International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2024: 7.101

Sanitation Facilities and Health Outcomes - A Comparative Study in a Rural Village

G. Kavitha

Assistant Professor (PT) of Economics, University Women's PG College, Kakatiya University, Warangal, Telangana, India

Abstract: ***A secure water, sanitation, and hygiene (WASH) environment indicates a safe and healthy human life, safeguarding women's dignity and privacy. This paper examines the socio-economic and health conditions of rural households in Warangal, Telangana, through a comparative study (2012-2025). These findings indicate notable demographic shifts, with a decline in illiteracy (from 41.33% to 21.33%) and an increase in educational attainment at primary, secondary, and tertiary levels. These shifts are significant as they indicate a positive trend towards improved education and awareness, which are crucial for sustainable development. Access to health facilities has remained high (90%), with notable improvements in regular medical checkups and increased awareness. Sanitation facilities have shown remarkable progress, with 50% of households expected to gain access to bathroom and toilet facilities by 2025, compared to 2012. Alongside a significant reduction in open defecation, health outcomes improved. Waterborne and Sanitation-Related diseases declined.***

Keywords: WASH conditions, rural households, educational progress, sanitation access, health awareness

1. Introduction

Sustainable Development Goal 6.2 calls for universal access to safely managed sanitation by 2030. This is defined as improved facilities that are not shared between households and that safely manage excreta, either on-site or off-site (Jain et al., 2023). In 2014, the Indian government launched the Swachh Bharat Mission (SBM) to improve public sanitation. The SBM, a significant national initiative, has played a crucial role in the improvements observed in this study. By 2020, the program had constructed 100 million toilets nationwide. In the first five years of SBM, national open defecation rates decreased from 60% to 19%, and the availability of toilets doubled. Maintaining hygiene, limiting the spread of disease, and upholding dignity all depend on access to safe, clean sanitation. Access to adequate facilities, Water supply, and sanitation are Crucial Components of urban and rural infrastructure Services. Essential for enhancing the quality of life and health of the human habitat. Maintaining hygiene, limiting the spread of disease, and upholding dignity all depend on having access to safe and clean sanitation (G. Kavitha, 2025).

1.1 Objectives

1) To study the availability and usage of sanitation facilities in rural areas.
2) To identify common health problems and the impact of sanitation on disease reduction.
3) To assess the levels of literacy and sanitation progress in the study areas.

1.2 Hypotheses

1) The introduction of improved sanitation facilities has significantly reduced the prevalence of open defecation practices.
2) The literacy levels of rural households have shown a promising improvement.

1.3 Design of the Sample and Tools of Analysis

A multi-stage sample design is adopted for the study. In the first stage, the Warangal district was chosen for its representative nature and the presence of diverse socio-economic conditions, with 150 women respondents. In the second stage, one Mandal has been selected from the district. In the third stage, three villages have been chosen, and from each village, 50 respondent women are randomly selected for the collection of primary data. The data are analysed for the study's objectives. For analysing the data, statistical tools such as frequency counts, percentages, averages, and cross-tabulation are employed.

2. Review Literature

One of the key goals of Sustainable Development (SDG5) is to acknowledge the importance of paying "special attention to the needs of women and girls" (Manas Ranjan Behera et al., 2024). According to WHO and UNICEF (2015), only 44% of the total population of 42 million has access to sanitation facilities. While much of the world is in dire need of improved sanitation conditions, India happens to be at the receiving end of the sanitation challenge, as almost 60% of the world's OD occurs in India (Alexander et.al 2022) According to SDG data from 2022, over 50% of the population in Bangladesh, India, and Senegal used "at least a basic sanitation service, such as improved sanitation facilities that is not shared with other households." In Uganda and Zambia, only 21% and 36.3%, respectively, had access to improved sanitation facilities (Sachs et al., 2024). Open defecation is an issue that can affect everyone, but women are often at more risk of experiencing violence and multiple health vulnerabilities (Mahrukh Saleem et.al, 2019). Identifies that women with poor sanitation facilities are more susceptible to hookworm infestation, resulting in maternal anaemia, which in turn is directly associated with adverse pregnancy outcomes.

Lal (2023) notes that the BRICS nations have been the primary drivers of global economic development. It focused on the two decadal (2000–2020) growth and development

patterns in different demographic and economic facets. The government's consolation measures, if effectively enforced and administered, can rejuvenate the MSME sector by building economic resilience, thereby further accelerating sectoral growth and technological and infrastructural improvements (Lal, 2020).

The study focuses on creating awareness among Adivasis for utilising sanitation facilities and the benefits of sanitation. In addition, the government must provide regular health workers and a medical team to educate people and encourage them to undergo health checkups (Lal, 2020a).

