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Assessment of Knowledge on Empowering Nurses Through Innovative Technology among Nursing Staff at Selected Govt. General Hospital, Kurnool Andhra Pradesh.

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ABSTRACT

Background: Innovative technology is increasingly used in nursing practice. This study assessed nursing staff's reported level of knowledge regarding innovative technology and its association with selected socio-demographic characteristics.

Methods: A quantitative descriptive survey was conducted among 80 nursing staff at a selected Government General Hospital in Kurnool, Andhra Pradesh. Data were collected using a questionnaire with a demographic section and 30 statements rated on a five-point agreement scale. Frequencies, percentages, mean, and standard deviation were used to summarize responses. Chi-square tests examined associations with demographic characteristics.

Results: The largest group was classified as poor (35%), followed by average (30%), good (23.8%), and excellent (11.2%). The overall mean score was 104.39 (SD = 30.629). Knowledge category was significantly associated with gender ($p = .016$), age ($p = .001$), educational qualification ($p < .001$), designation ($p = .008$), and work experience ($p = .023$). Associations with daily use of digital tools or health technology ($p = .230$) and working department ($p = .234$) were not statistically significant.

Conclusion: Responses varied, with the largest proportion classified in the poor category. The findings indicate associations between the reported knowledge category and several demographic characteristics.

Keywords: nursing staff, innovative technology, clinical practice, knowledge

INTRODUCTION

Nurses play an essential role in providing continuous, safe and effective health care. Innovative technologies—including electronic health records, telemedicine, mobile health applications, clinical decision-support systems, digital monitoring devices and online learning platforms—can help nurses access patient information, communicate with other providers, support clinical decisions and continue their professional education. The World Health Organization recognizes nurses as the largest occupational group in health care and emphasizes the importance of supporting the nursing workforce (WHO, 2025b). However, technology can support nursing practice only when staff have the knowledge and training to use it appropriately, and when privacy, usability and infrastructure are addressed (WHO, 2019).

India's Ayushman Bharat Digital Mission aims to build a national digital health ecosystem using interoperable systems and safeguards for health information (Ministry of Health and Family Welfare, Government of India, 2024–25). As digital tools become part of health care, assessing nursing staff's knowledge can help identify areas where education or workplace support may be needed. Therefore, this study will assess knowledge regarding innovative technology for empowering nurses among nursing staff at a selected Government General Hospital in Kurnool, Andhra Pradesh.

NEED FOR THE STUDY

Health care is increasingly using digital tools such as electronic health records, telemedicine, mobile health applications and clinical decision-support systems. These technologies can support nursing communication, documentation, access to information and continuing education, but their effective use depends on health workers' knowledge and training. The World Health Organization emphasizes that digital health interventions need appropriate training, supportive conditions and attention to privacy and infrastructure (WHO, 2019). In India, the Ayushman Bharat Digital Mission is developing a national digital health ecosystem, increasing the relevance of digital health knowledge among health professionals (Ministry of Health and Family Welfare, Government of India, 2024–25).

The knowledge of nursing staff regarding innovative technologies should be assessed to understand their familiarity with these tools and identify areas where further education may be useful. The level of knowledge among nursing staff at the selected Government General Hospital in Kurnool, Andhra Pradesh, needs to be established through a local assessment rather than assumed. The findings of this study may help identify learning needs and inform suitable educational support for nurses, contributing to the appropriate use of technology in nursing practice.

STATEMENT OF THE PROBLEM

Assessment of knowledge on Empowering nurses through innovative technology among nursing staff at selected Govt. General Hospital, Kurnool Andhra Pradesh.

OBJECTIVES OF THE STUDY

- To assess level of nurses knowledge regarding the innovated technology in clinical practices among nursing staff working in Govt. General Hospital, Kurnool.
- To associated the level of knowledge in nurses through innovative technology in clinical practices on nursing staff with their demographic variables.

