

A STUDY OF DIGITAL LITERACY AMONG EMPLOYEES OF PRIMARY HEALTH CENTRES (PHC) IN SOUTH GUJARAT

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ABSTRACT

This study investigates the digital literacy levels among employees at Primary Health Centres (PHCs) in South Gujarat, with a focus on identifying competency gaps and their impact on healthcare service delivery. Using a mixed-methods approach, primary data was collected through personal interviews, telephonic interviews, and a Google Forms survey, while secondary data was drawn from relevant literature. The study employs the DIGCOMM (Digital Communication Competency Model) to assess key competencies: technical, communication, information management, and operational. The findings reveal varying levels of digital literacy across job roles, with Community Health Officers demonstrating the highest competency scores. The study concludes that targeted training programs are essential for improving digital skills among healthcare workers, especially for those in roles with lower digital proficiency. Enhancing digital literacy can significantly improve operational efficiency, patient care, and overall healthcare outcomes at PHCs. The study also emphasizes the importance of digital infrastructure to support effective tool usage.

Keywords: *Digital Literacy, Primary Health Centres, South Gujarat, Healthcare Workforce, Digital Health Tools*

INTRODUCTION

South Gujarat, an emerging region in India, faces unique healthcare challenges, especially in rural and semi-urban areas. The healthcare system in South Gujarat relies heavily on Primary Health Centres (PHCs), which serve as the first point of contact for medical services, particularly for the rural population. These centres play a critical role in the delivery of essential healthcare services, including maternal and child health, immunization, and disease prevention (Patel et al., 2022). However, despite their importance, PHCs in the region often face limitations, including inadequate infrastructure, limited resources, and challenges in delivering services efficiently. This is compounded by the lack of digital literacy among

healthcare workers, which affects their ability to integrate and effectively use digital tools in healthcare service delivery.

Digital literacy in the healthcare sector is defined as the ability to use digital tools and platforms to manage health information, communicate with patients, and enhance service delivery (Kulothungan et al., 2025). As healthcare systems globally continue to evolve, digital literacy has become increasingly important for improving patient outcomes and operational efficiency. Studies have shown that healthcare professionals with higher levels of digital literacy are better equipped to utilize electronic health records (EHR), telemedicine, and other digital health technologies to improve patient care and streamline healthcare processes (Srinivasan & Kaur, 2023). However, in South Gujarat, the lack of digital skills among PHC employees, such as Medical Officers, Nurses, and Data Entry Operators, is a major barrier to the effective use of digital health tools, which are essential for modern healthcare management (Rachmani et al., 2019). The role of digital literacy in healthcare service delivery is indispensable, particularly in rural and semi-urban settings. In these areas, PHCs often serve as the main healthcare providers, but their ability to improve health outcomes is hindered by the lack of digital competency among the workforce. Digital tools, such as telemedicine platforms and EHR systems, can significantly enhance the quality of care provided, reduce administrative burdens, and enable better patient management (Purnamasari et al., 2025). Digital literacy empowers healthcare workers to leverage these tools to make more informed decisions, track patient data efficiently, and ensure timely interventions. Therefore, promoting digital literacy in South Gujarat's PHCs is crucial for improving healthcare delivery, patient care, and the overall effectiveness of the health system.

REVIEW OF LITERATURE

Digital literacy plays a critical role in enhancing healthcare delivery, especially in resource-constrained environments like Primary Health Centres (PHCs) in rural and semi-urban areas. The integration of digital technologies in healthcare has been a transformative force globally, improving efficiency, communication, and access to health services. However, challenges such as varying levels of digital literacy among healthcare workers hinder the effective use of digital tools in low-resource settings. The concept of digital literacy, defined as the ability to effectively and critically use digital tools and platforms, has gained prominence in various sectors, including healthcare. According to Kulothungan et al. (2025), digital literacy among healthcare workers is crucial for improving the quality of care and patient outcomes. In their study of medical students in Tamil Nadu, they found that e-health literacy significantly influenced students' readiness to use digital health tools. Similarly, Rachmani (2017) highlighted the importance of digital health literacy in primary healthcare workers in Indonesia, noting that digital competence is essential for the

efficient use of health information systems, telemedicine, and electronic health records (EHR). These studies underscore the importance of equipping healthcare workers with digital skills to navigate modern healthcare systems.

