Section: Community Medicine

Original Research Article

PERCEPTION & ATTITUDE TOWARDS TELENURSING AMONG NURSING STUDENTS OF TRIBAL DISTRICT BASTAR CHHATTISGARH: A CROSS- SECTIONAL STUDY

Shalini Jain[1], Mahesh Kumar Choudhary[2], Kamalesh Ejardar[3], Ranjith Kumar M[4]

[1]Assistant Professor, Department of Community Medicine, Late BRKM Government Medical College Jagdalpur, Bastar, Chhattisgarh 494001, India.
[2]Professor, Department of Community Medicine, RVRS Government Medical College, Bhilwara Rajasthan 311001, India.
[3]Demonstrator, Department of Pharmacology, Late BRKM Government Medical College Jagdalpur, Bastar, Chhattisgarh 494001, India.
[4]Post Graduate Resident, Department of Community Medicine, Late BRKM Government Medical College Jagdalpur, Bastar, Chhattisgarh 494001, India.

Received *: 07/09/2026*
Received in revised form *: 04/10/2026*
Accepted *: 16/10/2026*

Corresponding Author:
Dr. Shalini Jain,
Assistant Professor, Department of Community Medicine, Late BRKM Government Medical College Jagdalpur, Bastar, Chhattisgarh 494001, India.
Email: drshalinijain2389@gmail.com

DOI: 10.70034/ijmedph.2026.4.162

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2026; 16 (4); 1070-1077

ABSTRACT

Background: Telenursing is promising and transformative landscape in providing clinical care to every patient who needed it on time but it become lifesaving tool to provide nursing care in remote and geographically difficult terrain like tribal area of India. As telenursing is already an integral part of modern healthcare system so demand of telenursing expert workforce is very high. Hence this study is carried out to assess awareness, perceptions and attitudes toward telenursing among undergraduate and postgraduate nursing students of tribal district Bastar from Chhattisgarh state.

Materials and Methods: A cross sectional questionnaire based study was conducted among 310 nursing students. Out of 310 students, 303 students given consent through Google form and filled performa which is structured in following section- demographics data, clinical exposure, Awareness & knowledge of telenursing, Attitude and perceptions towards telenursing and perception towards technology-acceptance items rated on five-point scales. Data were analysis using SPSS- 22 version statistical software's descriptive tools, chi- square test, Mann-Whitney Test and Kruskal–Wallis tests and Spearman correlation.

Results: All respondents who reported sex was female (mean age 21.96 ± 3.21 years); 91.1% were undergraduate nursing students whereas remaining were post graduate nursing students. Although 63.7% rated their telenursing knowledge as good, only 28.4% had prior experience and 49.8% reported formal education on it. A positive attitude (agree or strongly agree that telenursing is a good idea for nurses) was held by 74.6%. Willingness to try new technology (79.3%) and perceived usefulness (69.1%) were high, but facilitating conditions scored lowest (39.3% positive). Most students preferred a combination of face-to-face and telenursing care (64.9%); only 3.0% preferred telenursing alone. A positive attitude was more frequent among students with formal telenursing education (84.4% vs 64.7%, $p < 0.001$), higher self-rated knowledge (81.8% vs 61.5%, $p < 0.001$), prior experience ($p = 0.046$), urban residence ($p = 0.009$) and senior academic year ($p = 0.019$). Perceived usefulness correlated most strongly with attitude ($\rho = 0.54$).

Conclusion: Students are receptive to telenursing but report weak institutional education and technical support and uneven exposure to telenursing. Structured telenursing content, practical training and better infrastructure should be built into nursing curricula.

Keywords: telenursing; nursing students; attitude; perception; technology acceptance; nursing education.