METHODOLOGY

Author and year	Focus of the literature	Relevance to the present study
Verma and Gupta (2016)	Problems nurses face in using electronic health records	Identifies practical barriers to technology use in clinical practice.
Kinnunen et al. (2019)	Factors related to nurses' health informatics competencies	Supports examining demographic and work-related factors.
Kaihlalanen et al. (2021)	Nursing informatics competences of registered nurses after educational initiatives	Relates education to nurses' technology competence.
Sinha and Joy (2022)	Nurses' knowledge of and attitude to nursing information systems	Directly comparable focus on nurses' knowledge of technology.
Hants et al. (2023)	Nursing process and clinical decision-making in digital health systems	Examines how digital systems support nursing decisions.
Jarva et al. (2023)	Development and testing of instruments on healthcare professionals' digital health competence	Informs measurement of digital health competence.
Kinnunen et al. (2023)	Nurses' informatics competency in using health information systems	Assesses nurses' competency in system use.
Golz et al. (2024)	Psychometric validation of the Digital Competence Questionnaire for Nurses	Offers a validated tool for measuring nurses' digital competence.
Jarva et al. (2024)	Digital health competence profiles and associated factors	Informs analysis of factors linked to competence.
Qin et al. (2024)	Development of a scale for nursing digital application skills	Informs measurement of nurses' digital skills.
Dumbre et al. (2025)	Digital competencies of nurses in healthcare services	Provides evidence from the Indian nursing context.
WHO (2019)	Recommendations on digital interventions for health system strengthening	Highlights training, privacy and infrastructure needs.
WHO (2021)	Global strategic directions for nursing and midwifery 2021–2025	Supports nursing leadership, professional development, and improved service delivery.
WHO (2023)	Digitalized health workforce education	Identifies research gaps in digital education for health workers.
WHO (2025a)	Global strategy on digital health 2020–2027	Provides a policy framework for technology-enabled healthcare.

METHOD OF THE STUDY

For the present study the researcher has used Descriptive Survey method.

Research approach:

A quantitative approach was used. Responses to the self structured questionnaire were recorded as numerical scores. This allowed the study to summarize the nurses' responses and examine their association with selected socio-demographic characteristics.

Research design:

A descriptive, non-experimental survey design was adopted to assess the level of knowledge regarding innovative technology in clinical practice among nursing staff and to examine its association with selected socio-demographic variables

Variables of the study:

The study outcome was the level of knowledge regarding innovative technology in clinical practice, categorized according to the score interpretation provided with the questionnaire.

The socio-demographic variables were gender, age, educational qualification, current designation, working experience, use of digital tools or health technology in daily clinical practice, and present working department.

Setting of the study:

The study was conducted among nursing staff at the selected Government General Hospital, Kurnool, Andhra Pradesh.

Population:

The target population comprised nursing staff working at the selected Government General Hospital in Kurnool, Andhra Pradesh. The accessible population represented in the study consisted of the 80-nursing staff included in the analysis.

SAMPLE OF THE STUDY

The sample consisted of 80 Nursing staff from govt. general hospital, Kurnool.

Sample and sample size:

A total of 80 nursing staff were included in the study sample.

SAMPLING TECHNIQUE

The sampling technique used was simple random sampling technique.

TOOLS FOR DATA COLLECTION**Development and description of tool:****Self-structured questionnaire: (Likert 5-point scale)**

The following tools were used for collecting the data to measure the variables of the study.

Section: 1: Consists of questions related to demographic data of Nursing staff

Section: 2: Consists of self-structured Likert scale to assess level of knowledge among nursing staff regarding empowering through innovative technology. It consists of 30 items related to daily use innovative technology in routine life of hospital

Ethical consideration

1. The study was approved by the TNAI committee and formal permission was taken from the Head of the institution.
2. Informed consent was obtained from the study samples, (Nursing staff).
3. The subjects were informed that their participation was purely on the voluntary basis

DATA ANALYSIS AND INTERPRETATION**FREQUENCY AND PERCENTAGE DISTRIBUTION OF EMPOWERING NURSES THROUGH INNOVATIVE TECHNOLOGY IN CLINICAL PRACTICES**