3. Results and Discussion

Table 1: Demographic Information of Sample Respondents

Variables	Indicators	Frequency (2012)	Improvement over 12 Years (2012 -2025)
Age Group	15 - 25 Yrs	60 (40.00)	66 (44.00)
	26 - 35 Yrs	68 (45.33)	72 (48.00)
	36 - 45 Yrs	22 (14.66)	12 (8.00)
	Total	150 (100.00)	150 (100.00)
Marital Status	Married	133 (88.66)	133 (88.66)
	Unmarried	08 (5.33)	08 (5.33)
	Widow	09 (6.00)	09 (6.00)
	Total	150 (100.00)	150 (100.00)
Size of family	3 -4	38 (25.33)	75 (50.00)
	5 - 6	92 (61.33)	60 (40.00)
	7 - 8	20 (13.33)	15 (10.00)
	Total	150 (100.00)	150 (100.00)
Type of Family	Nuclear	137 (91.33)	142 (94.66)
	Joint	13 (8.66)	8 (5.33)
	Total	150 (100.00)	150 (100.00)
Education	Illiterate	62 (41.33)	32 (21.33)
	Primary	67 (44.66)	75 (50.00)
	Secondary	13 (8.66)	25 (16.66)
	College	08 (5.33)	18 (12.00)
	Total	150 (100.00)	150 (100.00)

Table 1 Provides Demographic Information categorised by age, marital status, sex, type of family, and educational status. Most respondents are in the 26 to 35-year age group, increasing from 45.33% to 48% in 2025. The younger group, aged 15 to 25 years, also saw a slight increase, moving from 40.00% to 44.00%. However, the 36 -45 years group decreased by 14.66% to 8%, indicating a drop in middle-aged representation. Marital status remained relatively stable over the years, with married individuals accounting for 88.66%, unmarried individuals for 5.33%, and widows for 6%. Family size shows a trend toward smaller households. Families with 3 to 4 members increased from 25.33% to 50.00%. Meanwhile, households with 5 to 6 members decreased from 61.33% to 40.00%. The most prominent families — those with 7 to 8 members — decreased from 13.33% to 10.00%. This clearly reflects the growing trend of nuclear and compact family systems. Educational attainment shows a positive upward trend. The percentage of illiterate respondents fell sharply from 41.33% in 2012 to 21.33% in 2025. On the other hand, primary education increased slightly from 44.66% to 50.00%. More importantly, secondary education improved significantly, from 8.66% to 16.66%, and college-level education rose from 5.33% to 12.00%. This indicates significant progress in literacy and access to higher education.

Table 2: Occupation and Economic Conditions of Respondents

Variables	Indicators	Frequency (2012)	Improvement over 12 Years (2012 -2025)
Occupation	Agriculture & Agri-Labour	108 (72.00)	120 (80.00)
	Non-agriculture	05 (3.33)	10 (6.00)
	Other	37 (24.66)	20 (13.33)
	Total	150 (100.00)	150 (100.00)
Days of Employment in Agriculture	10 – 19 days	23 (15.33)	32 (21.33)
	20 day	37 (24.66)	45 (30.00)
	25 day	47 (31.33)	55 (36.66)
	30 day	01 (0.66)	5(3.33)
	No	42 (28.00)	13 (8.66)
	Total	150 (100.00)	150 (100.00)
Nature of work	Daily	93 (62)	126 (84.00)
	Contract	57 (38.00)	24 (16.00)
	Total	150 (100.00)	150 (100.00)
Average working hours per day	Up to - 8 hrs	25 (16.66)	43 (28.66)
	8 - 10 hrs	105 (70.00)	98 (65.33)
	10 - 12 hrs	19 (12.66)	9 (6.00)
	12 - 14 hrs	01 (0.66)	0 (00.00)
	Total	150 (100)	150 (100)
Income Per Month in Rs.	Below 2000	22 (14.66)	14 (9.33)
	2000 - 2500	98 (65.33)	117 (78.00)
	2500 - 3000	30(20.00)	19(12.66)
	Total	150 (100.00)	150 (100.00)
Size of the Landholding	Below 2 Acres	53 (11.33)	47 (31.33)
	2 – 4 Acres	10 (6.66)	10 (6.66)
	No Land	87 (58.00)	93 (62.00)
	Total	150 (100.00)	150 (100.00)
Debts	Yes	131 (87.33)	143 (95.33)
	No	19 (12.66)	7 (4.66)
	Total	150 (100.00)	150 (100.00)

Table 2 provides occupation and economic conditions. Agriculture and agri-labour continue to be the primary sources of income. The number of respondents engaged in agriculture grew from 72% to 80%. Non-agricultural work also increased slightly, from 3.33% to 6%, while "other occupations" dropped from 24.66% to 13.33%. This suggests that, despite some economic diversification, agriculture remains the primary source of employment in rural areas. Job opportunities in agriculture have improved over time. The number of respondents who worked 25 days or more increased from 31.33% to 36.66%. The 20-day workers also increased from 24.66% to 30%. Notably, the proportion of individuals with no employment in agriculture decreased from 28% to 8.66%. This suggests better integration of rural labour in agricultural activities. Daily wage work rose significantly from 62% to 84% in 2025. However, contract-based work dropped sharply from 38% to 16%. This points to less long-term security and growing reliance on casual labour. Working hours have increased over time. The sample respondents working up to 8 hours increased from 16.66% to 28.66%. Meanwhile, the percentage of those working 8 to 10 hours decreased slightly, from 70% to 65.33%. Moreover, the number of hours worked fell by 0.66% to 0%, providing better control over excessive working hours. The income level, as a significant improvement below Rs. 2000 earnings, dropped from 14.66% to 9.33%. The majority now earns between Rs. 2,000 and Rs. 2,500, up from 65.33% to 78%. Higher-income categories also grew; those earning between Rs.