INTRODUCTION

Telenursing is the delivery of nursing care, advice and monitoring at a distance through telecommunication and information technology. Various study based on nurse-led telenursing report better symptom control in chronic disease,[1] improved quality of life in heart failure,[2] gains in quality of life and self-care among patients receiving remote rehabilitation,[3] and favourable experiences among nurses working in telenursing based health care delivery system.[4]

India has moved quickly toward this model of care. The eSanjeevani platform recorded more than 163 million teleconsultations between November 2019 and September 2023,[5] and a scoping review of telemedicine services launched between 2000 and 2023 found that effectiveness evidence existed for fewer than half of the moderate- to large-scale services reviewed.[6] Limited digital literacy, lack of provider training and weak infrastructure continue to hold back implementation,[7] and the national digital health mission has progressed unevenly across states.[8] These gaps are most visible in districts such as Bastar in Chhattisgarh, where geographically dispersed, largely tribal and rural populations depend on a small number of tertiary facilities.

Today's nursing students will have to be expert to deliver telenursing. Telenursing competencies for nursing curricula have been proposed in various countries,[9] but a critical review of telenursing in various countries found significant gaps in digital health education at both undergraduate and post graduate levels.[10] Studies that ask students directly are consistent: a Korean survey of 188 nursing students found that most lacked awareness of telenursing yet were optimistic about it, [11] and a Viennese survey of 261 health and nursing students found strong interest but little knowledge and experience.[12] There are many studied carried out in various state of India on this topic but no study from tribal area like bastar Chhattisgarh India reported So this study therefore aimed to (i) describe the profile, clinical exposure and telenursing awareness of nursing students in Bastar district; (ii) measure their perceptions of usefulness, ease of use, social influence, facilitating conditions, self-efficacy, innovativeness and digital literacy; (iii) describe their attitude toward telenursing.

2. Literature Review:

2.1 Telenursing in practice & Nurses' experience with telenursing

Telenursing has been a lost cost effective way to provide nursing or health care using various information and communication technology tools during COVID-19 but it is also very effective tool for patient facing mental health, anxiety and various health conditions. An integrative review of 34 papers on nurse-delivered telenursing in home-based palliative care named reimbursement gaps, technical problems and insufficiently trained providers as the main barriers.[13] Among 53 Italian nurses, 94.4% would use telenursing, and positive attitudes were predicted by knowledge, management support and perceived time saving.[14] In Saudi Arabia, only 15.4% of 149 cardiac-care nurses had good knowledge of telenursing, although attitudes were positive overall.[15] An umbrella review of 65 reviews identified 52 factors shaping the adoption of digital nursing technologies; insufficient training and low technological confidence were barriers, while leadership support and targeted training were facilitators.[16] A scoping review of video-call telehealth in allied health and nursing likewise grouped barriers into eight categories, led by unreliable networks, lack of technology access and lack of technology skills.[17] Using a modified Technology Acceptance Model, subjective norm, ease of use and usefulness explained 69% of the variance in behavioural intention among 222 Taiwanese nurses.[18] Together these findings suggest that attitudes depend as much on enabling conditions as on the technology itself.

2.2 Nursing students' knowledge, attitudes and perceptions towards telenursing based on previous studies/reports

A study on 273 undergraduate nursing students from western Saudi Arabia, higher digital health literacy predicted more positive attitudes toward telenursing(adjusted odds ratio 1.48) with favourable attitudes alongside limited knowledge.[19] In a Jordanian based study among 92 students, perception was positive and was predicted by age, internet use and telenursing knowledge.[20] Among 204 final-semester students in Riyadh, attitudes were positively related to knowledge and negatively related to psychological distress.[21] In Croatia, attitudes among 140 students were mostly positive, yet 66.4% had received no lectures on telenursing and 65% felt a video call could not replace a live visit.[22] In Iran, 81.8% of 184 students considered telenursing necessary and 72.3% wanted it in the curriculum.[23] Among 1,113 first-year Dutch nursing students, telehealth activities were rated less positively than routine nursing activities.[24]

