Self-Reported Clinical Practice Skill Readiness of Final Year Nursing Students Studying in Bengaluru, Karnataka: An Institutional-Based Cross-Sectional Study

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Abstract

Introduction   In recent few years, the production of nurses in both the public and private sectors has been growing rapidly to fill up the gap of health care staff. As there is a lack of data available on clinical practice readiness among final year nursing students in India, the question remains of how nursing students see themselves and what qualities and areas interest them are of great importance.

Objectives   This study was conducted to determine the clinical practice skill readiness among final year nursing students and also to explore the factors that show the significant difference with clinical practice skill readiness level.

Methodology   A nonexperimental institutional-based cross-sectional online survey was conducted from October 15 to November 15, 2020 using a simple random sampling technique. A total of 200 final year nursing students have participated in the study through the self-structured and prevalidated comprehensive nursing competencies questionnaire (CNCQ). Data was collected through Google Form and exported to SPSS version 20.0 for further analysis. To compare the nursing competencies score with selected demographic characteristics, a one-way analysis of variance and an unpaired t-test were applied at a 95% confidence interval (CI). The post hoc test was used to check for multiple comparisons.

Results   Results of the study revealed that the overall CNCQ mean score of basic nursing skills were reasonably high (39.08 ± 13.27) compared with advanced nursing care skills (13.03 ± 5.28). A significant difference ($p < 0.05$) was observed in overall clinical posting duration in both basic ($p < 0.004$) and advanced ($p < 0.001$) nursing skills with selected demographic variables. There is also a significant difference found in

Keywords
► self-reported clinical practice
► graduating nursing students
► clinical performance

the overall level of qualification ($p < 0.004$) in basic nursing skills. It was observed that in basic nursing care skills half of the year clinical posting (minimum 6 months) duration had a significant difference with the improved performance skills ($p < 0.005$) (0.57; 95% CI 0.14–1.00). Whereas the results also show that, the advanced nursing skills will be greatly improved if the nursing students get an opportunity to practice in different specialty areas for at least 2 months ($p < 0.013$) (0.62; 95% CI 0.11–1.14) or half of the year ($p < 0.001$) (0.95; 95% CI 0.34–1.56). This result shows a clear indication of how important clinical posting for nursing students is.

Conclusion Our data suggested that the final year nursing students are losing ground in clinical practice readiness and competency. The result also shows that the clinical competency score will greatly improve in both basic and advanced nursing skills if the students are exposed to the clinical areas at least for a few months. Our findings will support the stakeholders, authorities of nursing colleges, and policymakers to make a significant decision to enhance the clinical practice among final year nursing students.

Introduction

In essence, the nursing profession has considerably been around ancient times. Since then it has drastically evolved throughout history. Today, nursing is among the most pivotal profession within the health care industry and are learned in a wide selection of occupational duties that are utilized within a variety of settings throughout the world.[1] As among the strong multidisciplinary health care teams, nurses and midwives make a consequential contribution to delivering on the commitments made within the 2018 Astana Declaration on Primary Health Care, ensuring patient-centered care to the community. Currently, nurses and midwives account for nearly 50% of the worldwide health workforce for all countries to succeed in Sustainable Development Goals on health and well-being. World Health Organization estimates that the globe will need further 9 million nurses and midwives by the year 2030.[2]

Despite the great need for nursing graduates, there are concerns for their overall clinical performance before and after joining the clinical areas. Various reports and studies have concluded that the current system fails to prepare nursing students for real practical performance in the field, and after graduation also they cannot perform the procedure in clinical environments as expected.[3] Presently, nursing profession has changed drastically and the focus of health care is leading into a complex direction that requires a generation of dedicated nursing professionals.[4]

Today, nursing educational institutions are expected to fabricate nurses which are clinically practiced ready despite of being a novice to satisfy the growing health care demands of an aging population and a projected looming nursing shortage.[5] Developed countries like the United States are currently experiencing a serious shortage of nurses due to the aging nursing workforce and decreased nursing program enrollments because of the nursing faculty crunch.[6] And presently India alone is facing a shortage of around 2 million nurses.[7] On the other hand, India is one of the top supplies of nurses to the Gulf and the Organization for Economic Co-operation and Development countries, especially the United States, Canada, United Kingdom, Ireland, Australia, and New Zealand.[8,9]