2,500 and Rs. 3,000 increased from 20% to 19%. This reflects a gradual economic improvement and a rise in rural incomes. Landholding patterns reveal a troubling trend. Households with less than 2 acres decreased from 11.33% to 31.33%, but the number of landless households increased from 58% to 62%. Meanwhile, holdings of 2 to 4 acres remained unchanged at 6.66%. This indicates a rise in landlessness and land fragmentation over the years, accompanied by an alarming increase in the number of respondents who are in debt, from 87.33% to 95.33%. Conversely, the number of respondents who are not bothered by debt decreased from 12.66% to 4.66%.

Table 3: Health Facilities Available in the Sample Respondents

Variables	Indicators	Frequency (2012)	Improvement over 12 Years (2012 -2025)
Hospital facilities	Yes	144 (96.00)	144 (96.00)
	No	06 (4.00)	06 (4.00)
	Total	150 (100.00)	150 (100.00)
Nature of Hospital	Govt. Hospital	123 (82.00)	136 (90.66)
	Pvt. Hospital	27 (18.00)	14 (9.33)
	Total	150 (100.00)	150 (100.00)
Distance in Km	Below 2Km	21 (14.00)	21 (14.00)
	3 - 5 Km	129 (86.00)	129 (86.00)
	Total	150 (100.00)	150 (100.00)
Medical Checkup	Twice a Year	00 (0.00)	58 (38.66)
	Annually	12 (8.00)	72 (48.00)
	Rarely	36 (24.00)	20 (13.33)
	Never	102 (68.00)	**0 (00.00)**
	Total	150 (100.00)	150 (100.00)

Table 3: Provides health facilities. Almost all respondents (96%) reported access to hospital facilities in both 2012 and 2025, showing stability in availability. Government hospitals lead the way in healthcare access, with an increase from 82% to 90.66%. At the same time, the use of private hospitals fell from 18% to 9.33%. This indicates that public health services are becoming stronger and that reliance on more expensive private care is decreasing. Accessibility in terms of distance has remained relatively unchanged. Most respondents (86%) travel 3 to 5 km, while only 14% travel within 2 km. This indicates limited improvement in spatial accessibility. None of the respondents had regular checkups. By 2025, 38.66% reported having biannual checkups, and 48% had annual checkups. The number of respondents who "never" visited for checkups dropped from 68% to 0%. This shows a growing awareness of health and better outreach of medical services.

Table 4: Sanitation Facilities Available in the Sample Respondents

Variables	Indicators	Frequency (2012)	Improvement of 12 Years (2012 -2025)
Bathroom facility	Yes	00 (00.00)	75 (50.00)
	No	150 (100.00)	75 (50.00)
	Total	150 (100.00)	150 (100.00)
Source of bath	Having a Bathroom Facility	00 (00.00)	75 (50.00)
	Open both with clothes	68 (45.33)	38 (28.33)
	Gunny bags shed	29 (19.33)	15 (10.00)
	Cloths shed	53 (35.33)	22 (14.66)
	Total	150 (100.00)	150 (100.00)
Toilet facility	Yes	00 (0.00)	75 (50.00)
	No	150 (100.00)	75 (50.00)
	Total	150 (100.00)	150 (100.00)
Source of Toilets	Having a Toilet Facility	0 (00.00)	87 (58.00)
	Open fields	148 (98.66)	63 (42.00)
	Bank of Canals	02 (1.33)	0 (00.00)
	Total	150 (100.00)	150 (100.00)
Do you carry water for the Toilet	Yes	150 (100.00)	63 (42.00)
	No	00 (0.00)	87 (58.00)
	Total	150 (100.00)	150 (100.00)
Problems While Going to the Toilet	Yes	118 (78.66)	47 (31.33)
	No	32 (21.33)	103 (68.66)
	Total	150 (100.00)	150 (100.00)
Problems While Going to Open Defecation	Fear of Snake Bite	42 (28.00)	12 (8.00)
	Physical attacks	36 (24.00)	18 (12,00)
	Scorpion bite	22 (14.66)	9 (6.00)
	Any others	23 (15.33)	17 (11.00)
	No problems	32 (21.33)	94 (62.66)
	Total	150 (50.00)	150 (100.00)

Table 4: Provides sanitation facilities. In 2012, none of the respondents had bathrooms and toilets. By 2025, 50% of respondents had access to bathroom and toilet facilities, indicating a significant improvement due to sanitation programs and awareness campaigns. Open bathing practices decreased significantly. The number of people bathing outdoors while clothed dropped from 45.33% to 28.33%. Those using gunny bags shed fell from 19.33% to 10%, and those using cloth sheds decreased by 35.33% to 14.66%. It shows better privacy and hygiene practices. The reliance on open defecation fields decreased from 98.66% to 42%, with 58% now having toilets at home and water available within the toilet area. Previously, 78.66% reported problems while going to the Toilet by 2025. 68.66% reported no problems, indicating better sanitation, safety and dignity. Fear and snake bites decreased by 28% to 8%. Physical attacks fell from 24% to 12%, and scorpion bites dropped from 14.66% to 6%. This reflects improved toilet facilities and less exposure to unsafe open areas.