From India, a survey of 183 nursing interns in Bangalore found mostly positive views and recommended adding telenursing to curricula.[25] Indonesian students felt ready after training but reported infrastructure barriers,[26] and 80 students at Jouf University had moderate knowledge with generally favourable attitudes.[27] Studies of broader student groups tell a similar story: only 14.9% of 1,000 health-profession students in the United Arab Emirates were familiar with telemedicine, yet 70.2% supported curriculum integration,[28] about 59% of 398 Pakistani medical students had good knowledge but only about 47% had satisfactory attitudes,[29] and among 428 medical and allied-health students in India, 90.9% considered telemedicine viable while 43% reported insufficient knowledge.[30]

2.3 Technology acceptance in nursing

The Technology Acceptance means intention to use a system due to perceived usefulness and ease of use. In a study of 132 Saudi undergraduate nursing students, these two constructs explained 87% of the variance in intention to use nursing informatics.[31] The extension that adds social influence has performed well among nurses too.[18] The questionnaire for current study also follows the same logic, adding social influence, facilitating conditions, self-efficacy, innovativeness and digital literacy.

2.4 Education and competency development

Technological literacy is the subject of a scoping review in nursing education as technology is seen as a means of supporting quality and safety in nursing and attitudes toward eHealth literacy, the ability to find, appraise and apply health information from electronic sources is vary importance factor to provide telenursing.

A simulation-based telenursing course for 114 third-year students in Israel raised awareness, knowledge, skills, attitudes and self-efficacy while lowering perceived barriers.[32] A seven-module telehealth course for 26 health-profession students improved acceptance,[33] and a simulation-based telehealth intervention for advanced-practice nursing students increased preparedness and confidence even though beliefs were already high.[34] Resources for nurse faculty are emerging,[35] and a scoping review of 60 studies mapped the digital skills nurses now need,[36] Foundation skills matter: health, digital and e-health literacy have been measured among Danish nursing students at entry and graduation,[37] and a mixed-method review of 11 studies on nursing students' e-learning during COVID-19 shows how readily students adapted when platforms and support were available.[38] In a randomized crossover trial across 10 rural Gujarat clinics, telemedicine reached 74% diagnostic concordance and 79.8% treatment-plan concordance with face-to-face care.[39] Among 78 health workers at two rural Karnataka primary health centres, 59% worried about confidentiality and 46% about job loss, although the hub-and-spoke model was judged feasible and accepted.[40]

2.5 Research gap

The literature shows positive but poorly informed student attitudes, repeated infrastructure barriers and a clear educational response. It offers little evidence from nursing students in tribal and rural India, and almost none that examines facilitating conditions and individual factors together. This study addresses that gap.

MATERIALS AND METHODS

Design and setting. A Google form questionnaire based cross-sectional study was designed to conduct this study among nursing students of Jagdalpur ,Bastar district, Chhattisgarh, India.

Study instrument (proforma): Data were collected with a structured, self-administered proforma, reproduced on the Google Form and accompanied by a consent notice letter. The proforma has six sections: (1) Demographics: age, sex, academic year, programme and residential area (urban or rural), (2)Clinical practice experience: participation in clinical practice, months of practice, frequency of hands-on patient care (daily, weekly, monthly, rarely), confidence in clinical decision-making (1 = not confident to 5 = very confident), (3) Awareness and knowledge of telenursing: self-rated knowledge (very knowledgeable, knowledgeable, heard of but not knowledgeable, unknowledgeable), prior experience, sources of learning (internet, social media, formal education, healthcare setting, other) and formal education on telenursing, (4) Attitudes and perceptions: perceived usefulness, perceived ease of use, social influence, facilitating conditions, attitude toward telenursing, preferred mode of care (face-to-face, telenursing, both equally) and optimism about the future of telenursing. (5) Individual factors: self-efficacy, innovativeness and digital literacy. (6) Open-ended questions: expected benefits of telenursing, anticipated challenges, and the support or training students would need.

Items in sections 4 and 5 use five-point scales (strongly disagree to strongly agree; very difficult to very easy for ease of use; very pessimistic to very optimistic for optimism). The constructs follow the Technology Acceptance Model and its extensions.[11,18,31] The IEC approval was taken from government medical college , Jagdalpur , bastar.