Consequently, nursing graduates have significantly increased in India as nursing colleges boomed from just 165 nursing colleges in 2004[10] to 1,667 in 2017.[11] These data indicate that there is a very rapid climb in the number of nurses produced in India to meet the national and international needs of nurses. However, in that spot, there is always a challenge to sustain quality with rapid production of quantity. Further, an acute shortage of nurses necessitates the readiness of nurses to right away take up the full-fledged role as registered nurses to set the seal on patient safety and quality of care.[12] Some recent studies conducted in Iran,[13] Australia,[14] and United Arab Emirates[15] showed that nurses are having clinical knowledge shortages and only a few of them are possessing entry-level competencies and practice-level readiness. And surprisingly, only a few research studies were done on clinical practice readiness, and in India, there is less statistical data to understand the nursing student's competencies which are produced by mass growing nursing institutes in Bengaluru, Karnataka, India. Therefore, this study was planned to assess the self-reported clinical practice of final year nursing students at Bengaluru. The findings of this study will help the nurse educator to see the lacunae or the gap between the theory and clinical practice culture among nurses and this study will also help the national and international recruiters about the clinical practice readiness among final year nursing students from Bengaluru.

Objectives of the Study

1. To determine the clinical practice skill readiness among final year nursing students.
2. To explore the factors that show the significant difference with clinical practice skill readiness level.

Methods

Study Design and Study Population

An institutional-based cross-sectional online survey was undertaken on final year nursing students studying in B.Sc. Nursing, General Nursing and Midwifery (GNM), and Post Basic (PB) B.Sc. Nursing at selected private nursing colleges across Bangalore in the academic year 2019 to 2020. A total of 200 final year nursing students have participated in the study.

Study Setting

Bangalore (also known as Bengaluru) is the capital of Karnataka state, India. There are a total number of 124 nursing colleges in Bangalore, of both government and nongovernment colleges. This survey was undertaken in the academic year 2019/2020 on final year nursing students at eight nursing institutes which are situated in the northern part of Bengaluru. As we obtained information from the institute's head, there was a total of 208 nursing students completing their graduation in the 2019/2020 academic year in the eight nursing institutes, including B.Sc. Nursing, PB B.Sc. Nursing, and GNM Nursing.

Sample Size and Sampling Procedures

A total of 200 samples were collected conveniently from eight selected private nursing colleges in Bangalore. The sample size was estimated using the formula $(Z1-\alpha/2)^2$ (p)(q)/$d^{2,16}$ the expected proportion of a good level of nursing competency is 0.23 (23%),[17] the expected precision of 6%, and at 95% level of confidence, the estimated sample size was 189 participants, whereas considering 10% nonresponsive rate, total 208 sample size was considered for the present study. A sampling frame of students studying in the final year nursing was obtained from selected colleges and the desired sample was obtained conveniently. However, 8 students did not complete the questionnaire (96.2% response rate); thus finally, data collected from 200 participants were considered for analysis. It was an online survey, and all final year students (B.Sc. Nursing, PB B.Sc. Nursing, and GNM Nursing) who were willing to give informed consent were included in the study. Participants who did not have access to the Internet and did not given informed consent were excluded from the study.

Tool for Data Collection and Data Collection Instrument

A self-structured prevalidated and reliable ($r = 0.93$) instrument, that is, "comprehensive nursing competencies questionnaire (CNCQ)," was used to assess the clinical practice readiness of final year nursing students.[17] Permission was obtained from Prof. Dr. Suresh K. Sharma, Principal, College of Nursing (All India Institute of Medical Sciences [AIIMS], Jodhpur, Rajasthan, India) to use the prevalidated CNCQ tool. The tool consisted of a total of 100 essential nursing skills items based on the prescribed curriculum for the baccalaureate nursing program in India, which was divided into two sections, that is, (1) basic nursing skills (52 items) and (2)

advanced nursing skills (48 items). Each listed nursing skill practiced during the nursing program was measured on the six-point rating scale, that is, perform independently (5), under supervision (4), only assisted (3), only observed (2), only read (1), and do not know anything (0). The basic nursing skill section included a total of 52 items (with score range: 0–260) under different categories, that is, admission and discharge, personal hygiene, medication administration, invasive procedures, wound care and bandaging, respiratory nursing interventions, elimination, perioperative nursing, infection control, handling of basic medical equipment, and documentation. Similarly, the advanced nursing skills section included 48 items (with a score range: 0–240) under different categories, that is, medical and surgical nursing, child health nursing, obstetrical and gynecological nursing, and mental health nursing.

