Education		
Not literate	29	23
Primary school	23	18.3
Middle school	15	11.9
High school	27	21.4
Diploma	21	16.7
Graduates	11	8.7
Occupation		
Unemployed	68	54.1
Unskilled worker	29	23
Semi-skilled worker	9	7.1
Skilled worker	11	8.7
Clerical/shop/farm	9	7.1
Socio-economic status [Modified B G Prasad Classification][6]		
Upper middle class	4	3
Middle class	48	38
Lower middle class	44	35
Lower class	30	24
Total members in the family		
≤4	44	34.9
5-6	64	50.8
>6	18	14.3

Table 2: Distribution of study subjects based on sanitation facilities and related practices (N=126)

Variables	Frequency(n)	Percentage (%)
Usage of toilet		
Yes	82	65
No/open air defecation	44	35
Type of toilets (N=84)*		
Separate toilet	62	73.8
Shared toilet	20	23.8
Public toilet	2	2.4
*2 participants had access to shared toilet but practiced open air defecation		
Reason for not constructing toilets (N=44)		
Lack of money	35	79.5
Lack of space	9	20.5
Disposal of waste water		
Streets	42	33.3
Within courtyard	29	23
Gutters	55	43.7
Segregation of waste at household		
Yes	41	32.5
No	85	67.5
Solid waste disposal		
Waste dump sites	63	50
Public Garbage bins	31	24.6
Streets	29	23
Burning	3	2.4
Source of water(Drinking)		
Piped water into dwelling	6	4.8
Piped water into yard	10	7.9
Public tap	74	58.7
Bore well	34	27
Can water	2	1.6
Treatment of water before drinking		
Yes	82	65
No	44	35