International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

A Study to Assess the Knowledge, Attitude, and Practices on Water and Sanitation Hygiene Among Household Members Living in Virar

Maj S Arya Asokan[1], Maj Nagalakshmi Yeruva[2], Prof. Lt Col (S) Meenakshi Manocha[3], Col AS Saritha[4], Maj Monika Sharma[5]

"CLENLINESS IS NEXT TO GODLINESS- KEEP YOUR SOURROUNDINGS CLEAN, MAKE EARTH GREEN"

Abstract:

Introduction

This study explores the knowledge, attitude, and practice (KAP) related to water and sanitation hygiene among households in Virar, a rapidly urbanizing suburb of Mumbai. With increasing population density and infrastructural challenges, understanding household-level hygiene behaviours is crucial for designing effective public health interventions. Findings highlight gaps between awareness and practice, emphasizing the need for community-based education and improved sanitation infrastructure.

Access to safe water and sanitation is a cornerstone of public health. In India, despite national programs like *Swachh Bharat Abhiyan*, many communities continue to face challenges in adopting hygienic practices. Previous studies in rural India have shown that while awareness of hygiene is relatively high, actual practices often lag due to cultural habits, resource constraints, or infrastructural limitations. Virar, with its mix of urban and peri-urban households, provides a unique setting to assess these dynamics.

Background

In India, a Nation with a population of 1.4 billion, significant challenges related to water and sanitation persist. Approximately 35 million people lack access to safe water, and an alarming 678 million individuals face the absence of safe toilet facilities. These challenges are exacerbated by extreme water stress, contamination of surface water, and the lack of piped water supply. The adverse effects of climate change, such as droughts and rising sea levels, further jeopardize families) access to safe water and sanitation for families

The repercussions of insufficient water, sanitation, and hygiene (WASH) services extend to health facilities, contributing to a high Neonatal Mortality Rate of 24 deaths per 1000 live births. Sepsis primarily transmitted in health facilities, accounts for 15% of Neonatal Mortality and 11% of Maternal Deaths.

The Percentage of Indians with access to improved water sources has risen significantly from 72% in 1990 to 88% in 2008, reaching 97.7% in 2020. The Government of India significant strides achieving household toilets for over 99% of the population between 2014 to 2020, totalling 110 million toilets built since 2014.

Objectives

- Assess knowledge,attitudeand practices regarding safe drinking water, sanitation, and hygiene.

Methodology

- Study design: Cross-sectional survey.

- Sample size: 200 households selected across different wards of Virar.
- Data collection: Structured questionnaires and observational checklists.
- Variables studied:
  - Knowledge of water purification methods
  - Attitudes toward open defecation vs. toilet use
  - Practices of handwashing with soap
  - Household waste disposal methods

Results

Knowledge

The analysis of knowledge indicated that the majority of participants, a total of 186, identified the Mahanagar Palika as their primary source of drinking water, whereas 12 relied on bore wells and only 2 obtained water from reservoirs, reflecting a strong dependence on municipal water supply.

With respect to water availability, 89 participants reported that water was available only sometimes, 62 stated that it was consistently available, 42 indicated that it was available most of the time, and 7 reported that water supply was rarely sufficient.

Knowledge regarding the boiling point of water also showed considerable variation: 128 participants correctly stated that water boils at 100°C, while others provided incorrect responses such as 100°F by 33 participants, 97°F by 18 participants, and 100°F by 21 participants.

The findings further revealed that 161 participants stored boiled water in open containers, whereas 38 used closed containers, indicating gaps in safe water-storage practices.

When asked about reasons for avoiding long-term water storage, 94 participants believed that stagnant water becomes a breeding ground for microorganisms, 41 felt that prolonged storage changes the taste, 13 stated that water becomes unfit for consumption over time, and 53 considered all listed reasons to be valid.

Awareness of the health effects of contaminated water was also evident, with 141 participants identifying diarrhea as the most common outcome, while 25 associated contamination with chikungunya, 17 with skin rashes, and 15 with chickenpox.