Pilot Study

Pilot study was conducted on 10% of the sample size of the main study in one of the nursing colleges which was not included in the main study to check for the clarity of language, acceptability, validity, and completeness of the questionnaire.

Data Collection Technique

Official permission was obtained from principals of all the eight nursing colleges, and the data were collected using a Google Form. Then, students were requested to respond to the questionnaire through online Google Forms, with a consent form appended to it. The link was sent through e-mails and WhatsApp. The instructions were given to the students in the Google Form not to use reference material and not to discuss with their friends to find the correct answer. A standardized and pretested questionnaire was adapted and we have conveniently selected 8 nursing colleges and conducted a cross-sectional survey from October 15 to November 15, 2020. The tool was included with five sociodemographic variables. Under the basic nursing care skills, 11 areas and a total of 52 questions were asked. Under advanced nursing care skills, four areas, including medical-surgical, child health, obstetrical and gynecological, and mental health nursing, a total of 48 questions were asked. Then, students were requested to respond to the questionnaire through Google Form.

Operational Definitions

The two terms frequently used in the present study are operationally defined:

Clinical practice readiness: Graduating nurses' level of clinical competency for each selected basic and advanced nursing skill, based on the scale of performed independently 5, under supervision 4, only assisted 3; only observed 2, only read theoretically 1, to do not know anything 0.

Final year nursing students: Final year B.Sc. Nursing, GNM, and PB B.Sc. Nursing students, who are about to complete their nursing program and do their internship.

Data Quality Control

Quality of data was assured by proper designing and pretesting of the questionnaires in one of the nursing colleges located other than Bangalore on 10% of the total participants, to ensure that the questions are clear and can be understood by the respondents, and further questionnaires were refined based on the results of the pilot study.

Study Variables

Dependent/Outcome variable: Self-reported clinical practice readiness.

Research variables: Demographic characteristics of study subjects such as age, gender, level of educational qualification, percentage in a previous university exam, clinical posting duration, etc.

Data Processing and Analysis

After the data collection, the data were exported from Google Form to Statistical Package for Social Science (SPSS) version 20.0 for analysis and interpretation. The descriptive statistics were presented with mean ± standard deviation, frequency, and percentage. The data were analyzed using an unpaired *t*-test and a one-way analysis of variance (ANOVA). To compare the demographic variables with the basic and advanced nursing skills, post hoc multiple comparisons were performed for significant variables.

Results

A total of 200 nursing students have participated in this study. Out of the study participants, 167 (83.5%) of them were female and 105 (52.5%) students were in the age group of 18 to 19 years. One hundred and forty (70%) students were

studying Bachelor of Nursing. Ninety-four (47%) students got 60 to 69% marks in university exams but 108 (54%) of them had clinical experience only for 2 months or less (►**Table 1**).

►**Table 2** depicts the mean competencies score for nursing skills which were divided into two parts, basic nursing skills and advanced nursing skills. The maximum score for basic nursing skills is 355 and for advanced nursing skills 145. The findings suggest that the overall CNCQ mean score of basic nursing skills was reasonably high (39.08 ± 13.27) compared with advanced nursing care skills (13.03 ± 5.28). Regarding basic nursing skills, it was found that the mean score of personal hygiene (4.46 ± 1.06) and infection control and bio-medical waste (BMW) management (4.03 ± 1.27) is higher than other basic nursing skills where the mean competencies score is relatively the same. Further, under advanced nursing skills, the mean score is relatively the same.