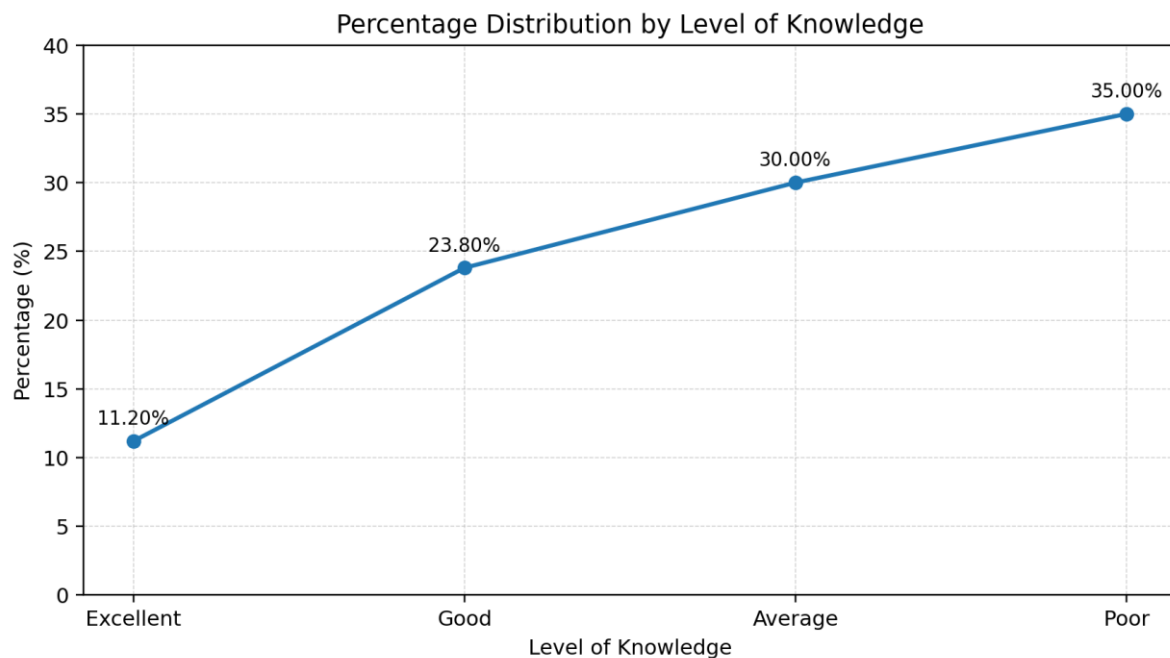
Frequency and percentage distribution of empowering nurses through innovative technology in clinical practices

N=80

Sl.No	Level of knowledge	Frequency	Percent	Mean	S.D
1	Excellent	9	11.20	54.67	3.61
2	Good	19	23.80	75.32	8.38
3	Average	24	30.00	107.62	6.49
4	Poor	28	35.00	137.32	10.27
	Total	80	100.00	104.39	30.629

INTERPRETATION: Among 80 nursing staff, 9 (11.2%) had excellent, 19 (23.8%) had good, 24 (30.0%) had average, and 28 (35.0%) had poor level reported knowledge regarding innovative technology in clinical practice.

The graph shows the percentage distribution across the four levels of knowledge reported in the source table.



To associated the level knowledge innovative technology in clinical practices on nursing staff with their demographic variables.

Frequency distribution of the Socio Demographic Variables

Variable	Category	Frequency	Percent
Gender	Male	14	17.50
	Female	66	82.50
	Total	80	100.00
Age in years	20-30 years	14	17.50
	31-40 years	23	28.80
	41-50 years	32	40.00
	Above 50 years	11	13.80
	Total	80	100.00

Variable	Category	Frequency	Percent
Educational Qualification	GNM Nursing	48	60.00
	B.Sc Nursing	27	33.80
	M.Sc Nursing	5	6.20
	Total	80	100.00
Current Designation	Staff Nurse	59	73.80
	Head Nurse	21	26.20
	Total	80	100.00
Working Experience	5-10 years	23	28.80
	11-20 years	30	37.50
	21-30 years	19	23.80
	Above 30 years	8	10.00
	Total	80	100.00
Are you using digital tools are health technology in daily clinical practices	Yes	47	58.80
	No	33	41.20
	Total	80	100.00
Present Working Department	Emergency Department	19	23.80
	ICUs Department	20	25.00
	Post Operative wards	7	8.80
	General Wards	34	42.50
	Total	80	100.00

INTERPRETATION:

Among the 80 participants, females formed the clear majority (66; 82.5%), while males accounted for 14 (17.5%). The largest age group was 41–50 years (32; 40%), followed by those aged 31–40 (23; 28.8%). Smaller proportions were aged 20–30 (14; 17.5%) or above 50 (11; 13.8%). This indicates that the sample was concentrated among participants aged 31–50. In terms of educational qualification, most held a GNM Nursing qualification (48; 60%), about one-third held a B.Sc. Nursing qualification (27; 33.8%), and a small proportion held an M.Sc. Nursing qualification (5; 6.2%). Most participants were staff nurses (59; 73.8%), while 21 (26.2%) were head nurses.