In terms of purification practices, 153 participants reported boiling water to make it potable, whereas 20 added bleach, 16 allowed the water to stand and settle, and 13 strained it through cloth.

Sanitation-related data showed that 110 participants used flush-to-pipe sewage systems, 47 used dry pit latrines, 25 depended on composting toilets, and 16 had no access to sanitation facilities.

Regarding toilet location, 69 participants used toilets within their own dwelling, 31 used those located in their own yard or plot, 66 accessed toilets situated elsewhere, and 34 reported using facilities located at considerable distance from their home.

Knowledge of handwashing procedures also varied, with 62 participants believing that proper handwashing consists of 7 steps, 58 stating 5 steps, 54 indicating 4 steps, and 26 believing 8 steps are required for adequate hygiene.

Attitude

The findings showed that 55% of the participants agreed that water obtained from any source was safe for drinking and domestic use, whereas 42% did not agree with this statement, and 3% were uncertain.

When asked whether water free from visible particles was safe for consumption, 100 participants disagreed with the idea that clear-looking water is safe to drink, while 90 agreed and 10 reported having no knowledge regarding this.

The majority, a total of 187 participants, agreed that dirty water can cause diseases, whereas 11 disagreed and 2 had no idea about its health effects.

With regard to sanitation practices, 99 participants agreed to sharing latrines with other members of the community, while 83 disagreed and 17 were unsure.

The study further revealed that 152 participants supported the use of water filters for purification, whereas 23 did not agree with their use, and 25 expressed no opinion.

A substantial proportion, 172 participants, agreed that standing water could become a breeding site for mosquitoes and rodents, while 23 disagreed and 7 were uncertain.

Additionally, 145 participants acknowledged the presence of water-related problems in their neighbourhood, whereas 40 disagreed and 14 had no idea about issues related to waste disposal.

Furthermore, 150 participants believed that water supplied through pipelines was safe for drinking, while 37 did not consider it safe and 13 had no opinion.

In terms of hygiene practices, 152 participants agreed that water storage containers should be cleaned daily, whereas 27 disagreed and 21 reported having no knowledge of proper container maintenance.

Finally, the majority of participants, totalling 187, agreed that boiling water helps eliminate germs, while 9 disagreed with this belief and 3 stated that they had no idea regarding the effectiveness of boiling for water purification.

Practices

Out of the 200 families surveyed in Pushpanagar Dongri, 13% demonstrated good practices in maintaining water sanitation, while 67% exhibited fair practices, and 2% showed poor practices related to water sanitation management.

Conclusion

Access to safe drinking water and adequate sanitation is a critical determinant of public health, particularly in urban communities where reliance on municipal water systems is high. The present study assessed the knowledge, attitudes, and practices regarding water safety and sanitation among 200 families in Pushpanagar Dongri, revealing both strengths and areas requiring improvement.

The findings indicated that the majority of participants, 186, relied on Mahanagar Palika as their primary source of drinking water, while 12 used bore wells and only 2 obtained water from reservoirs, demonstrating strong dependence on municipal supply. Water availability varied across households, with 89 participants reporting occasional supply, 62 having consistent availability, 42 indicating availability most of the time, and 7 reporting that water was rarely sufficient.

Knowledge regarding water purification was mixed: 128 participants correctly identified the boiling point of water as 100°C, while others provided incorrect responses such as 100°F by 33 participants, 97°F by 18 participants, and 100°F by 21 participants. Storage practices revealed potential health risks, as 161 participants stored boiled water in open containers compared to 38 who used closed containers. Regarding reasons for avoiding long-term storage, 94 participants cited microbial growth, 41 believed prolonged storage affected taste, 13 considered water unfit for consumption, and 53 agreed with all listed reasons.