Table 5: General Health Problems Faced by the Sample Respondents

Variables	Indicators	Frequency (2012)	Improvement over 12 Years (2012 -2025)
Water and Airborne Diseases	Fever	20 (13.33)	18 (12.00)
	Cough	10 (6.66)	10 (6.66)
	Cold	12 (8.00)	13 (8.66)
	Malaria	08 (5.33)	5 (3.33)
	Typhoid	06 (4.00)	4 (2.66)
	Jaundice	08 (5.33)	5 (3.33)
	Diarrhea	22 (14.66)	17 (11.33)
	Body Pains	26 (17.33)	22 (14.66)
	Stomach Pain	20 (13.33)	19 (12.66)
	Others	18 (12.00)	16 (10.66)
	No	0 (00.00)	21 (14.00)
	Total	150 (100.00)	150 (100.00)
Health problems	Anemia	40(26.66)	34(22.66)
	TB	16(10.66)	7(4.66)
	Asthma	17(11.33)	11(7.33)
	BP	31(20.66)	31(20.66)
	Anaemia / BP	14(9.33)	10(6.66)
	No	32(21.33)	57(38.00)
	Total	150(100.00)	150(100.00)
Dermatological Allergies	Rashes	09(6.00)	5 (3.33)
	Taupe	03(2.00)	0 (00.00)
	Swelling	17(11.33)	10 (6.66)
	No	121(80.66)	135 (90.00)
	Total	150(100.00)	150 (100.00)
Sanitation-Related Diseases	Diarrheal diseases	39(26.00)	28 (18.66)
	Worms	35(23.33)	15 (10.00)
	Acute Respiratory Infections	43(28.66)	28 (18.16)
	Burden of Caretaking	21(14.00)	11(7.33)
	Mental Health	12(8.00)	6 (4.00)
	No	0 (00.00)	62 (41.33)
	Total	150(100.00)	150 (100)

Table 5 provides general health information on various health issues and waterborne and airborne diseases, such as fever, cough, and cold, which remained relatively stable from 2012 to 2025. Malaria decreased from 5.33% to 3.33%. Typhoid dropped from 4% to 2.66%. Jaundice fell from 5.33% to 3.33%, and diarrhoea declined from 14.66% to 11.33%. By 2025, 14% of respondents reported no illness at all, compared to 2012. The anaemia rate dropped from 26.66% to 22.66%. Tuberculosis (TB) cases fell from 10.66% to 4.66%. Asthma prevalence decreased from 11.3% to 7.33%. Blood pressure (BP) cases remained steady at 20.66%. The percentage of women reporting no chronic health issues increased from 21.33% to 38%. Skin problems, including rashes and swelling, went down, and the "no problem" category rose sharply from 80.66% in 2012 to 90% in 2025. Regarding sanitation-related diseases, worm infestations decreased from 23.33% to 10%. Mental health issues also fell from 8% to 4%. Notably, in 2012, "NO" respondents reported being free of such issues; however, by 2025, 41.33% reported having no sanitation-related health problems.

Table 6: Gynaecology Related Problems Faced by the Respondents

Variables	Indicators	Frequency (2012)	Improvement over 12 Years (2012 -2025)
Types of Abdominal Pains	Gripping	44(29.33)	32 (21.33)
	Squeezing	74(49.33)	47 (31.33)
	Dragging	29(19.33)	18 (12.00)
	No	03(2.00)	53 (35.33)
	Total	150(100.00)	150 (100.00)
Types of Uterus Problems	White discharge	19 (12.66)	13 (8.66)
	Irregular periods	39 (26.00)	29 (19.33)
	Back pain& Bleeding	16 (10.66)	10 (6.66)
	White discharge& irregular periods	45 (30.00)	34 (22.66)
	Irregular periods, back pain, and bleeding	24 (16.00)	17 (11.33)
	No	07 (4.66)	47 (31.33)
	Total	150 (100.00)	150 (100.00)

Table 6 provides insights into two important categories of gynaecological health concerns among women—abdominal pains and uterus-related problems. Abdominal pain is a common issue for women. The table illustrates various types of pain that women may experience. Among these, squeezing pain was the most common, reported by nearly half of the respondents (49.33%). Over time, this issue has decreased, dropping to 31.33% in 2025. Gripping pain and dragging pain were also significant, affecting 29.33% and 19.33% of women, respectively. Both types showed notable improvement by 2025, with rates falling to 21.33% and 12.00%, respectively. An encouraging trend is evident in the "no pain" category, which initially started at 2.00% but rose sharply to 35.33% by 2025. When examining health issues related to the uterus, several patterns emerge. Irregular periods were a significant concern affecting 26% of women. White discharge and irregular periods were reported by 30% of the participants. Both of these issues have shown a steady decline in prevalence over the years. Back pain with bleeding and multiple problems, such as irregular periods, back pain, and bleeding, were less common but still significant. Both categories have also decreased. Significantly, the number of women reporting "no" uterus problems has increased from just 4.66% in the earlier period to over 31.33% in 2025. This marks a significant improvement in reproductive health.