The variables such as age, percentage in previous university exam, clinical posting duration, and educational qualification were tested using ANOVA test and the variable gender is tested using unpaired *t*-test to check the nursing competency score. The results show that there is a higher CNCQ score and statistically significant ($p < 0.05$) in overall clinical posting duration in both basic ($p < 0.004$) and advance ($p < 0.001$) nursing skills with selected demographic variables. There is also a significant difference found in the overall level of qualification ($p < 0.004$) in basic nursing skills. Further, our study did not find any other significant difference with other demographic variables such as age, gender, and percentage in previous university exams. The overall significance score found in clinical posting duration and the level of qualification is important because there is a consistent amount of clinical posting in a year in different nursing specialty subjects and the advanced level of qualification

Table 1 Sociodemographic characteristics of final year nursing students from nursing institutions in Bangalore ($n = 200$)

Demographic variables		Frequency (*f*)	Percentage (%)
Age (in years)	≤ 21	105	52.5
	22	77	38.5
	≥ 23	18	9.0
Gender	Male	33	16.5
	Female	167	83.5
Educational qualification	B.Sc. Nursing	140	70.0
	PB B.Sc. Nursing	49	24.5
	GNM Nursing	11	5.5
Percentage (%) of marks obtained in previous university exam	50–59	29	14.5
	60–69	94	47
	70–79	67	33.5
	> 80	10	5
Duration of clinical posting	Throughout the year	35	17.5
	Half of the year	57	28.5
	Only for 2 months or less	108	54.0

Abbreviations: GNM, General Nursing and Midwifery; PB, Post Basic.

Table 2 Mean competencies score of basic and advanced nursing care skills of the final year nursing students form nursing institutions in Bangalore ($n = 200$)

Domains of nursing care skills	Nursing care skills score		
	Maximum score	Mean $\pm$ SD	Rank order
Basic nursing care skills	355	39.08 $\pm$ 13.27	–
Personal hygiene	74	4.46 $\pm$ 1.06	I
Medication administration	29	3.87 $\pm$ 1.06	II
Admission/discharge	34	3.02 $\pm$ 1.23	III
Respiratory nursing interventions	38	3.21 $\pm$ 1.20	IV
Documentation	23	3.42 $\pm$ 1.33	V
Invasive procedures	11	3.10 $\pm$ 1.25	VI
Wound care and bandaging	36	3.91 $\pm$ 1.08	VII
Infection control and BMW	50	4.03 $\pm$ 1.27	VIII
Elimination	22	3.31 $\pm$ 1.33	IX
Perioperative nursing	12	3.12 $\pm$ 1.25	X
Handling basic medical equipment	26	3.63 $\pm$ 1.21	XI
Advanced nursing care skills	145	13.03 $\pm$ 5.28	–
Mental health nursing	39	2.99 $\pm$ 1.40	1
Child health nursing	46	3.33 $\pm$ 1.32	2
Midwifery	35	3.03 $\pm$ 1.45	3
Medical surgical nursing	25	3.68 $\pm$ 1.11	4
Overall nursing care skills	500	52.11 $\pm$ 18.55	–

Abbreviations: BMW, biomedical waste; SD, standard deviation.

among nurses then there is a higher chance for the students to get improved in different types of clinical skills which ultimately makes them be a specialized nurse in the coming future (►**Table 3**).

One-way ANOVA was performed to determine the significant difference in the average basic nursing skills and advance nursing skills across different timings of clinical posting duration. As the ANOVA test was found statistically significant in overall clinical posting duration with selected demographic variables, the post hoc test was done to check the multiple comparisons between basic and advanced nursing care skills with clinical posting duration. It was observed that in basic nursing care skills, half of the year clinical posting duration had a significant difference with improved performance skills ($p < 0.005$) compared with throughout the year (0.40) and only for 2 months (0.10). It was also observed that the advanced nursing skills will be greatly improved if the nursing students get an opportunity to practice in different specialty areas for at least 2 months ($p < 0.013$) or half of the year ($p < 0.001$) (►**Table 4**).

►**Table 5** depicts the pairwise comparison of basic nursing care skills with the level of educational qualification of final year graduating nurses. The result shows that there is a significant difference between advanced nursing qualification (PB B.Sc.) and improved basic nursing skills ($p < 0.004$) compared with B.Sc. Nursing graduating students as they are freshly graduating. This could be due to the fact that PB B.Sc.