Awareness of the health consequences of contaminated water was notable, with 141 participants identifying diarrhea as the most common outcome, while others associated contamination with chikungunya by 25 participants, skin rashes by 17, or chickenpox by 15. Boiling was the predominant purification method for 153 participants, followed by bleach addition by 20, allowing water to settle by 16, and cloth filtration by 13.

Sanitation facilities and practices demonstrated considerable variation. A total of 110 participants used flush-to-pipe systems, 47 used dry pit latrines, 25 depended on composting toilets, and 16 had no access to sanitation facilities. Toilet location was also diverse: 69 participants used toilets within their dwellings, 31 in their yard or plot, 66 accessed toilets elsewhere, and 34 traveled a considerable distance. Knowledge of handwashing steps varied, with 62 participants identifying the recommended seven steps, 58 reporting five steps, 54 indicating four steps, and 26 believing eight steps were necessary.

Attitudinal assessment revealed that 55 percent of participants believed water from any source is safe for consumption, while 42 percent disagreed and 3 percent were uncertain. When asked whether water free of visible particles is safe, 100 participants disagreed, 90 agreed, and 10 were unsure. A strong majority of 187 participants acknowledged that dirty water causes disease. Sharing latrines was acceptable to 99 participants, whereas 83 disagreed and 17 were unsure. Support for water filtration was expressed by 152 participants, with 23 dissenting and 25 expressing no opinion. Standing water as a breeding site for mosquitoes and rodents was recognized by 172 participants. Awareness of local water-related problems was evident in 145 participants, while 40 disagreed and 14 were unsure. Furthermore, 150 participants considered piped water safe, while 37 disagreed and 13 were undecided. Regarding hygiene practices, 152 participants agreed that water containers should be cleaned daily, and 187 acknowledged boiling as an effective purification method.

Despite a reasonably high level of knowledge and positive attitudes, practical implementation was limited. Only 13 percent of families exhibited good water-sanitation practices, 67 percent demonstrated fair practices, and 2 percent showed poor practices. This gap highlights the critical distinction between awareness and actual behavior and underscores the need for interventions to translate knowledge into consistent, safe practices.

In conclusion, while participants in Pushpanagar Dongri display substantial awareness of water safety, sanitation, and hygiene, deficiencies in proper storage, purification, and practical application persist. The study emphasizes the importance of community-based educational programs, reinforced hygiene training, and infrastructural improvements to bridge the gap between knowledge, attitude, and practice, thereby mitigating the risk of waterborne diseases and promoting sustainable public health outcomes.

Discussion

The study reveals a knowledge-practice gap: while most households understand the importance of hygiene, actual practices are inconsistent. Cultural habits, limited infrastructure, and economic constraints contribute to this disparity. Similar findings have been reported in rural Indian settings, where interventions focusing on behaviour change communication have proven effective**.**

Recommendations

- Community education programs to reinforce the importance of handwashing and safe water storage.
- Infrastructure development to ensure access to toilets and waste disposal systems.
- Behavioural change campaigns tailored to local cultural contexts.
- Monitoring and evaluation by local health authorities to track improvements in WASH practices.

Conclusion

Households in Virar demonstrate moderate knowledge of water and sanitation hygiene but face challenges in translating this into consistent practices. Strengthening infrastructure and community-based education can bridge this gap, ultimately reducing the burden of waterborne diseases and improving overall public health.

INTRODUCTION

Sanitation is the most important thing you can do to improve health, prevent disease, and promote development. "Water supply and sanitation facilities are essential for human development. They result in various health and nutritional benefits which in turn have a positive impact on child mortality and morbidity. Bartram and Cairncross (2010) found that adequate sanitation and safe drinking water could avoid 2.4 million deaths (4.2% of all deaths) every year globally. Children from developing countries account for the majority of these deaths mainly due to diarrhoea and subsequent malnutrition.