Work experience was distributed across several ranges. The largest group had 11–20 years of experience (30; 37.5%); 23 (28.8%) had 5–10 years, 19 (23.8%) had 21–30 years, and 8 (10%) had more than 30 years. Regarding digital tools or health technology in daily clinical practice, 47 participants (58.8%) reported using them, while 33 (41.2%) reported that they did not. By department, the largest group worked in general wards (34; 42.5%), followed by ICUs (20; 25%), the emergency department (19; 23.8%), and postoperative wards (7; 8.8%). Overall, the sample was predominantly female, mainly composed of GNM-qualified staff nurses, and included participants with a range of ages and work experience. A majority reported using digital tools or health technology, though a substantial proportion did not.

Association between Knowledge regarding the innovated technology in clinical practices on Nursing staff with Socio Demographic Variables

Socio Demographic Variable	Category	N/%	Level of Knowledge regarding the innovated technology in clinical practices				Total	Chi square	df	p value	sig
			Excellent	Good	Average	Poor					
Gender	Male	N	1	2	1	10	14	10.284	3	0.016	*
		%	1.20%	2.50%	1.20%	12.50%	17.50%				
	Female	N	8	17	23	18	66				
		%	10.00%	21.20%	28.80%	22.50%	82.50%				
Total		N	9	19	24	28	80				
		%	11.20%	23.80%	30.00%	35.00%	100.00%				
Age in years	20-30 years	N	4	8	2	0	14	27.339	9	0.001	**
		%	5.00%	10.00%	2.50%	0.00%	17.50%				
	31-40 years	N	4	4	5	10	23				
		%	5.00%	5.00%	6.20%	12.50%	28.80%				
	41-50 years	N	1	7	11	13	32				
		%	1.20%	8.80%	13.80%	16.20%	40.00%				
	Above 50 years	N	0	0	6	5	11				
		%	0.00%	0.00%	7.50%	6.20%	13.80%				
Total		N	9	19	24	28	80				
		%	11.20%	23.80%	30.00%	35.00%	100.00%				
Educational Qualification	GNM Nursing	N	3	11	17	17	48	27.210	6	0.000	**
		%	3.80%	13.80%	21.20%	21.20%	60.00%				
	B.Sc Nursing	N	2	8	6	11	27				
		%	2.50%	10.00%	7.50%	13.80%	33.80%				
	M.Sc Nursing	N	4	0	1	0	5				
		%	5.00%	0.00%	1.20%	0.00%	6.20%				
Total		N	9	19	24	28	80				
		%	11.20%	23.80%	30.00%	35.00%	100.00%				
Current Designation	Staff Nurse	N	4	11	18	26	59	11.759	3	0.008	**
		%	5.00%	13.80%	22.50%	32.50%	73.80%				
	Head Nurse	N	5	8	6	2	21				
		%	6.20%	10.00%	7.50%	2.50%	26.20%				
Total		N	9	19	24	28	80				
		%	11.20%	23.80%	30.00%	35.00%	100.00%				
		N	2	5	5	11	23	19.269	9	0.023	*