Nursing is an advanced nursing course compared with B.Sc. Nursing where students will learn advanced clinical skills in the health care sector after completion of their GNM degree. So it is important to have continuing education with higher nursing degree to improve the basic and specialized nursing skills in different areas.

►**Table 6** depicts the independently practiced basic nursing skills procedures. The basic nursing skills had been categorized into several subsections like admission and discharge, infection control and BMW management, documentation, hygiene care, elimination, innovative procedure, medication administration, oxygenation/respiratory care, wound care and bandaging, handling basic medical equipment, and preoperative care. The result shows that under the basic nursing skill (admission and discharge skills) procedures, more than half 159 (79.5%) and 133 (66.5%) of the students know about vital signs monitoring and health assessment procedure. The majority 116 (58%) and 87 (43.5%) of the students know about infection control and BMW management procedure skills. Note that 115 (57.5%) and 98 (49%) of the participants know about temperature, pulse, and respiration charting and how to write nurse's notes. Further, majority 175 (87.5%), 122 (61%), and 136 (68%) of the participants were able to perform bed making, oral care, and hair care procedures. In elimination skills, 57 (28.5%) and 51 (25.5%) of the students were able to perform bowel wash and enema. Regarding innovative procedure, 78

Table 3 Comparison of nursing competencies score with selected demographic characteristics of final year nursing students from nursing institutions in Bangalore ($n = 200$)

Demographic variables	N	Basic nursing skill score			Advanced nursing skills score		
		Mean ± SD	F-value	p-Value	Mean ± SD	F-value	p-Value
Age							
≤ 21 y	105	3.48 ± 0.86	5.68	0.40	3.30 ± 1.43	6.67	0.75
22 y	77	3.64 ± 1.04			3.42 ± 1.29		
≥ 23 y	18	3.72 ± 1.07			3.17 ± 1.46		
Gender							
Male	33	3.67 ± 0.99	0.70	0.48	3.48 ± 1.39	0.68	0.49
Female	167	3.54 ± 0.94			3.31 ± 1.37		
Percentage in previous university exam							
50–59	29	3.59 ± 0.86	4.84	0.42	3.66 ± 1.37	5.81	0.43
60–69	94	3.45 ± 0.99			3.21 ± 1.48		
70–79	67	3.70 ± 0.96			3.40 ± 1.18		
> 80	10	3.60 ± 0.69			3.10 ± 1.59		
Clinical posting duration							
Throughout the year	35	3.94 ± 0.83	1.89	0.004[a]	3.94 ± 1.13	1.09	< 0.001[a]
Half of the year	57	3.68 ± 1.00			3.61 ± 1.14		
Only for 2 months	108	3.37 ± 0.92			2.99 ± 1.46		
Educational qualification							
B.Sc. Nursing	140	3.61 ± 0.88	1.53	0.003[a]	3.32 ± 1.29	2.13	0.153
PB B.Sc. Nursing	11	4.27 ± 0.79			4.09 ± 1.04		
GNM Nursing	49	3.27 ± 1.09			3.20 ± 1.62		
Demographic variables	N	Basic nursing skill score			Advanced nursing skills score		
		Mean ± SD	t-Value	p-Value	Mean ± SD	t-Value	p-Value
Gender							
Male	33	3.67 ± 0.99	0.70	0.48	3.48 ± 1.39	0.68	0.49
Female	167	3.54 ± 0 0.94			3.31 ± 1.37		

Abbreviations: GNM, General Nursing and Midwifery; PB, Post Basic; SD, standard deviation.
[a]$p < 0.001$ and 0.004 are statistically significant.

Table 4 Pairwise comparison of basic nursing care skills and advanced nursing care skills with clinical posting duration of final year nursing student from nursing institutions in Bangalore

Basic nursing care skills		
Pairwise comparison	MD (95% CI of difference)	p-Value
Throughout the year	0.26 (−0.21, 0.73)	0.40
Half of the year	0.57 (0.14, 1.00)	0.005[a]
Only for 2 months	0.31 (−0.05, 0.67)	0.10
Advance nursing care skills		
Pairwise comparison	MD (95% CI of difference)	p-Value
Throughout the year	0.33 (−0.35, 1.00)	0.48
Half of the year	0.95 (0.34, 1.56)	0.001[a]
Only for 2 months	0.62 (0.11, 1.14)	0.013[a]

Abbreviations: CI, confidence interval; MD, mean difference.
[a]Significant.