The key to controlling Diarrhoea deaths is to focus on three interdependent core issues: water, sanitation and hygiene (WASH). WASH is one of the strategic programmes of the United Nations Children's Fund (UNICEF) to achieve 'sustainable water, sanitation services, and the promotion of hygiene, with a focus on reducing inequalities especially for the most vulnerable children' (UNICEF, 2016). The present article focuses on the first two aspects and tries to review the progress in India.

BACKGROUND OF THE STUDY

In India, a Nation with a population of 1.4 billion, significant challenges related to water and sanitation persist. Approximately 35 million people lack access to safe water, and an alarming 678 million individuals face the absence of safe toilet facilities. These challenges are exacerbated by extreme water stress, contamination of surface water, and the lack of piped water supply. The adverse effects of climate change, such as droughts and rising sea levels, further jeopardize families) access to safe water and sanitation for families

The repercussions of insufficient water, sanitation, and hygiene (WASH) services extend to health facilities, contributing to a high Neonatal Mortality Rate of 24 deaths per 1000 live births. Sepsis primarily transmitted in health facilities, accounts for 15% of Neonatal Mortality and 11% of Maternal Deaths.

The Percentage of Indians with access to improved water sources has risen significantly from 72% in 1990 to 88% in 2008, reaching 97.7% in 2020. The Government of India significant strides achieving household toilets for over 99% of the population between 2014 to 2020, totalling 110 million toilets built since 2014.

To address multifaceted problem, a comprehensive strategy is required with substantial investment in infrastructure, policy reforms, climate - resilient solutions, community engagement, and educational initiatives. Collaboration among government bodies, NGOs and the private sector is essential to develop sustainable solutions that not only address immediate water and Sanitation deficiencies but also contribute to broader goals pf public health and sustainable development in India.

OBJECTIVES

To assess the knowledge, attitude and practice towards water sanitation hygiene practices followed by the residents.

METHODOLOGY

The study was conducted as a descriptive cross-sectional survey to assess household-level knowledge, attitudes, and practices among residents of Virar (urban and peri-urban areas). The target population comprised household members living in Virar, and a sample size was calculated using standard statistical formulas based on population size and a 95% confidence level. Households were selected through stratified random sampling — households were first categorized into strata (slums, apartments, independent houses) and then a random sample was drawn from each stratum to ensure representation

across different housing types. Data were collected using a structured questionnaire that captured demographic details as well as participants' knowledge, attitudes, and practices, and via an observation checklist that verified practices such as the presence of hand-washing facilities, water storage conditions, and the cleanliness of toilets.

RESULTS

Knowledge

The analysis revealed that the majority of participants, 186, relied on Mahanagar Palika as their primary source of drinking water, while 12 used bore wells and 2 obtained water from reservoirs. Water availability varied, with 89 participants reporting intermittent supply, 62 consistent availability, 42 most of the time, and 7 rarely sufficient. Knowledge regarding the boiling point of water was mixed, with 128 correctly stating 100°C, while others gave incorrect responses. Boiled water was mostly stored in open containers by 161 participants, indicating unsafe practices. Awareness of contamination risks was evident, with 141 identifying diarrhea as the most common outcome, and 153 reported boiling water for purification. Sanitation practices varied, with 110 using flush-to-pipe systems, 47 dry pit latrines, 25 composting toilets, and 16 lacking facilities. Toilet location and handwashing knowledge also showed variation, highlighting gaps in safe water and hygiene practices.

Attitude

Participants demonstrated generally positive attitudes toward water safety and sanitation. About 55% believed water from any source is safe for consumption, while 42% disagreed. Most participants, 187, acknowledged that dirty water can cause disease, and 152 supported daily cleaning of storage containers. A majority recognized the risks of standing water (172) and supported water filtration (152). Opinions varied on sharing latrines and visibility-based water safety, and 150 participants considered piped water safe. Overall, attitudes reflected awareness of contamination risks and preventive practices, though some misconceptions persisted.