Table7 (a): Income Levels of the Respondents Influenced by the Age(2012)

Age	Below – 2000	2000 – 2500	2500 – 3000	Total
15 -25 Yrs	8(5.33)	10 (6.66)	4(2.66)	22(14.66)
26- 35 Yrs	25(16.66)	40(26.66)	33(22.00)	98(65.33)
36- 45 Yrs	5(3.33)	17(11.33)	8(5.33)	30(20.00)
Total	38 (25.33)	67(44.66)	45(30.00)	150(100)

Table 7b: Income Levels of the Respondents Influenced by the Age (2025)

Age	Below – 2000	2000 – 2500	2500 – 3000	Total
15 -25 Yrs	6(4.00)	4(2.66)	4(2.66)	14(9.33)
26- 35 Yrs	34(22.66)	47(31.33)	36(24.00)	117(78.00)
36- 45 Yrs	5(3,33)	11(7.33)	3(2.00)	19(12.66)
Total	45(30.00)	62(41.33)	43(28.66)	150(100)

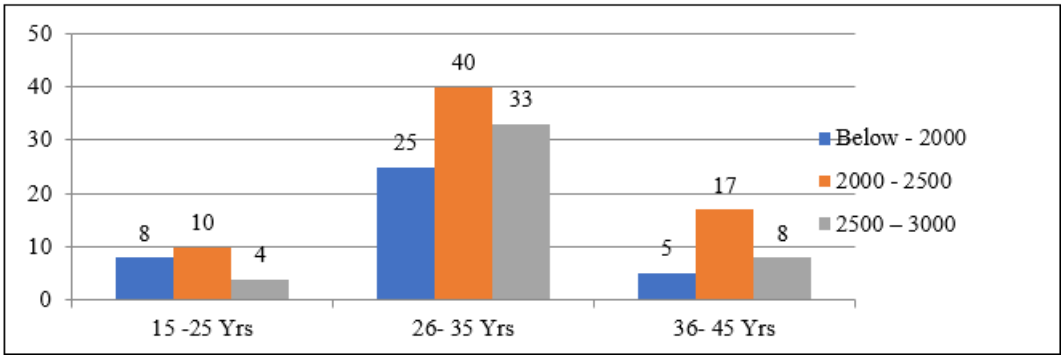

Figure 1:1 (2012)

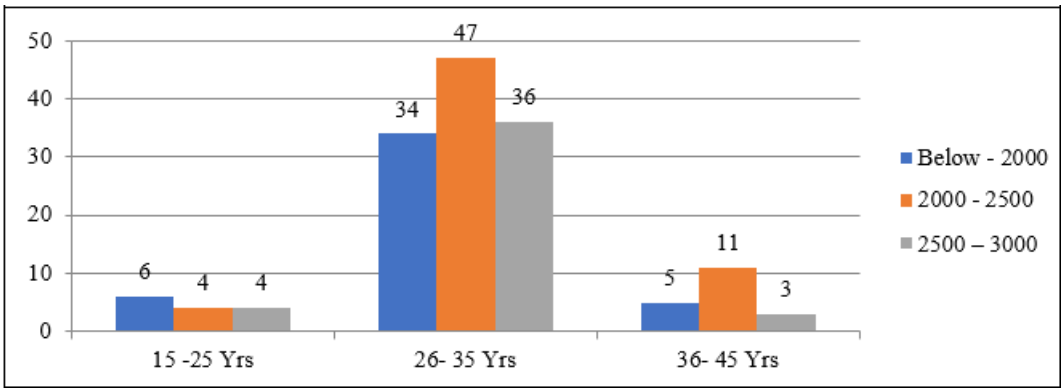

Figure:1:2 (2025)

Figure 1.1 shows the income levels of three age groups. In both graphs, the 26–35-year-olds have the highest number of individuals across all income levels. This means that this age is the most active in earning. Their figures rose from 25, 40, and 33 in the first graph to 34, 47, and 36 in the second graph for the respective income levels. This increase indicates improved incomes and job opportunities for this age group. Among respondents aged 15–25, earnings are low in both graphs. In the first graph, earnings were as follows: 8 individuals earned below 2000, 10 earned between 2000 and 2500, and 4 earned between 2500 and 3000.

Figure 1:2 shows these earnings drop to 6, 4, and 4, respectively. This clearly shows a decrease in younger people's income due to limited work experience. Among respondents aged 36–45, five earned below 2000, eight earned between 2000 and 2500, and 17 earned between 2500 and 3000 in the first graph. In the second graph, it remained the same for those earning below 2000, increased to 11 in the 2000–2500 range, and decreased to 3 in the 2500–3000 range. This could mean some shifting of income, with fewer people falling into the highest earning category in the second set than in the first.

On the whole, the 26–35-year age group is the most financially stable and earns the most. The lowest income levels were registered in the 15–25 years age group; the 36–45 years age group showed mixed changes. The data suggest that income generally peaks in middle age before either stabilising or slightly declining in later years.