Data collection: Eligible participants were undergraduate (B.Sc.) and post graduate (M.Sc.) nursing students who opened the Google form link which was circulated electronically, gave consent and completed the form. Recruitment was voluntary and by convenience: the link was shared with students and anyone who responded was included. Out of 310 form submissions, 7 respondents declined consent leaving 303 for analysis. Responses were recorded automatically in the linked Google Sheet and exported to Microsoft Excel.

4. Data Analysis

Mircosoft Excel based Datasheet of 303 respondent was statistically analysed using SPSS 22. Five-point responses were scored 1–5 in the favourable direction. A positive attitude was defined as "agree" or "strongly agree" that using telenursing is a good idea for nurses. A composite perception score was the mean of nine items (usefulness, ease of use, social influence, facilitating conditions, attitude, optimism, self-efficacy, innovativeness and digital literacy); its internal consistency was acceptable (Cronbach's α = 0.82, n = 303 cases).

Categorical variables are shown as frequencies and percentages and continuous variables as mean ± SD or median (IQR). Associations between positive attitude and student characteristics were tested with the chi-square test. Composite scores were compared with the Mann–Whitney U test (two groups) or the Kruskal–Wallis test (more than two groups) Relationships among the ordinal constructs were

assessed with Spearman's rank correlation. Two-sided $p < 0.05$ was taken as significant. Open-ended answers were grouped by keyword into themes and counted; because one response can fall into several themes, theme counts are indicative only.

RESULTS

5.1 Profile of respondents

A total of 303 students were analysed. Their mean age was 21.96 ± 3.21 years (range 18–44), 276 (91.1%) were undergraduate students and remaining 27 (8.9%) were post graduate student.

Table 1: Socio-demographic and clinical profile of respondents (N = 303)

Characteristic	Category	number of case (n)	Percentage (%)
Age (n = 303)	≤ 20 years	98	32.3
	21–22 years	122	40.3
	23–24 years	49	16.2
	≥ 25 years	34	11.2
Programme (n = 303)	B.Sc. nursing	276	91.1
	M.Sc. nursing	27	8.9
Academic year of Under graduate students (n = 276)	First	55	19.9
	Second	44	15.9
	Third	110	39.9
	Fourth	67	24.3
Academic year of Post graduate students (n = 27)	First	15	55.6
	Second	12	44.6
Residence Type (n = 303)	Urban	175	57.8
	Rural	128	42.2
Clinical practice (n = 303)	Yes	303	100
Hands-on care (n = 303)	No	2	0.7
	Daily	240	79.2
	Weekly	28	9.2
	Monthly	23	7.6
	Rarely	2	0.7
Confidence in clinical decisions, 4–5 point out of 5 scale (n = 303)	High	198	65.3

Months of clinical practice had a median of 5 (IQR 3–19; n = 303).

All students are in clinical practice which is as per course of study (Table 1). Everyone who reported sex was female (n = 303). Urban residents formed 57.8% of the sample and third-year students were the largest group (39.9%). Four in five students (81.6%) gave hands-on care daily, and 76.9% agreed that clinical experience matched what they had learned in theory. The median month of clinical training is 5 months with IQR (3-19 months).

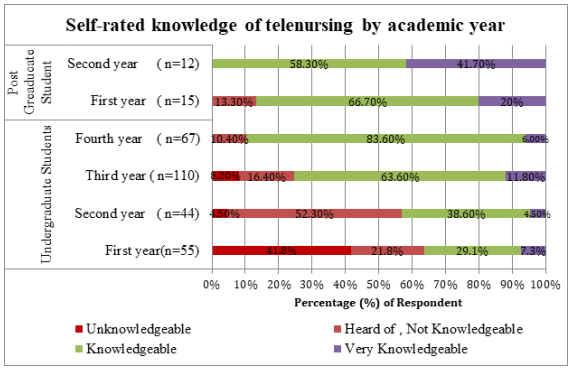


Figure 1: Self- rated Knowledge of nursing student about telenursing with respect to programme & academic year

It is observed form Figure: 1 that among first-year students of Under graduate programme 41.8% were unknowledgeable, against none of the fourth-year students, and First year of post graduate students. It is also observed that 89.6% of fourth-year students rated themselves knowledgeable.