Practice

Despite reasonable knowledge and attitudes, practical implementation of safe water and sanitation was limited. Among the 200 families surveyed, only 13% demonstrated good practices, 67% had fair practices, and 2% showed poor practices. Common practices included boiling water, limited use of filters or bleach, and varied sanitation facility use, indicating a gap between awareness and actual behavior in maintaining water hygiene.

SECTION A- A SOCIO DEMOGRAPHIC DATA OF THE SAMPLES FOR THE RESEARCH STUDY

Table 1 Distribution of samples as per socio demographic characteristics.

Category	Classification	No. Of samples	Percentage (%)
AGE	18-28years	30	15
	29-38years	72	36
	39-28years	71	35.5
	>48years	27	13.5
GENDER	Male	111	55.5
	Female	89	44.5
	Others	0	0

RELIGION	Hinduism	183	91.5
	Muslim	14	7
	Christian	1	0.5
	Others	1	0.5

Table 1 illustrates that the largest proportion of participants (36%) fell within the age group of 29–38 years, indicating that this age range formed the core of the study population. In contrast, only 13.5% of the participants were aged above 48 years, representing the smallest age group in the sample. The table also shows that the majority of respondents were males, accounting for 55.5%of the total sample. Regarding religion, a significant proportion of the participants, 91.5%, identified as Hindu, making it the predominant religious group in the study. In comparison, only 0.5% of the participants belonged to the Christian faith.

The remaining participants were categorized under other religions, also forming just 0.5%, indicating minimal representation from minority groups.

SECTION B- A SOCIO DEMOGRAPHIC DATA OF THE SAMPLES FOR THE RESEARCH STUDY

Fig1 Distribution of samples as per socio economic characteristics

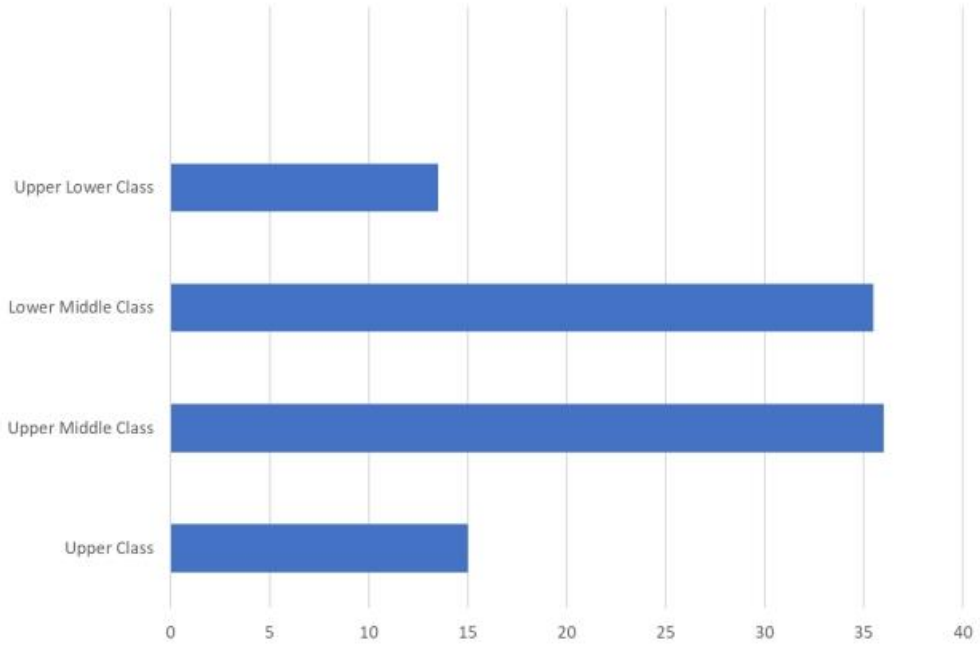

Figure 1 depicts the distribution of the study samples according to their socio-economic characteristics. Analysis of the data revealed that the largest proportion of participants, 35.5 %, belonged to the Lower Middle Class, indicating that a significant segment of the population falls within this income group. This was followed by participants from other socio-economic classes in smaller proportions. Notably, no participants were identified as belonging to the Lower Class, suggesting that the lowest income group was not represented in the study area. The distribution highlights the predominance of middle-income families in the sample population. Such socio-economic patterns may have implications for health, hygiene, and

access to resources, including safe drinking water and sanitation facilities. Overall, the findings provide an important context for interpreting the study results in terms of community practices and attitudes.