Socio Demographic Variable	Category	N/%	Level of Knowledge regarding the innovated technology in clinical practices				Total	Chi square	df	p value	sig
			Excellent	Good	Average	Poor					
Working Experience	5-10 years	%	2.50%	6.20%	6.20%	13.80%	28.80%				
	11-20 years	N	3	5	8	14	30				
		%	3.80%	6.20%	10.00%	17.50%	37.50%				
	21-30 years	N	4	8	5	2	19				
		%	5.00%	10.00%	6.20%	2.50%	23.80%				
	Above 30 years	N	0	1	6	1	8				
		%	0.00%	1.20%	7.50%	1.20%	10.00%				
	Total		N	9	19	24	28				
		%	11.20%	23.80%	30.00%	35.00%	100.00%				
Are you using digital tools are health technology in daily clinical practices	Yes	N	3	12	17	15	47	4.307	3	0.230	NS
		%	3.80%	15.00%	21.20%	18.80%	58.80%				
	No	N	6	7	7	13	33				
		%	7.50%	8.80%	8.80%	16.20%	41.20%				
Total		N	9	19	24	28	80				
		%	11.20%	23.80%	30.00%	35.00%	100.00%				
Present Working Department	Emergency Department	N	1	2	4	12	19	11.652	9	0.234	NS
		%	1.20%	2.50%	5.00%	15.00%	23.80%				
	ICUs Department	N	3	6	8	3	20				
		%	3.80%	7.50%	10.00%	3.80%	25.00%				
	Post Operative wards	N	1	2	1	3	7				
		%	1.20%	2.50%	1.20%	3.80%	8.80%				
	General Wards	N	4	9	11	10	34				
		%	5.00%	11.20%	13.80%	12.50%	42.50%				
Total		N	9	19	24	28	80				
		%	11.20%	23.80%	30.00%	35.00%	100.00%				

Note : ** = Significant at 0.01 level

NS = Not Significant

INTERPRETATION:

The table examines the association between nurses' knowledge level regarding innovative technology in clinical practice and seven demographic or work-related characteristics among 80 nurses. Overall, 28 nurses (35.0%) were classified as having poor knowledge, 24 (30.0%) as average, 19 (23.8%) as good, and 9 (11.2%) as excellent. Thus, 65% were in the average or poor categories, while 35% were in the good or excellent categories.

Gender: Knowledge level was significantly associated with gender ($\chi^2 = 10.284$, $df = 3$, $p = .016$), at the 5% significance level. Among male nurses, 71.4% were in the poor category, compared with 27.3% of female nurses. Conversely, 37.9% of female nurses were in the good or excellent categories, compared with 21.4% of male nurses. In this sample, the distribution therefore differed by gender, with male nurses more concentrated in the poor category. This association does not show that gender caused the difference.

Age: There was a statistically significant association between age and knowledge level ($\chi^2 = 27.339$, $df = 9$, $p = .001$). In the 20–30-year group, 85.7% were in the good or excellent categories, and none were in the poor category. The poor category included 43.5% of nurses aged 31–40 and 40.6% of those aged 41–50. Among nurses above 50, 54.5% were average and 45.5% poor, with none in the good and excellent categories. The youngest group showed the most favourable distribution, although its size was only 14 nurses.

Educational qualification: Knowledge level was significantly associated with educational qualification ($\chi^2 = 27.210$, $df = 6$, reported $p = .000$; this should be written as $p < .001$). Among GNM nurses, the average and poor categories each accounted for 35.4%. Among B.Sc. nurses, 40.7% were in the poor category. Of the five M.Sc. nurses, four (80%) were excellent and one was average.

Current designation: There was a significant association between designation and knowledge level ($\chi^2 = 11.759$, $df = 3$, $p = .008$), which is significant at the 1% level. Among staff nurses, 44.1% were in the poor category, compared with 9.5% of head nurses. In contrast, 61.9% of head nurses were in the good or excellent categories, compared with 25.4% of staff nurses. In this sample, head nurses had a more favourable distribution of knowledge ratings.

Work experience: Knowledge level was also significantly associated with years of work experience ($\chi^2 = 19.269$, $df = 9$, $p = .023$), at the 5% level. The poor category included 47.8% of nurses with 5–10 years of experience and 46.7% of those with 11–20 years. Among those with 21–30 years, 63.2% were good or excellent and 10.5% poor. Among nurses with more than 30 years of experience, 75% were average; none were excellent.

Use of digital tools or health technology: The association between reported use and knowledge level was not statistically significant ($\chi^2 = 4.307$, $df = 3$, $p = .230$). poor ratings made up 31.9% of the nurses who reported using digital tools and 39.4% of those who did not. The groups show some descriptive differences across categories, but the test does not provide sufficient evidence of an association in this sample.

