A Study on the Impact of Jal Jeevan Mission on Women in Rural Households of Bengaluru

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Abstract
The Jal Jeevan Mission (JJM) aims to provide functional household tap connections (FHTCs) to all rural households by 2024, significantly impacting women who traditionally bear the burden of water collection. This study examines the impact of JJM on women in rural households of Bengaluru, analyzing changes in their daily routines, accessibility to water, health, and socio-economic status. A survey of 150 respondents was conducted, and the results indicate a significant reduction in time spent fetching water, improved health outcomes, and increased participation in income-generating activities. However, infrastructural and socio-cultural challenges persist.
Keywords: Jal Jeevan Mission, Accessibility, Socio-Economic Status, Health, Challenges

Introduction

Access to clean and safe drinking water is fundamental to human health, yet millions of people worldwide continue to suffer from waterborne diseases and inadequate sanitation. Unsafe drinking water remains a leading cause of mortality and disease burden globally, exacerbating public health crises and increasing economic and social inequalities.

According to the World Health Organization (WHO), in 2019, unsafe drinking water, inadequate sanitation, and poor hygiene were responsible for an estimated 1.4 million deaths and 74 million Disability-Adjusted Life Years (DALYs) worldwide. In India, the crisis was particularly severe, with 36% of the national population in 2018 lacking access to an improved drinking water source at home. The situation was even more alarming in rural areas, where 44% of households did not have access to safe and reliable drinking water on their premises. This widespread water insecurity led to an increased prevalence of diarrheal diseases, child malnutrition, and other health complications, disproportionately affecting women and children who often bear the burden of collecting water from distant sources.

Jal Jeevan Mission: A Transformative Initiative

Recognizing the urgent need for intervention, the Government of India launched the Jal Jeevan Mission (JJM) in 2019, an ambitious initiative aimed at providing every rural household with a functional household tap connection by 2024. The mission is designed to enhance water accessibility, availability, and quality, ensuring that every family, regardless of location, has access to safely managed drinking water (SMDW).

JJM aligns with the WHO/UNICEF Joint Monitoring Programme's (JMP) definition of SMDW, which emphasizes three key components:

- Water Accessibility – Water must be available on premises, eliminating the need for long and unsafe journeys to fetch water.
- Water Availability – The water supply must be reliable and sufficient to meet daily household needs.
- Water Quality – The water must be free from contaminants, including bacteria, viruses, and harmful chemicals, to ensure safety for consumption.

Beyond improving infrastructure, JJM plays a crucial role in India's commitment to Sustainable Development Goals (SDGs), particularly SDG 6.1, which focuses on universal and equitable access to safe and affordable drinking water for all. By enhancing water security, the program contributes to better health outcomes, economic productivity, and gender equity, ensuring a better quality of life for millions of people in rural India.

While significant progress has been made under JJM, challenges remain, including water source sustainability, infrastructure maintenance, and ensuring community participation. Addressing these concerns through technological advancements, robust policy frameworks, and active community involvement will be essential in achieving the mission's long-term success.

Review of Literature

A study by UNICEF (2021) highlighted that unsafe drinking water and inadequate sanitation contribute significantly to the prevalence of waterborne diseases, malnutrition, and maternal health complications. Women, especially in rural India, bear the brunt of poor water infrastructure as they are primarily responsible for household water collection. The availability of piped water through JJM is expected to reduce the health risks associated with contaminated water sources and decrease the physical burden of carrying water over long distances.

According to a World Bank (2020) report, rural women in India spend an average of 200 hours annually fetching water. The introduction of on-premises water supply through JJM has the potential to free up this time, enabling women to participate in income-generating activities, pursue education, or engage in skill development programs. Studies by Agarwal & Gupta (2022) further support this argument, showing that improved water accessibility correlates with higher female workforce participation and greater economic independence.

A research study by NITI Aayog (2023) found that young girls often miss school due to the responsibility of water collection, particularly in water-scarce rural regions. The availability of safe drinking water at home can lead to higher school attendance rates among girls, ensuring better educational outcomes and reducing gender disparities in education.

The Ministry of Jal Shakti (2022) provided a comprehensive analysis of JJM's progress and its impact on gender roles in rural communities. The report emphasized that access to safe drinking water directly improves women's quality of life, giving them greater autonomy over their time and reducing their dependency on male family members for water procurement. The study also pointed out that JJM has led to greater community participation by women, with many taking active roles in village water and sanitation committees (VWSCs) to ensure sustainable water management.

Despite its success, Singh & Radhakrishnan (2023) noted that rural water supply programs face challenges such as infrastructure gaps, water quality issues, and maintenance concerns. Ensuring that the benefits of JJM reach all women in rural Bengaluru requires continuous monitoring, community participation, and sustainable water management practices.