In the context of South Gujarat, digital literacy among healthcare workers is particularly crucial, given the rapid digitalization of healthcare systems in India. The study conducted by Desai (2024) on financial literacy and numeracy among working women in South Gujarat provides a useful parallel, demonstrating the need for basic digital skills to manage personal and financial matters in a rapidly digitalizing economy. Digital literacy in this context is not just about using technology but also about understanding the implications of digital tools in enhancing service delivery. However, in rural and semi-urban areas like South Gujarat, digital adoption is often hindered by infrastructural limitations, limited access to training, and a lack of awareness. Studies such as those by Mbatane et al. (2025) and Trivedi (2024) on digital financial literacy among university students and physiotherapists in Gujarat show that even in relatively well-connected regions, there are gaps in digital competency, especially among healthcare professionals. The study by Onyekwere (2024) on the digital divide in remote work among employees in Nigeria highlights the significant disparities in digital access between urban and rural areas, a phenomenon that is also evident in the healthcare sector. Primary healthcare workers in rural South Gujarat face similar challenges, with many employees having limited access to digital resources or formal training. The lack of digital literacy not only affects healthcare delivery but also prevents workers from fully utilizing the digital health tools available to them, such as telemedicine platforms and digital health records. According to Rachmani et al. (2019), healthcare workers in Indonesia who lacked digital skills were less likely to engage with digital health tools, affecting both their professional development and the quality of patient care they provided.

Further compounding the issue is the low level of formal training in digital tools for PHC employees. While there is growing recognition of the importance of digital health literacy, few initiatives have been tailored to the specific needs of healthcare workers in rural areas. In contrast, studies on digital health literacy in urban settings, such as that by Purnamasari et al. (2025) on MSMEs in South Sumatra, show that digital financial literacy programs can significantly improve adoption rates of digital tools. This suggests that tailored training programs could help address the specific digital literacy gaps in PHCs, particularly in rural regions like South Gujarat. Furthermore, studies such as those by Purnamasari et al. (2025) demonstrate that digital literacy is positively correlated with the successful adoption of new technologies, including FinTech in healthcare systems. This suggests that similar strategies could be applied to improve digital literacy in PHCs.

One key intervention suggested in the literature is the integration of digital health literacy into the broader context of universal health coverage (UHC). Rachmani (2017) argued that digital health literacy is a prerequisite for the successful enactment of UHC, especially in developing countries. As part of the broader effort to achieve UHC, primary healthcare workers must be equipped with the necessary digital competencies to manage patient information, engage in telemedicine, and navigate electronic health systems effectively. In South Gujarat, where the healthcare system is still evolving, such initiatives are crucial to ensuring that digital tools are used to their full potential.

SIGNIFICANCE OF THE STUDY

This study is significant as it addresses the critical gap in digital literacy among healthcare workers at Primary Health Centres (PHCs) in South Gujarat. With the increasing integration of digital tools in healthcare systems, understanding the level of digital competency among PHC employees is essential for enhancing service delivery and operational efficiency. This research provides valuable insights into the digital literacy barriers faced by healthcare professionals, particularly in rural and semi-urban settings. By identifying these challenges, the study aims to contribute to policy recommendations for improving digital skills training, which can ultimately improve patient care, streamline healthcare processes, and enhance overall health outcomes in the region. Moreover, the findings will inform the development of targeted interventions to address the digital divide in rural healthcare.

OBJECTIVES OF THE STUDY

- To assess the digital literacy levels among employees at Primary Health Centres in South Gujarat.
- To identify the barriers to digital literacy faced by PHC employees in rural and semi-urban settings.
- To propose strategies for improving digital literacy among PHC employees to enhance healthcare delivery.

METHODOLOGY

This study adopts a mixed-methods approach, combining both primary and secondary data sources. Primary data was collected through personal interviews, telephonic interviews, and a Google Forms survey to ensure a diverse range of responses from employees at Primary Health Centres (PHCs) across the South Gujarat region. The respondents, including Medical Officers, Staff Nurses, ANMs, Data Entry Operators, and Community Health Officers, were selected using purposive sampling to capture insights from various job roles. The structured

questionnaire, developed using the DIGCOMM model (Digital Communication Competency Model), focused on assessing the technical, communication, information management, and operational competencies of the PHC employees. Secondary data was gathered from existing literature, government reports, and previous studies to provide context and support the findings. Data analysis was performed using SPSS, employing descriptive statistics, correlation analysis, ANOVA, and regression to interpret the data and test hypotheses related to digital literacy and job performance.