Present working department: Knowledge level was not significantly associated with department ($\chi^2 = 11.652$, $df = 9$, $p = .234$). Descriptively, 63.2% of emergency department nurses were in the poor category, while 15.0% of ICU nurses were poor and 40.0% were average. In general wards, 29.4% were poor; the post-operative ward group had 7 nurses, so its percentages are especially sensitive to individual responses. These differences should be treated as descriptive because the overall association was not statistically significant.

Overall, the table reports significant associations between knowledge level and gender, age, educational qualification, current designation, and work experience. It reports no statistically significant association with digital-tool use or present working department. These are associations, not evidence that any characteristic causes a particular knowledge level.

DISCUSSION

OBJECTIVE 1:

Among the 80-nursing staff, the largest group was classified in the poor category (28; 35.0%), followed by the average (24; 30.0%), good (19; 23.8%), and excellent categories (9; 11.2%). Taken together, 52 participants (65.0%) were in the poor or average categories, while 28 (35.0%) were in the good or excellent categories. This distribution suggests that reported knowledge was uneven and that a substantial proportion of staff may benefit from continuing support in using technology in clinical practice.

These categories were derived from a 30-item self-structured Likert questionnaire, so they describe participants' categorized responses rather than demonstrated clinical competence. The study reports an overall mean score of 104.39 ($SD = 30.629$), but does not state the total possible score, scoring direction, or cut-offs used for the four categories. The category means also increase from 54.67 in the excellent group to 137.32 in the poor group.

OBJECTIVE 2:

Knowledge category was significantly associated with gender ($\chi^2 = 10.284$, $p = .016$), age ($\chi^2 = 27.339$, $p = .001$), educational qualification ($\chi^2 = 27.210$, $p < .001$), designation ($\chi^2 = 11.759$, $p = .008$), and work experience ($\chi^2 = 19.269$, $p = .023$). These findings indicate that the distribution of reported knowledge categories differed across these groups in this sample; they do not establish that any demographic or employment characteristic caused the differences.

The within-group counts show the nature of some of these differences. The poor category included 10 of 14 male nurses (71.4%) and 18 of 66 female nurses (27.3%). Among nurses aged 20–30 years, 12 of 14 (85.7%) were in the good or excellent categories, while none were poor; among those above 50 years, none were good or excellent. Four of the five nurses with an M.Sc. qualification were excellent.

Head nurses had a more favourable distribution than staff nurses: 13 of 21 head nurses (61.9%) were good or excellent, compared with 15 of 59 staff nurses (25.4%). Work experience showed a less consistent pattern. The good or excellent categories included 12 of 19 nurses with 21–30 years of experience (63.2%), whereas poor ratings were common among those with 5–10 years (11 of 23; 47.8%) and 11–20 years (14 of 30; 46.7%). Most participants with more than 30 years of experience were average (6 of 8; 75.0%). The results do not show a steady increase in reported knowledge with years of service.

No statistically significant association was found with reported daily use of digital tools or health technology ($\chi^2 = 4.307$, $p = .230$) or working department ($\chi^2 = 11.652$, $p = .234$). Although poor ratings were descriptively more common among nurses who did not report using digital tools (13 of 33; 39.4%) than among those who did (15 of 47; 31.9%), the study does not provide evidence of an association. A yes-or-no measure of use may not capture frequency, type of technology, quality of access, or training received. Department-level differences, including the small post-operative group, should likewise be treated as descriptive.

IMPLICATIONS FOR NURSING PRACTICE

The findings support offering practical, continuing education on the digital tools used in the hospital, with opportunities for guided practice and follow-up.

Training can be made accessible across designations and experience levels and can cover safe documentation, information privacy, communication tools, and use of clinical decision support where these are part of local practice. Because the questionnaire results are not reported by individual item, future training should first identify the specific topics where staff need support rather than assume a particular skill gap.

CONCLUSION:

In this sample, the largest group of nursing staff was classified as having poor reported knowledge of innovative technology, and 65.0% were in the poor or average categories. Knowledge category was associated with gender, age, educational qualification, designation, and work experience, but not significantly associated with reported daily technology use or department. The results support accessible, practice-based education and clearer measurement of technology-related knowledge.

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