The existing literature underscores the transformative role of Jal Jeevan Mission in improving water accessibility, reducing the gendered burden of water collection, and promoting women's health, education, and economic participation. However, addressing infrastructure and sustainability challenges is crucial to maximizing the program's impact on women in rural Bengaluru. Future studies should focus on long-term assessments of JJM's effectiveness and the development of inclusive policies to ensure equitable access to safe drinking water for all women.

Objectives

1. To assess the impact of JJM on water accessibility for women in rural Bengaluru.
2. To evaluate changes in women's time allocation, health, and socio-economic activities.
3. To recommend policy measures to enhance JJM's impact on women.

Research Methodology

Descriptive research method is adopted for the present study. Simple random sampling technique was used to select aSample of 150 women from five villages namely Arehalli, Harohalli, Bhaktipura, Mayasandra and Bestamanahalli of Anekal Taluk, Bengaluru. The data required for the present study are collected through both primary and secondary sources. The primary data was collected through a questionnaire on daily routines, health, and economic activities of women. The collected data was analyzed using percentage analysis and chi square test to draw the interpretations.

Results and Discussion

The implementation of the Jal Jeevan Mission (JJM) has significantly transformed water accessibility, time spent fetching water, health outcomes, socio-economic participation, and remaining challenges for rural households in Bengaluru. The following sections provide an in-depth analysis of the collected data.

Table 1 Water Accessibility Before and After JJM

Water Source	Before JJM (%)	After JJM (%)
Public Tap	45%	5%
Borewell	30%	15%
Household Tap Connection	10%	70%
Other (Wells, Tankers)	15%	10%

Table 2 Chi-Square Test Results

Test Statistic	Value
Chi-Square (χ^2)	83.00
Degrees of Freedom (df)	3
p-value	0.000

Table 1 shows that before the launch of JJM, 45% of respondents relied on public taps, often leading to long waiting times and water shortages. This dropped drastically to 5% after the intervention. The dependency on borewells reduced from 30% to 15%, indicating a shift towards sustainable water sources. Household tap connections increased from 10% to 70%, showing the mission's success in providing on-premises water access. Other sources (wells, tankers, etc.) reduced from 15% to 10%, as tap connections became more prevalent. This data indicates a substantial improvement in accessibility, reducing the burden of water collection and ensuring a consistent water supply for rural households.

The Chi-Square test result for the Water Accessibility Before and After JJM by women in the study area is presented in table 2. The Chi-Square value (83.00) is highly significant ($p < 0.05$), indicating a substantial change in water accessibility after JJM implementation. The observed values significantly differ from the expected distribution, confirming that the increase in household tap connections and decrease in public tap dependency are statistically significant.

Table 3 Time Spent on Fetching Water by the Respondents

Time Spent Per Day	Before JJM (%)	After JJM (%)
More than 2 hours	50%	5%
1 - 2 hours	30%	10%
Less than 1 hour	15%	15%
No time spent	5%	70%

Table 4 Chi-Square Test Results

Test Statistic	Value
Chi-Square Value (χ^2)	103.15
Degrees of Freedom (df)	3
p-value	0.001 (Highly Significant)

Table 3 shows that women spending over two hours fetching water decreased from 50% to 5% after JJM implementation significantly reducing physical strain and time wasted. 1-2 hours fetching water dropped from 30% to 10%, showcasing improved

water availability. The proportion of households that no longer spend time fetching water increased from 5% to 70%, emphasizing the impact of household tap connections. This transformation frees up valuable time for women and young girls, allowing them to pursue education, employment, or social activities instead of spending hours collecting water.

The Chi-Square test result for the time spent on fetching water by the respondents is presented in table 4. The Chi-Square value (103.15) is highly significant ($p < 0.05$), indicating a substantial change in the time spent on fetching water by the respondents after JJM implementation. This confirms that the difference in time spent fetching water before and after JJM is statistically significant, demonstrating a major improvement in water accessibility.

Table 5 Impact of JJM on Health of Respondents

Health Issues	Before JJM (%)	After JJM (%)
Waterborne Diseases	60%	25%
Back/Joint Pain (due to carrying water)	45%	10%
General Fatigue	50%	20%

Table 6 Chi-Square Test Results

Test Parameter	Value
Chi-Square Value (χ^2)	2.49
Degrees of Freedom (df)	2
p-value	0.288 (Not Significant)

Table 5 shows that with the implementation of JJM waterborne diseases decreased from 60% to 25%, reflecting improved water quality and hygiene. Back and joint pain cases reduced from 45% to 10%, indicating that fewer women are carrying heavy water loads.General fatigue cases dropped from 50% to 20%, suggesting an improvement in overall health and well-being. These health benefits have direct implications for better productivity, reduced healthcare costs, and an improved quality of life for women and their families.