5.2 Awareness and knowledge of telenursing

Self-rated knowledge was fairly high: 63.0% described themselves as knowledgeable or very knowledgeable, while 37% had only heard of telenursing or knew nothing about it (Table 2). Only 28.1% had used telenursing previously. It is also observed from Table 2 that 49.8% students reported that they came to know about telenursing through formal education. The internet (45.9%) and formal education (49.8%) were the commonest sources, followed by social media (21.5%) and healthcare settings (18.5%) 106 students out of 303 students (28.7%) named two or more sources of learning about telenursing.

Table 2: Awareness, experience and education on telenursing

Characteristic	Category	number of case (n)	Percentage (%)
Self-rated knowledge (n = 303)	Very knowledgeable	20	6.6
	Knowledgeable	171	56.4
	Heard of, not knowledgeable	76	25.1
	Unknowledgeable	36	11.9
Prior experience of telenursing (n = 303)	Yes	85	28.1
	No	218	71.9
Formal education about telenursing (n = 303)	Yes	149	49.2
	No	154	50.8
Source of learning (n = 303; multiple answers)	Internet	139	45.9
	Formal education	149	49.2
	Social media	65	21.5
	Healthcare setting	56	18.5

5.3 Perceptions and attitude

It is observed from Table 3, that three every four students (74.9%) agreed that telenursing is a good idea for nurses, and only 2.0% disagreed.

Table 3: Responses to technology-acceptance items

Construct (n =303)	Strongly negative n (%)	Negative n (%)	Neutral n (%)	Positive n (%)	Strongly positive n (%)
Perceived usefulness	5 (1.7)	2 (0.7)	85 (28.1)	176 (58.1)	35 (11.6)
Perceived ease of use	1 (0.3)	31 (10.2)	121 (39.9)	131 (43.3)	19 (6.3)
Social influence	5 (1.7)	14 (4.6)	108 (35.6)	152 (50.2)	24 (7.9)
Facilitating conditions	11 (3.6)	47 (15.5)	124 (40.9)	102 (33.7)	19 (6.3)
Attitude toward telenursing	3 (1.0)	3 (1.0)	70 (23.1)	180 (59.4)	47 (15.5)
Optimism about future	2 (0.7)	7 (2.3)	109 (36.0)	149 (49.2)	36 (11.9)
Self-efficacy	2 (0.7)	11 (3.6)	104 (34.3)	154 (50.8)	30 (10.6)
Innovativeness	0 (0.0)	2 (0.7)	60 (19.8)	172 (57.8)	65 (21.8)
Digital literacy	0 (0.0)	4 (1.3)	97 (32.0)	160 (53.5)	37 (12.2)

Innovativeness was the strongest item (79.6% positive), followed by perceived usefulness (69.7%) and digital literacy (65.7%). Ease of use (49.9% positive) and, above all, facilitating conditions (40% positive; 19.1% negative) lagged behind. Students are willing, but doubt that the technical and organizational support available for them to learn and implement the telenursing in practical use.

It is observed from Figure 2 that most students (196; 64.7%) wanted face-to-face and telenursing care equally, 98 (32.3%) preferred face-to-face care alone, and only 9 (3.0%) preferred telenursing alone (Figure 2). It can be concluded from Figure 2 that students see telenursing as an addition to bedside care, not as preferred method.