Table 8a: Education Influenced by theRespondents of Income levels (2012)

Education	Below - 2000	2000 - 2500	2500 – 3000	Total
Illiterate	6(4.00)	4(2.66)	4(2.66)	14(9,33)
Primary	34(22.66)	47(31.33)	36(24.00)	117(78.00)
Secondary	5(3.33)	11(7.33)	3(2.00)	19(12.66)
Total	45(30.00)	62(41.33)	43(28.66)	150(100)

Table 8b: Education Influenced by theRespondents of Income levels (2025)

Education	Below - 2000	2000 - 2500	2500 – 3000	Total
Illiterate	5(3.33)	13(8.66)	4(2,66)	22(14.66)
Primary	17(11.33)	39(26.00)	42(28.00)	98(65.33)
Secondary	10(6.33)	15(10.00)	5(3.33)	30(20.00)
Total	32(21.33)	67(44.66)	51(34.00)	150(100)

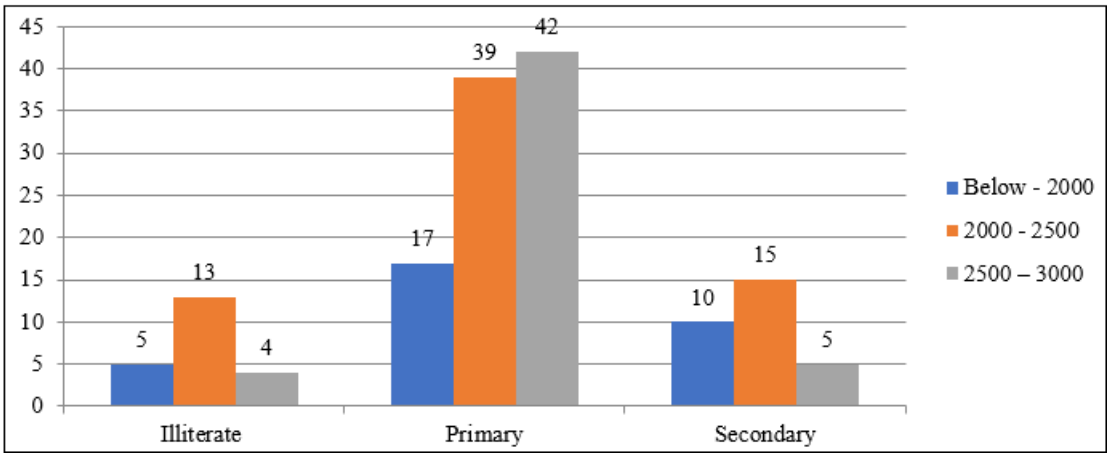

Figure 2:1 (2012)

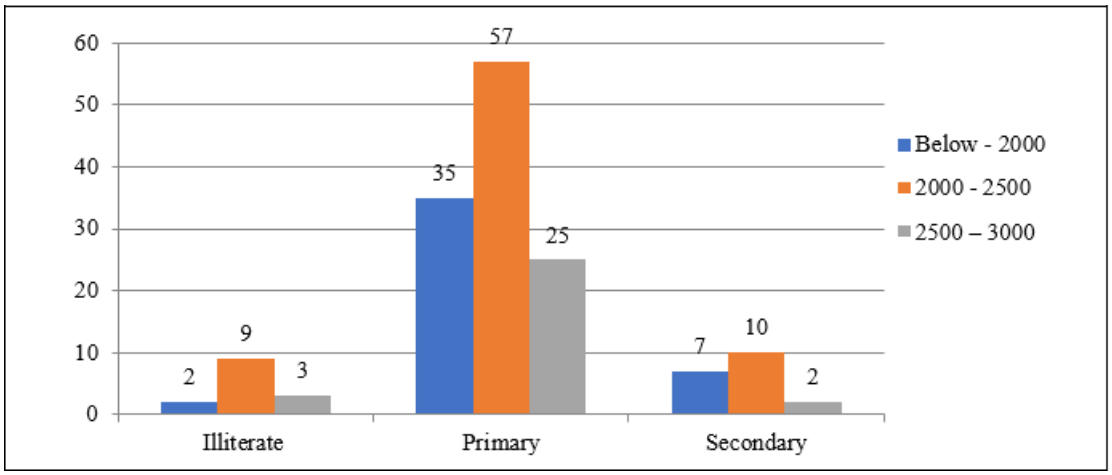

Figure 2:2 (2025)

Figure 2:1 shows the three income levels for each educational level. For the Illiterate category, there is a notable slope across income levels: 2000-2500 increases to 13, suggesting that literacy challenges persist across all economic segments. At the Primary education level, 39 respondents have an income below 2000, and 42 individuals have an income of 2500-3000, indicating that higher-income families achieve higher primary education completion rates. The Secondary education below 2000 is only 10 individuals, and 2000-2500 level income respondents are 15, 2500-3000 income respondents are 5, with the lowest income group paradoxically showing more secondary attainment than the highest income group.