Table 5 Pairwise comparison of basic nursing care skills with the level of educational qualification of final year nursing students from nursing institutions in Bangalore

Pair wise comparison	MD (95% CI of difference)	p-Value
B.Sc. Nursing	−0.67 (−1.35, 0.02)	0.06
GNM Nursing	0.34 (−0.02, 0.71)	0.07
PB B.Sc. Nursing	1.01 (0.27, 1.74)	0.004[a]

Abbreviations: CI, confidence interval; GNM, General Nursing and Midwifery; MD, mean difference; PB, Post Basic.
[a]Significant.

(39%) and 47 (23.5%) of the participants were able to perform nasogastric (NG) tube feeding and venous blood sampling procedure. In the skills of medication administration, 124 (62%), 118 (59%), and 115 (57.5%) of the participants were able to perform oral drug administration, intramuscular injection, and eye, ear, and nasal drop instillation. Regarding wound care and bandaging skill procedure, 91 (45.5%) and 54 (27%) of the participants knew how to perform bandaging and surgical wound dressing. It is also observed that more than 50% of the students, 144 (72%) and 114 (57%), knew how to handle basic medical equipment like pulse oximeter and electrocardiogram (ECG) recording followed by 45 (22.5%) of them being able to perform preoperative care for the patients.

►**Table 7** depicts the independently practiced advanced nursing skills of final year nursing students. A total of 200 students had participated in the study. Advanced nursing skills have been categorized into four specialty areas. The result shows that in the medical and surgical advanced nursing skill, majority 34 (17%), 29 (14.5%), 33 (16.5%), 23 (11.5%), and 20 (10%) of the participants can independently perform blood transfusion, administration of total parenteral nutrition, gastric lavage, basic life support (BLS), endotracheal/tracheostomy suctioning, and tracheostomy care procedure. Further, in child health nursing majority 100 (50%), 85 (42.5%), 65 (32.5%), 64 (32%), and 49 (24.5%) of the participants were able to perform procedures like nebulization, newborn assessment, intramuscular injection, immunization, care of newborn, and care of newborn in radiant warmer. In the obstetrics and gynecological advance nursing procedure, 80 (40%), 62 (31%), 60 (30%), and 59 (29.5%) of the participants could independently perform procedures like assisting the mother with breastfeeding, antenatal examination, antenatal care, and postnatal examination. Whereas it is observed that 114 (57%), 109 (54.5%), 65 (32.5%), and 63 (31.5%) of the participants were able to perform behavioral therapy, history collection, MMSE, and process recording procedures in the mental health advance nursing skill.

Discussion

Nurses are referred to as the backbone of the health care system. They are the key to the detection, treatment, and prevention of disease across the world.[18] Nurses and midwives account for nearly 50% of the global health workforce and the need to fill up these gaps is rising rapidly.[2] Western nations continue to worsen as their population is aging rapidly. So the nurse's migration is at an all-time high in the 21st century. Currently, India is facing a shortage of nurses and the nursing colleges are blooming rapidly to take the chances. And in India, Karnataka has the highest number of nursing colleges, and most of them are in Bangalore. The four southern states of India have two-thirds of the nursing institutions in India. And we can see a clear disproportion.[19] As the number of nursing colleges is increasing day by day in Bengaluru, the quality of nursing care is decreasing simultaneously. Several reports indicated that the compromised quality of nursing in terms of blooming institutions, shortage of nursing faculty, less clinical experience among students, poor infrastructure, less salary, and the institution authority involvement in clinical practice.[19–21] It is important not to produce the nurses like a mass but to produce qualified experienced nurses who are able to handle any health situation anywhere in the world. The novice nurses who are going to become registered nurses are expected to have basic knowledge in nursing skills and should perform the basic and advanced procedures seamlessly wherever they are.