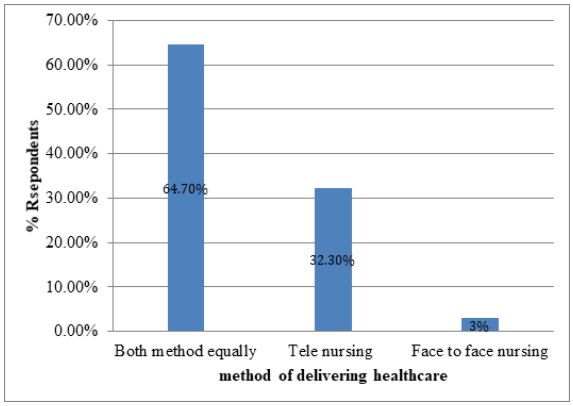


Figure 2: Method of delivering of healthcare by nursing students

5.4 Factors associated with a positive attitude

A positive attitude was significantly more common among students with formal telenursing education (84.4% vs 64.7%; odds ratio about 2.9; $p < 0.001$), higher self-rated knowledge (81.8% vs 61.5%; $p < 0.001$), prior experience (83.1% vs 71.0%; $p = 0.046$), urban residence (80.8% vs 66.7%; $p = 0.009$) and a more senior academic year (62.3% in first year to 82.8% in fourth year; $p = 0.019$) (Table 4). Attitude did not differ significantly by programme ($p = 0.171$), although M.Sc. students had a higher composite perception score; only 27 of them took part, so this result is tentative.

Table 4: Positive attitude and composite perception score by student characteristics

Characteristic	Group	Positive attitude, n/N (%)	χ^2 (df), p	Composite score, mean ± SD	Test p
Academic year for Undergraduate Students	First	30/55 (54.5)	19.91 (3), 0.00001	3.48 ± 0.65	0.010 (K-W)
	Second	24/44 (54.5)		3.60 ± 0.39	
	Third	88/110 (80.0)		3.77 ± 0.40	
	Fourth	53/67 (79.1)		3.71 ± 0.37	
Residence	Urban	139/175 (79.4)	8.843 (1), 0.0029	3.73 ± 0.46	0.007 (M-W)
	Rural	82/128 (64.1)		3.57 ± 0.48	
Prior experience	Yes	69/85 (81.1)	4.063 (1), 0.0438	3.81 ± 0.42	0.001 (M-W)
	No	152/218 (69.7)		3.60 ± 0.48	
Formal education	Yes	124/149 (83.2)	15.708 (1), < 0.001	3.83 ± 0.40	< 0.001 (M-W)
	No	97/154 (62.9)		3.50 ± 0.48	
Programme	B.Sc.	201/276 (72.8)	0.9482 (1), 0.330	3.63 ± 0.48	0.005 (M-W)
	M.Sc.	22/27 (81.5)		3.92 ± 0.30	
Self-rated knowledge	Knowledgeable	153/191 (80.1)	22.613 (1), < 0.001		
	Low knowledge	67/112 (59.8)			

K-W = Kruskal–Wallis; M-W = Mann–Whitney U. Composite score = mean of nine items (1–5); overall 3.66 ± 0.47 (n = 285). Composite by self-rated knowledge: unknowledgeable 3.15, heard of 3.52, knowledgeable 3.77, very knowledgeable 4.02.

5.5 Relationships among factors

Spearman correlation coefficient is calculated to understand the relationship between various factors. It is observed from Table 5 that all factors except facilitating conditions have positive good relationship among them. It is observed that Perceived usefulness had the strongest link with attitude (ρ = 0.54), followed by social influence (0.46), self-efficacy (0.45) and ease of use (0.39). Self-rated knowledge correlated with every construct (ρ = 0.17 to 0.36), most strongly with ease of use and self-efficacy. Facilitating conditions had only weak associations (ρ ≤ 0.29), and none with optimism or innovativeness.