Figure 2:2 shows the second chart presents similar education levels, but with more granular income segmentation: Below 2000, 2000-2500, and 2500-3000. The Illiterate category shows minimal variation (2, 9, 3), while Primary education demonstrates a strong positive correlation with income, with only two respondents in the lowest income category. The number of respondents in the 2000-2500 income level has increased from 35 to 57. This stark contrast illustrates how economic capacity directly influences educational advancement. Secondary education remains limited across all income groups (7, 10, 2), suggesting secondary education remains a significant barrier regardless of baseline income.

Table 9a: Education Influenced by theRespondents of Health Problems (2012)

Education	Anemia	TB	Asthma	Anaemia/BP	BP	No	Total
Illiterate	18(12.00)	8(5.33)	9(6.00)	5(3.33)	10(6.66)	11(7.33)	61(40,66
Primary	12(8.00)	3(2.00)	4(2,66)	4(2.66)	12(8.00)	14(9.33)	45(30.00)
Secondary	10(6.66)	5(3.33)	3(2.00)	5(3.33)	9(6.00)	7(4.66)	39(29.00)
Total	40(26.66)	16(10.6)	17(11.33)	14(9.33)	31(20.6)	32(21.33)	150(100)

Table 9b: Education Influenced by theRespondents of Health Problems (2025)

Education	Anemia	TB	Asthma	Anaemia/BP	BP	No	Total
Illiterate	14(9.33)	2(1.33)	5(3.33)	3(2.00)	10(6.66)	23(15.33)	57(38.00)
Primary	10(6.66)	1(0.66)	3(2.00)	3(2.00)	12(8.00)	19(12.66)	48(32.00)
Secondary	10(6.66)	4(2.66)	392.00)	4(2.66)	9(6.00)	15(10.00)	45(30.00)
Total	34(22.66)	7(4.66)	11(7.33)	10(6.66)	31(20.66)	57(38.00)	150(100)

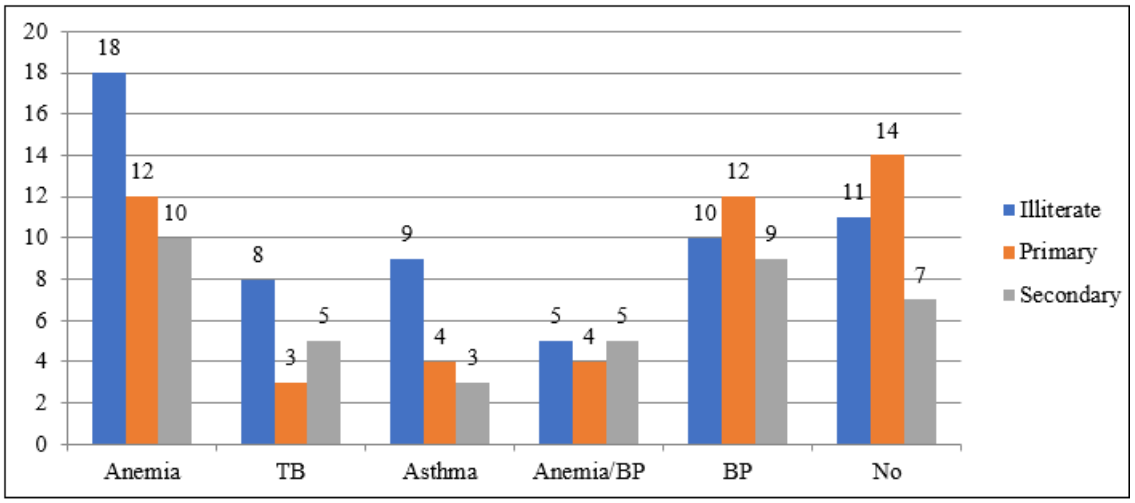

Figure 3:1 (2012)

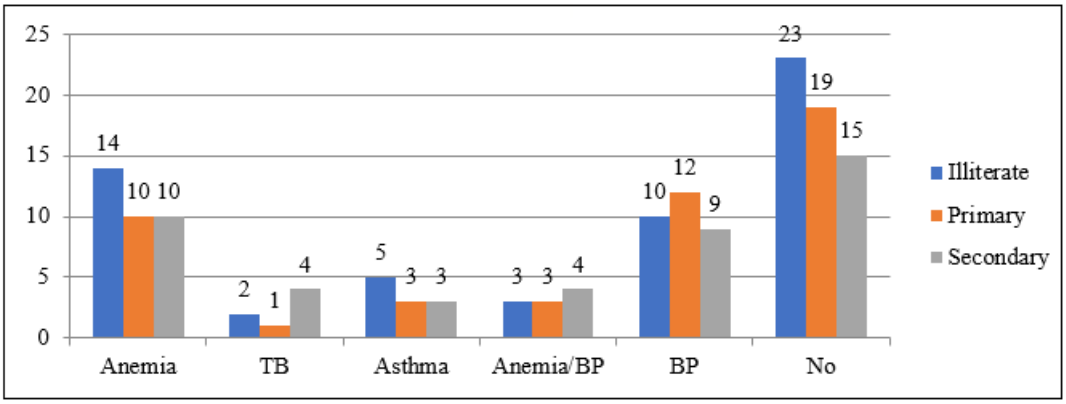

Figure 3:2 (2025)