SECTION C- A ASSESSMENT OF KNOWLEDGE TOWARDS WATER AND SANITATION HYGIENE

Fig 2. Source of drinking water

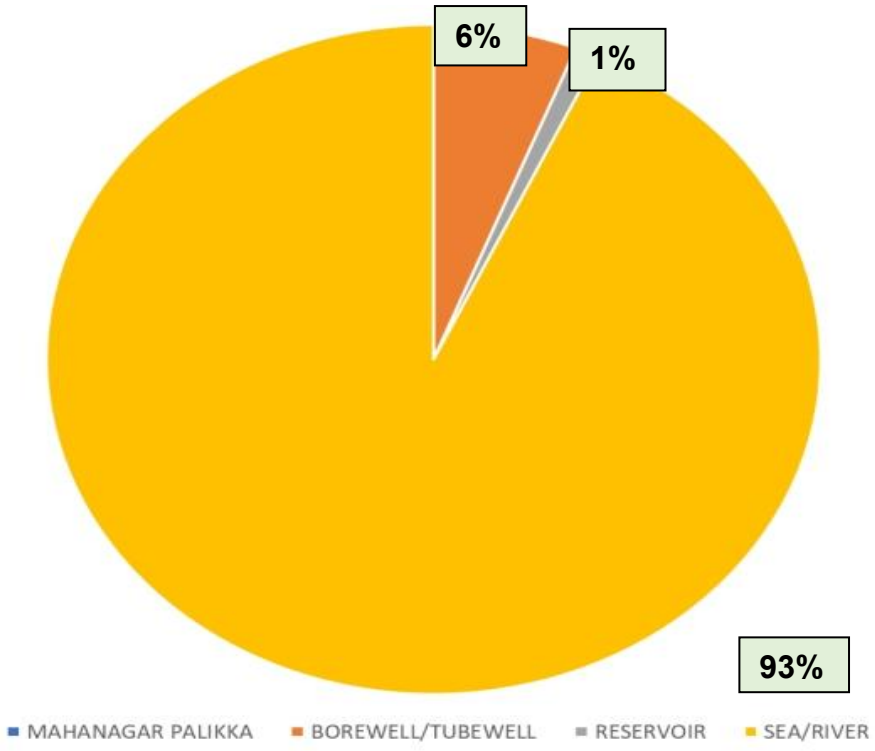

Fig 2 depicts that the out of the total sample size of 200 participants, a significant majority reported that their primary source of drinking water was the Mahanagar Palika, with 186 individuals indicating this option. This highlights the dominant reliance on municipal water supply within the study population. In contrast, a much smaller proportion, specifically 12 participants, stated that they obtained their drinking water from bore wells. An even smaller number, only 2 participants, identified water reservoirs as their main source. These findings clearly illustrate the variation in water sources accessed by the community. Overall, the data suggests that municipal water remains the most widely utilized and trusted source among respondents.

Ethical Consideration-Consent was taken from the participants of the study subjects.

REFERENCES:

1. Kirithika S, Madhan Kumar LR, Kingson Kumar M, Keerthana E, Lohalavanya R. Smart public toilets using IoE. In: Proceedings of the 2020 International Conference on Emerging Trends in Information Technology and Engineering (ic-ETITE); 2020. p. 1-5.