The Chi-Square test result for the impact of JJM on health of respondentsis presented in table 6. The Chi-Square value (2.49), which shows that there is a noticeable reduction in waterborne diseases, back/joint pain, and general fatigue after the implementation of JJM, but the difference is not statistically significant ($p > 0.05$). However, continued monitoring may reveal long-term improvements in public health outcomes.

Table 7 Socio-Economic Participation of Respondents

Activity	Before JJM (%)	After JJM (%)
Engaged in Income Generation	30%	55%
Active in Community Groups	20%	45%
Attending Vocational Training	10%	30%

Table 8 Chi-Square Test Results

Test Parameter	Value
Chi-Square Value (χ^2)	1.36
Degrees of Freedom (df)	2
p-value	0.506 (Not Significant)

Table 7 shows that with the implementation of JJM participation of women in income-generating activities increased from 30% to 55%, as they had more time for work.Women are active in community groups increased from 20% to 45%, indicating greater social empowerment and involvement in decision-making.Vocational training participation rose from 10% to 30%, allowing women to develop skills for better employment opportunities.This enhanced economic and social participation of women leads to greater financial independence and empowerment.

The Chi-Square test result for the socio-economic participation of respondents after JJM implementation is presented in table 8. The Chi-Square value (1,36), which shows thatwhile more women are engaging in income-generating activities, community participation, and vocational training after JJM, the change is not statistically significant ($p > 0.05$). This suggests that additional

interventions, such as skill development programs and economic incentives, may be needed to enhance women's socio-economic participation.

Tables 9 Challenges Faced by Women Even after Implementing JJM

Challenge	% of Respondents Affected
Irregular Water Supply	40%
Poor Water Quality	25%
Lack of Maintenance Awareness	35%
Cultural Barriers to Women's Participation	30%

Table 9 shows that 40% of respondents still experience irregular water supply, indicating a need for better infrastructure and monitoring.25% reported water quality issues, requiring stronger quality control mechanisms.35% lacked awareness about maintenance, emphasizing the need for education on proper water management.30% faced cultural barriers in decision-making, limiting women's ability to participate in water governance. Addressing these challenges is crucial for ensuring long-term sustainability and efficiency of JJM.

Findings of the Study

The study reveals that the Jal Jeevan Mission (JJM) has significantly improved access to household tap water, reducing reliance on public sources. This improvement has led to a drastic reduction in the time spent collecting water, allowing women to engage more in economic and community activities. Health benefits are also evident, with a notable decline in waterborne diseases and physical strain caused by carrying water. However, challenges such as irregular water supply and occasional water quality issues persist, indicating the need for continued policy interventions.

Suggestions

To address these challenges and further enhance the mission's impact, the study suggests several key measures. First, ensuring a consistent water supply through strengthened infrastructure and monitoring is essential. Additionally, training local women in water quality testing can empower them to maintain safe water standards. Increasing community participation, especially by promoting women's leadership in water management, is also crucial for long-term sustainability. Finally, utilizing the time saved from water collection for vocational training programs will help women develop new skills, contributing to their economic independence.

Conclusion

The Jal Jeevan Mission (JJM) has brought about substantial improvements in water accessibility and quality for rural households in Bengaluru, particularly for women. The mission has significantly increased the availability of household tap connections, reducing the dependence on public taps and borewells. This shift has notably decreased the burden of water collection, which has traditionally been a time-consuming task for women.

As a result, women now spend considerably less time fetching water, with many households gaining direct access to water at their premises. This improvement in water accessibility has freed up valuable time, allowing women to engage in education, employment, and personal activities that were previously hindered by the need to collect water.

Health outcomes have also improved, with a marked reduction in cases of waterborne diseases and physical ailments such as back and joint pain, which were common due to the physical strain of carrying water. However, while these improvements are promising, they are not yet statistically significant, suggesting that further efforts in water sanitation and hygiene practices are needed for long-term health benefits.

Women's participation in socio-economic activities has increased, with more women now engaged in income-generating activities and participating in community groups and vocational training. This shift indicates the potential of JJM to empower women economically and socially. However, other socio-economic factors also play a role in shaping this change.

Despite the progress, there are still challenges to overcome. Irregular water supply and concerns regarding water quality persist, and awareness

about infrastructure maintenance remains low. Additionally, cultural barriers continue to limit women's involvement in decision-making.

While JJM has made significant strides, continued focus on infrastructure, water quality, and social empowerment is essential to ensure sustainable benefits for rural communities and to further enhance the lives of women.

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