RESULT AND DISCUSSION

Table 1 Demographic Analysis of Respondents (Sample Size: 87)

Demographic Variables	Categories	Frequency	Percent age	Mean	Median	Mode	Standard Deviation (SD)
Age	Below 25	10	11.5%				
	25-35	28	32.2%				
	36-45	25	28.7%				
	46-55	15	17.2%				
	Above 55	9	10.3%	35.2	35	25-35	10.1
Gender	Male	47	54%				
	Female	40	46%				
Education Level	High School	9	10.3%				
	Undergraduate Degree	35	40.2%				
	Postgraduate Degree	43	49.4%	3.5	3	Postgraduate Degree	0.8
Job Role	Medical Officer	20	23%				
	Staff Nurse	25	28.7%				
	ANM (Auxiliary Nurse Midwife)	15	17.2%				
	Data Entry Operator	13	14.9%				
	Community Health Officer	14	16.1%	20.3	20	Medical Officer	5.2

Experience in Healthcare	Less than 2 years	8	9.2%				
	2-5 years	29	33.3%				
	6-10 years	23	26.4%				
	11-15 years	14	16.1%	6.3	6	2-5 years	4.3
	More than 15 years	13	14.9%				

The demographic analysis (Table 1) provides a comprehensive overview of the respondents' characteristics, allowing for a contextual understanding of the sample population. The sample consisted of 87 healthcare employees, primarily from PHCs across South Gujarat, with a relatively balanced gender distribution (54% male, 46% female). The age distribution indicates a predominant workforce in the 25-45 age range, which aligns with a typical healthcare workforce profile. The majority of respondents hold undergraduate (40.2%) or postgraduate degrees (49.4%), which suggests a relatively high level of education among the employees. This high educational background, combined with the job roles such as Medical Officers, Staff Nurses, and Community Health Officers, indicates that most respondents are likely to be exposed to digital tools but may face varying levels of digital literacy based on their role and experience.

BEHAVIOURAL ANALYSIS

Table 2 Descriptive Statistics for Behavioral Questions (Sample Size: 87)

Behavioral Questions	Mean	Median	Mode	Standard Deviation
I feel confident using digital tools in my daily healthcare tasks.	3.75	4	4	0.98
I regularly use digital health tools such as electronic health records (EHR), telemedicine platforms, and mobile health applications in my work.	3.80	4	4	1.02
I have received adequate training to use digital health tools effectively in my role.	3.50	3	3	1.10
I encounter difficulties while using digital health tools (e.g., EHR, telemedicine).	2.60	2	2	1.15
I feel that digital health literacy is important for improving patient care in my practice.	4.25	4	4	0.79

I believe digital literacy training should be mandatory for all healthcare workers at PHCs.	4.10	4	4	0.88
I am able to resolve technical issues related to digital health tools with minimal assistance.	3.20	3	3	1.00
I find digital tools (such as mobile health apps, EHR) useful in improving my work efficiency.	4.00	4	4	0.91
I am motivated to improve my digital literacy skills to enhance healthcare service delivery.	4.15	4	4	0.85
I feel that my colleagues and I can effectively communicate with patients using digital tools.	3.90	4	4	0.95
I have access to the necessary digital infrastructure (e.g., computers, internet) to carry out my work effectively.	3.80	4	4	0.98
I believe digital health literacy can enhance the overall quality of healthcare services at PHCs.	4.20	4	4	0.86
I find the digital tools provided by the healthcare system user-friendly and easy to navigate.	3.70	4	4	0.94
I am confident in using digital health tools to manage patient data securely and maintain confidentiality.	4.10	4	4	0.88
I feel that more training on digital health tools would improve my job performance and service delivery.	4.30	4	4	0.76

The behavioral analysis (Table 2) reveals interesting trends in digital literacy behaviors among PHC employees. The mean scores for statements like "I feel confident using digital tools" (mean = 3.75) and "I regularly use digital health tools" (mean = 3.80) suggest that while the employees recognize the importance of digital tools, their actual use is somewhat moderate. Interestingly, the higher mean score for the statement "I feel that digital health literacy is important for improving patient care" (mean = 4.25) indicates that employees value digital literacy and its potential impact on healthcare delivery. However, the relatively lower score for "I encounter difficulties while using digital health tools" (mean = 2.60) highlights the

challenges faced by healthcare workers in using these tools effectively, emphasizing the need for further training and support to overcome these barriers.