Figure 3:1 presents a comparison of the prevalence of health problems across educational levels among three groups. The graph reveals that anaemia is the leading problem experienced by the illiterate group, with 18 cases being reported. With increasing educational level, anaemia decreases by 12 in the primary group and by 10 in the secondary group. This reflects that education is positively associated with good nutrition and health care. The incidences of TB are highest among the illiterates, with eight cases, and lowest among the primary group, with three cases and the secondary group, with five. This indicates that education leads to better hygiene and awareness, thereby reducing the incidence of infectious diseases. Asthma and anaemia/Blood Pressure (BP) levels are comparatively low and almost equal across all three groups, averaging 4 and 5 cases, respectively. However, BP shows a different trend: it is more prevalent among the educated groups, with 4 cases in the illiterate group, 12 in the primary group, and 9 in the secondary group. This may indicate that blood pressure is more related to lifestyle and stress factors than to education. The "No disease" category is highest among the primary-educated, totalling 14, compared with nine among illiterates and seven among secondary-educated people. This indicates that basic education improves general health awareness.

Figure 3.2 presents the distribution of diseases by educational background. Anaemia is once again the most prevalent disease, as it affected 14 illiterates and 10 representatives each from the primary and secondary groups. TB is the least widespread disease because only one or two individuals were affected in each category. Asthma slightly increased in the secondary-educated group. Anaemia/BP remains consistent, with a ratio of three to four respondents in each category. BP is relatively high in all three categories: 12 illiterates, 10 primary, and nine secondary. This proves that it does not target any particular group. The "No disease" category lists the highest number of 23 illiterates, 19 primary, and 15 secondary. This shows that the majority of the population remains disease-free. However, this number decreases slightly with increasing education because educated people tend to be more self-aware of their disease diagnosis. Overall, the data indicate that education tends to have a very significant effect on health: illiterate individuals are more prone to anaemia and TB, whereas educated ones report a lower incidence of illness. This is likely attributed to

their knowledge, hygiene practices, and access to better medical care. However, the rise in BP cases among educated groups shows that some lifestyle-related conditions may not depend solely on literacy levels.

4. Conclusion

Access to clean water and sanitation is essential for sustainable development, public health, and economic growth, as it underpins human well-being, prevents waterborne diseases, and fosters dignity, safety, and gender equality. The persistent challenges include a lack of access for billions of people, funding gaps, weak governance, inadequate infrastructure, and the impacts of climate change. Overcoming these issues requires integrated solutions, including community-led initiatives, improved water-quality monitoring, policy reforms, and increased financial investment to achieve sustainable water management and hygiene for all.

References

[1] Anoop Jain, Akhil Kumar. Rockli Kim, SV Subramanian (2023); Prevalence of zero-sanitation in India: Patterns of change across the states and Union Territories,1993-2021.Journal of global health2023 July 28;

[2] G. Kavitha (2025), Impact of Inadequate Sanitation on Socioeconomic and Health Conditions among Rural Households - An Empirical Study, International Journal of Science and Research (IJSR), Volume 14, Issue 7, July 2025. https://dx.doi.org/10.21275/SR25722150619

[3] Manas Ranjan Behera, Ranjit Kumar Dehury, Deepanjali Behera, Bhuputra Panda (2024). Exploring the association between household sanitation and women's menstrual hygiene management in rural Odisha, India: Clinical Epidemiology and Global Health, Volume 30, November-December.

[4] Alexander, K., Allton, C., Felsman, C., Hahn, M., Okegbe, T., Palmer, D., Taglieri, J. and Thibert, M. (2016). Ending Open Defecation in India: Insights on implementation and Behavior Change for Swachh Bharat Abhiyan. Online. Online. Online. Online.https://spia.princeton.edu/sites/default/files/content/India%20Workshop%20Report_FINAL_2.25.2016.pdf (Accessed September 18, 2022)

[5] Sachs, J. D., G. Lafortune, and G. Fuller. (2024). The SDGs and the UN Summit of the Future Sustainable Development Report 2024. Dublin University Press.https://www.tara.tcd.ie/handle/2262/108572

[6] Mahrukh Saleem, Teresa Burdett, Vanessa Heaslip(2019). Health and social impacts of open defecation on women: a systematic review BMC Public Health 2019 February 6; 19:158. doi: 10.1186/s12889-019-6423-z

[7] Lal B Suresh & others (2020). Impact of Covid-19 on micro, small, and medium enterprises (MSMEs): An overview, International Journal of Multidisciplinary Research and Development, Volume 7; Issue 12; 2020; Page No. 05-12: https://www.researchgate.net/publication/363534094

[8] Lal BS (2020a). Freedom From Open Defecation: An Empirical Study from Two Adivasi Villages, International Journal of Management (IJM), Volume 11, Issue 9, September 2020, pp. 2164-2179. https://www.researchgate.net/publication/353779080

[9] Lal B Suresh (2023). The BRICS Countries: Trends of Demographic and Economic Development, International Journal of Science and Research (IJSR), Volume 12, Issue 4, April. https://www.researchgate.net/publication/369982167