The purpose of the present study was to assess the self-reported clinical practice among graduating nurses across Bengaluru. Currently, there were only a few research data available about the clinical practice readiness among final year graduating nurses across India as well as in the world. The findings of the present study suggest that the overall CNCQ mean score of basic nursing skills was reasonably high (39.08 ± 13.27) compared with advanced nursing care skills (13.03 ± 5.28) which were inconsistent when we compared with a similar study done in Uttarakhand, India,[17] where the mean competency score of basic nursing skills is 236.5 ± 25.0 and advanced nursing skills is 148.7 ± 25.6. This discrepancy might be due to the difference in study settings, characteristics of study participants, sampling techniques used in the study, and the techniques of data collection in which the current study covers eight institutions. And also the possible conclusion is that AIIMS Uttarakhand is one of the premier institutions in our country having senior nursing instructors and different specialized multispecialty hospitals leading the students to have more exposure. The difference of results in basic and advanced nursing practice skills among nursing students could also be due to the nursing curriculum, way of teaching in the different nursing institutions, public versus private institutions, the experience of faculty members, and inadequate clinical experience for the students which we should take into account. But similar results were also seen in other several studies conducted in India,[22] Iran,[23] Ethiopia,[24] and Zimbabwe[25] which is a cause of concern.

Our research found a significantly high percentage in basic nursing skills compared with advanced nursing skills. The basic nursing skills result shows that 79.5% was the highest percentage under admission/discharge skills, 58% under infection control and BMW management, 57% under documentation, 87.5% under hygiene care, 28.5% under elimination, 39% under the innovative procedure, 62% under medication administration, 60% under oxygenation/respiratory care, 45%

Table 6 Percentage of independently practiced basic nursing skills of final year nursing students from nursing institutions in Bangalore ($n = 200$)

Admission/Discharge		
Skills	f	%
Vitals sign monitoring	159	79.5
Health assessment	133	66.5
Admission of patient	63	31.5
Discharge/discharge teaching of patient	53	26.5

Hygiene care		
Skills	f	%
Bed making	175	87.5
Oral care	122	61.0
Hair care	136	68.0
Back care	121	60.5
Bed bath	105	52.5

Medication administration		
Skills	f	%
IV infusion	92	46.0
Intramuscular injection	118	59.0
IV drugs	106	53.0
Oral drug	124	62.0
Subcutaneous injection	101	50.5
Intradermal injection	91	45.5
Eye, ear, nasal drops instillation	115	57.5

Handling basic medical equipment		
Skills	f	%
Pulse oximeter	144	72.0
Recoding ECG	114	57.0
Using defibrillator	21	10.5

Infection control and BMW		
Skills	F	%
BMW management	87	43.5
Use of PPE	78	39.0
Disinfection	31	15.5
Fumigation/fogging	116	58.0

Elimination		
Skills	F	%
Catheter care	42	21.0
Suppositories	39	19.5
Enema	51	25.5
Urinary catheterization	19	9.5
Bowel wash	57	28.5

Oxygenation/respiratory care		
Skills	F	%
Nebulization	120	60.0
Steam inhalation	116	58.0
O2 administration by simple face mask	113	56.5
O2 administration by nasal prongs	61	30.5
Assisted patient with incentive spirometer	38	19.0
O2 administration by partial/nonbreather/venture mask	30	15.0

Documentation		
Skills	f	%
TPR charting	115	57.5
Nurse's notes	98	49.0
Informed consent	54	27.0

Innovative procedure		
Skills	f	%
Venipuncture	30	15.0
PBG monitoring	37	18.5
Venous blood sampling	47	23.5
NG tube feeding	78	39.0
NG tube insertion	24	12.0

Wound care and bandaging		
Skills	f	%
Bandaging	91	45.5
Surgical wound dressing	54	27.0
Bed sore dressing	42	21.0
Pin-site care dressing	25	12.5
Removal of structure and staples	47	23.5
Burns wound dressing	28	14.0

Preoperative care		
Skills	f	%
Preoperative care	45	22.5
Postoperative care	34	17.0
Intraoperative care	17	8.5

Abbreviations: BMW, biomedical waste; ECG, electrocardiogram; IV, intravenous; NG, nasogastric; PBG, porphobilinogen; PPE, personal protective equipment; TPR, temperature, pulse, and respiration.