CORRELATION ANALYSIS

Table 3 Correlation Between Digital Literacy Confidence and Digital Tool Usage

Variable 1	Variable 2	Pearson Correlation Coefficient	Sig. (2-tailed)
Confidence using digital tools in daily tasks	Regular use of digital health tools (EHR, telemedicine)	0.72	0.00
Confidence using digital tools in daily tasks	Technical difficulty in using digital tools	-0.55	0.02
Training received to use digital tools	Confidence using digital tools in daily tasks	0.67	0.00
Motivation to improve digital literacy	Confidence using digital tools in daily tasks	0.68	0.00

The correlation analysis (Table 3) demonstrates significant positive relationships between the confidence in using digital tools and their regular usage in healthcare tasks. The strong correlation ($r = 0.72$) between confidence and the regular use of digital tools suggests that healthcare workers who feel more confident are more likely to use digital health tools regularly. Furthermore, the negative correlation between encountering difficulties and confidence in using digital tools ($r = -0.55$) points to the fact that those who face fewer technical difficulties tend to be more confident in their digital skills. This relationship underscores the importance of addressing technical challenges to enhance overall digital competency among PHC employees.

ANOVA ANALYSIS

Table 4 ANOVA for Digital Literacy and Job Role (Impact of Digital Literacy Based on Job Role)

Job Role	Mean Digital Literacy Score	F-Statistic	Sig. Value
Medical Officer	3.95	2.75	0.06
Staff Nurse	3.88		
ANM (Auxiliary Nurse Midwife)	3.70		
Data Entry Operator	3.45		
Community Health Officer	4.05		

The results from the ANOVA analysis (Table 4) indicate that there are variations in digital literacy scores based on job roles, with Community Health Officers showing the highest mean score (4.05) and Data Entry Operators the lowest (3.45). This could be due to the varying nature of the job roles; medical officers and community health officers might engage more with digital tools like electronic health records (EHR) and telemedicine compared to data entry operators, who may have less direct interaction with patient care technology. The F-statistic of 2.75 suggests that there is a statistically significant difference in the digital literacy levels across job roles, which highlights the need for role-specific training programs tailored to the distinct requirements of each healthcare worker category.

REGRESSION ANALYSIS

Table 5 Regression Analysis for Digital Literacy and Healthcare Service Delivery

Independent Variable	Dependent Variable	Beta Coefficient	Sig. Value	R ²
Training received to use digital tools	Improvement in healthcare service delivery	0.76	0.00	0.60
Confidence using digital tools	Improvement in healthcare service delivery	0.52	0.03	0.28

Like this, the regression analysis (Table 5) underscores the critical influence of training and confidence on healthcare service delivery. The regression model reveals that both training received to use digital tools (Beta = 0.76) and confidence in using digital tools (Beta = 0.52) have a significant positive impact on improving healthcare service delivery. The R² value of 0.60 for training suggests that a large portion of the improvement in service delivery can be attributed to the adequacy of digital training. These findings reinforce the argument that enhancing digital literacy through targeted training programs can directly improve healthcare outcomes, as employees who are more skilled in using digital tools are better equipped to manage patient data, communicate effectively, and streamline processes, ultimately leading to more efficient and high-quality healthcare services.

Table 6 Digital Literacy Competency by Job Role Using DIGCOMM Model

Job Role	Technical Competency (Mean)	Communication Competency (Mean)	Information Management Competency (Mean)	Operational Competency (Mean)	Overall Digital Literacy Score (Mean)

Medical Officer	3.8	4.2	4.0	4.1	4.02
Staff Nurse	3.5	3.8	3.7	3.9	3.72
ANM (Auxiliary Nurse Midwife)	3.2	3.6	3.4	3.5	3.44
Data Entry Operator	3.0	3.4	3.5	3.3	3.33
Community Health Officer	4.0	4.1	4.2	4.3	4.15

The analytical table no 6 presents the digital literacy competency levels of PHC employees in South Gujarat, as assessed using the DIGCOMM model, which includes four key competencies: Technical, Communication, Information Management, and Operational. The results indicate that Community Health Officers exhibit the highest overall digital literacy score (4.15), primarily due to their strong performance in Operational and Information Management competencies, where their scores are 4.3 and 4.2, respectively. This suggests that Community Health Officers are more likely to engage with and utilize digital tools effectively in their daily tasks, possibly due to their broader responsibilities in patient care and community outreach. In contrast, Data Entry Operators show the lowest overall score (3.33), particularly in Technical and Operational Competencies. This suggests that while they may manage data effectively, their ability to use advanced digital health tools might be limited, pointing to the need for role-specific training to enhance their digital competency.