2. Kuberan A, Singh AK, Kasav JB, Prasad S, Surapaneni KM, Upadhyay V, Joshi A. Water and sanitation hygiene knowledge, attitude, and practices among household members living in rural setting of India. J Nat Sci Biol Med. 2015;6:0-74. doi:10.4103/0976-9668.166090.
3. Kanungo S, Chatterjee P, Saha J, Pan T, Chakrabarty ND, Dutta S. Water, sanitation, and hygiene practices in urban slums of Eastern India. J Infect Dis. 2021;224:0-83. doi:10.1093/infdis/jiab354.
4. GBD 2017 Typhoid and Paratyphoid Collaborators. The global burden of typhoid and paratyphoid fevers: a systematic analysis for the Global Burden of Disease Study 2017. Lancet Infect Dis. 2019;19:369-381. doi:10.1016/S1473-3099(18)30685-6.
5. Prüss-Ustün A, Wolf J, Bartram J, et al. Burden of disease from inadequate water, sanitation and hygiene for selected adverse health outcomes: an updated analysis with a focus on low- and middle-income countries. Int J Hyg Environ Health. 2019;222:765-777. doi:10.1016/j.ijheh.2019.05.004.
6. Bethony J, Brooker S, Albonico M, Geiger SM, Loukas A, Diemert D, Hotez PJ. Soil-transmitted helminth infections: ascariasis, trichuriasis, and hookworm. Lancet. 2006;367:1521-1532. doi:10.1016/S0140-6736(06)68653-4.
7. World Health Organization. World health statistics 2018: Monitoring health for the SDGs: Sustainable Development Goals. Geneva, Switzerland: WHO; 2018.
8. Prüss-Ustün A, Bos R, Gore F, Bartram J. Safer water, better health: costs, benefits and sustainability of interventions to protect and promote health. Geneva, Switzerland: World Health Organization; 2008.
9. Bartram J, Cairncross S. Hygiene, sanitation, and water: forgotten foundations of health. PLoS Med. 2010;7:0. doi:10.1371/journal.pmed.1000367.
10. UNICEF. Water, sanitation and hygiene [Internet]. 2022 Oct [cited 2022 Oct]; Available from: https://www.unicef.org/india/what-we-do/water-sanitation-hygiene
11. WHO–UNICEF. Downloads index [Internet]. 2022 Sep [cited 2022 Sep]; Available from: https://washdata.org/data/downloads
12. World Health Organization. Health gains from the Swachh Bharat initiative [Internet]. 2018 [cited 2022 Sep]; Available from: https://www.who.int/india/news/detail/27-07-2018-health-gains-from-the-swachh-bharat-initiative
13. Mara D, Lane J, Scott B, Trouba D. Sanitation and health. PLoS Med. 2010;7:0. doi:10.1371/journal.pmed.1000363.
14. Jenkins MW, Freeman MC, Routray P. Measuring the safety of excreta disposal behavior in India with the new Safe San Index: reliability, validity and utility. Int J Environ Res Public Health. 2014;11:8319-8346. doi:10.3390/ijerph110808319.
15. Van Minh H, Nguyen-Viet H. Economic aspects of sanitation in developing countries. Environ Health Insights. 2011;5:63-70. doi:10.4137/EHI.S8199.
16. Banerjee T, Shukla BN, Filgona J, Anupurba S, Sen MR. Trends of typhoid fever seropositivity over ten years in north India. Indian J Med Res. 2014;140:310-313. PMC4216508.
17. World Health Organization. Water, sanitation and hygiene (WASH) [Internet]. 2022 Oct [cited 2022 Oct]; Available from: https://www.who.int/india/health-topics/water-sanitation-and-hygiene-wash

18. Aneesh MR. Quality of drinking water and sanitation in India. Indian J Hum Dev. 2021;15:138-152.
19. Census of India. Rural urban distribution of population (provisional population totals) 2011. ORGI Digital Library [Internet]. 2011 [cited 2022 Sep]; Available from: https://censusindia.gov.in/nada/index.php/catalog/1430
20. Elgin C, Oyvat C. Lurking in the cities: urbanization and the informal economy. Struct Change Econ Dyn. 2013;27:36-47.