Table 5: Spearman correlations among studied factors

	PU	EOU	SI	FC	ATT	OPT	SE	INN	DL
EOU	0.33***								
SI	0.44***	0.44***							
FC	0.17**	0.22***	0.29***						
ATT	0.54***	0.39***	0.46***	0.21***					
OPT	0.35***	0.29***	0.38***	0.06	0.41***				
SE	0.46***	0.40***	0.43***	0.17**	0.45***	0.48***			
INN	0.28***	0.17**	0.33***	−0.07	0.29***	0.46***	0.48***		
DL	0.43***	0.21***	0.41***	0.13*	0.37***	0.41***	0.43***	0.49***	
Knowledge	0.23***	0.36***	0.31***	0.27***	0.25***	0.31***	0.35***	0.17**	0.31***

PU = perceived usefulness; EOU = ease of use; SI = social influence; FC = facilitating conditions; ATT = attitude; OPT = optimism; SE = self-efficacy; INN = innovativeness; DL = digital literacy. * p < 0.05, ** p < 0.01, *** p < 0.001.

DISCUSSION

Knowledge and exposure: It is observed from this study that 63 % nursing students called themselves knowledgeable, but only 28.1% had used it and half had no formal teaching. Self-rating is a soft measure, and the steep gradient from first to fourth year suggests the knowledge comes from general exposure over time and not from a structured course. With comparison to outcomes other research paper most Korean students lacked substantial awareness of telenursing,[11] 66.4% of Croatian students had had no lectures on it,[22] and only 14.9% of health-profession students in the Emirates were familiar with telemedicine.[28]

Attitude and model of care. It is observed from this study that 64.7% nursing students preferred combined care, similar observation in found in Croatia based study where 74.6% agree with telenursing combine with other care method,[22] Bangalore,[25] and Saudi Arabia.[21] So it can be concluded that show that students value telenursing as a complement. That matters for curriculum design: the aim is blended practice, not substitution.

Support is the weak link. Facilitating conditions scored lowest and correlated weakly with the other constructs, suggesting that students' willingness does not depend on, and is not satisfied by, current support. The same barrier appears in Indonesian nursing students,[26] in nurses,[15,16] and in reviews of video-call telehealth.[17] Rural students were less positive (64.1% vs 79.4%) and infrastructure may explain part of that gap, although this study did not measure connectivity.

Education works through knowledge and confidence. Formal education had the largest effect (odds ratio about 2.9), and knowledge correlated with attitude and self-efficacy. This echoes findings that attitudes follow knowledge,[14,20,21] and that digital health literacy predicts attitudes,[19] in our data digital literacy correlated with attitude at ρ = 0.37. The Israeli simulation course,[32] and other short

courses,[33,34] show that such education can be delivered and can change self-efficacy and attitudes.

Technology acceptance. Perceived usefulness was the strongest correlate of attitude, as in earlier acceptance-model work with students and nurses.[18,31] Social influence and self-efficacy also mattered, so seniors and clinical teachers who model telenursing may help acceptance.

Implications for nursing education. Telenursing content should be introduced from the first year; simulation and supervised practice should follow,[9,10,32] and institutions should provide devices, connectivity and local-language materials. The telemedicine literature in India reports enough rural acceptance and diagnostic concordance,[39,40] to justify training students for it.

Limitations. Participation was voluntary and by convenience, and the single-district setting limits generalization. The sample was almost entirely female.

CONCLUSION

Nursing students in tribal district Bastar Chhattisgarh are receptive to telenursing: 74.9% hold a positive attitude and 79.6% are willing to try new medical technology. They see it as a complement to face-to-face care (64.7%), not a substitute. Their enthusiasm outruns their preparation and the support around them. Only 28.1% have used telenursing, half have had no formal teaching on it, and just 40% believe the technical and organizational support exists. Formal education, higher knowledge, prior experience, urban residence and seniority were all linked to a more positive attitude, and perceived usefulness was the strongest correlate of attitude.

Nursing programmes should therefore add structured telenursing content from the first year, supported by simulation and supervised practice. Colleges and health authorities should also supply devices, connectivity and local-language material, especially for rural students. Longitudinal and multi-district studies with tested knowledge measures should follow.

Acknowledgment

The authors thank the nursing students who gave their time to complete the survey, and the principals and faculty of the participating nursing colleges in Bastar district for facilitating data collection.

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