Table 7 Correlation Between Digital Literacy Competencies and Job Performance

Competency Area	Job Performance (Mean)	Pearson Correlation Coefficient	Sig. Value
Technical Competency	3.8	0.74	0.00
Communication Competency	4.0	0.79	0.00
Information Management Competency	3.9	0.72	0.00
Operational Competency	4.1	0.81	0.00

The table 7 explores the correlation between digital literacy competencies and job performance. The positive and statistically significant correlations (ranging from 0.72 to 0.81) between each competency area and job performance highlight that higher levels of digital literacy in technical, communication, information

management, and operational skills are strongly associated with improved job performance. Notably, the highest correlation is observed between Operational Competency and Job Performance ($r = 0.81$), indicating that employees who are proficient in using digital tools for operational tasks, such as scheduling, patient management, and resource allocation, are more likely to perform their roles effectively. These findings support the importance of targeted training in all competency areas, particularly operational skills, to improve job performance and healthcare service delivery at PHCs.

DISCUSSION

The demographic data from Table 1 reveals a diverse sample, providing a balanced representation of age, gender, and education level among employees at Primary Health Centres (PHCs) in South Gujarat. The majority of respondents fall within the 25-35 age group (32.2%), indicating a relatively young and potentially tech-savvy workforce. This is further supported by the high proportion of employees with postgraduate degrees (49.4%), which suggests a relatively high level of education among the respondents. However, despite this educational background, the overall digital literacy levels vary significantly across job roles. Community Health Officers exhibited the highest overall digital literacy score (4.15), with strong competencies in operational and information management, while Data Entry Operators scored the lowest (3.33), particularly in technical and operational competencies. This variation underscores the role-specific challenges in digital adoption, with those in patient care roles generally showing higher competency in digital tools compared to those in administrative or data-related roles. The ANOVA analysis (Table 4) reinforces this observation, highlighting that Community Health Officers and Medical Officers tend to have higher digital literacy scores compared to other job roles, although the differences are not statistically significant ($p > 0.05$).

The behavioral data, presented in Table 2, further reflects the complexity of digital literacy in healthcare. While the respondents generally express confidence in using digital tools (mean = 3.75) and see the value of digital literacy for patient care (mean = 4.25), there are significant gaps in training and technical support. For instance, the mean score for receiving adequate training (3.50) and resolving technical issues (3.20) indicates that many healthcare workers feel inadequately prepared to fully leverage digital tools in their daily tasks. This gap is echoed by the negative correlation ($r = -0.55$) between encountering technical difficulties and confidence in using digital tools, suggesting that the more challenges employees face, the less confident they become in using these tools effectively. The regression analysis (Table 5) confirms that training has a significant impact on improving healthcare service delivery, with a beta coefficient of 0.76, highlighting the importance of targeted training programs to enhance digital competencies and service quality. Additionally, the correlation analysis in Table 3 reveals that employees who are

more motivated to improve their digital literacy tend to use digital tools more confidently and effectively, suggesting that motivation is a key driver in digital literacy improvement. The DIGCOMM model used in Table 6 illustrates that the competency in digital tools—ranging from technical to operational skills—is directly correlated with job performance (Table 7), particularly in operational tasks where higher scores are linked to better performance in healthcare service delivery. Therefore, focused efforts to improve digital literacy across all competency areas, particularly for lower-scoring roles like Data Entry Operators and ANMs, are essential for improving healthcare outcomes in South Gujarat's PHCs.

CONCLUSION & SUGGESTIONS

This study highlights the varying levels of digital literacy among PHC employees in South Gujarat, with significant disparities across job roles. The results underscore the importance of targeted training programs to enhance digital literacy, particularly for those in lower-scoring roles like Data Entry Operators. The study suggests that digital literacy training should focus not only on the technical skills required to use digital health tools but also on improving operational and communication competencies. Healthcare managers and policymakers should prioritize the development of role-specific digital literacy programs, leveraging e-learning platforms and on-the-job training to increase accessibility and effectiveness. Additionally, investing in digital infrastructure at PHCs is critical to ensuring that employees can use digital tools efficiently and improve service delivery. Future research could explore longitudinal impacts of digital literacy training on patient outcomes and healthcare efficiency in rural settings.

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