Table 7 Percentage of independently practiced advanced nursing skills of final year nursing students from nursing institutions in Bangalore ($n = 200$)

Medical and surgical nursing

Skills	f	%
Blood transfusion	34	17.0
Endotracheal/tracheostomy suctioning	20	10.0
Tracheostomy care	20	10.0
Care of central venous catheter	18	9.0
Administration of TPN	29	14.5
Colostomy care	20	10.0
Arterial blood sampling	18	9.0
Care of intercostal chest drainage site	15	7.5
Gastrostomy/jejunostomy feeding	14	7.0
Gastric lavage	33	16.5
BLS	23	11.5
Care of patient on mechanical ventilator	15	7.5
Care of patient with cardiac catheterization	12	6.0

Child health nursing

Skills	f	%
Nebulization	100	50.0
New born assessment	85	42.5
Intramuscular injection	65	32.5
Immunization	64	32.0
Care of new born	60	30.0
Care of new born in radiant warmer	49	24.5
IV medication with use of infusion pump	35	17.5
Care of new born under phototherapy	57	28.5
Administration of oxygen by oxygen tent	29	14.5
Administration of oxygen by oxygen hood	24	12.0
Care of new born in incubator	21	10.5
Pediatric vein puncture	12	6.0
Neonatal resuscitation	9	4.5
Pediatric BLS	15	7.5

Obstetrical and gynecological nursing

Skills	f	%
Perineal care	37	18.5
Assisting the mother with breast feeding	80	40.0
Antenatal care	60	30.0
Postnatal care	58	29.0
Antenatal examination	62	31.0
Postnatal examination	59	29.5
Nonstress test	48	24.0
Vaginal examination	27	13.5
Examination of placenta	31	15.5
Partogram	24	12.0
Collection of pap smear	8	4.0
Normal vaginal delivery	9	4.5
IUCD insertion	7	3.5
Episiotomy and suturing	8	4.0

Mental health nursing

Skills	f	%
History collection	109	54.5
Behavioral therapy	114	57.0
Assisting in AT	13	6.5
MMSE	65	32.5
Care patient for ECT	24	12.0
Process recording	63	31.5
Use of restraints	47	23.5

Abbreviations: BLS, basic life support; ECT, electroconvulsive therapy; IUCD, intrauterine contraceptive device; IV, intravenous; TPN, total parenteral nutrition.

under wound care and bandaging, 72% under handling basic medical equipment, and 22% under preoperative care. Whereas in advanced nursing skills 17% was the highest skill percentage under medical and surgical nursing, 50% under child health nursing, 40% under obstetrics and gynecological nursing, and 57% under mental health nursing. This percentage is moderately low when we compare our study with the study done in Uttarakhand[17] where the result shows that in the basic nursing skills 95.9% was the highest percentage under admission/discharge skills, 94% under infection control and BMW management, 72.8% under documentation, 94.8% under hygiene care, 83.8% under elimination, 79.8% under the innovative procedure, 90.2% under medication administration, 95.4% under oxygenation/respiratory care, 83.2% under wound care and bandaging, 79.2% under handling basic medical equipment, and 38.1% under preoperative care. Similarly in advanced nursing skills, 34.1% were under medical and surgical nursing, 62.4% under child health nursing, 50.3% under obstetrics and gynecological nursing, and 94.2% under mental health nursing.

This study indicated a significant difference in clinical posting duration with the improved performance skills ($p < 0.005$) whereas it was also observed that the advanced nursing skills will be greatly improved if the nursing students get an opportunity to practice in different specialty areas for at least 2 months ($p < 0.013$) or half of the year ($p < 0.001$).

A study conducted at universities in Northern Ethiopia indicates the overall clinical practice competency of graduating nursing students shows that only 29% of the participants were clinically competent and 71% were incompetent.[26] Similarly, another study found that 50% of graduating nurses could not independently practice some of the basic nursing procedures, while only 10% of them could independently practice some of the advanced nursing procedures.[17] This is parallel to our study where we found that only 10.5% of the participants could perform the basic nursing procedures and 20% of them could perform advanced nursing procedures independently. Whereas 52% of the students could perform the basic procedures and 37.5% of them could perform advanced procedures while under supervision. The findings are low when compared with a finding from a study done in Hawassa University, Hawassa, Ethiopia, which revealed that only 25.2% of the students were clinically competent.[26] It is also lower than the study done by Debre Birhan Health Science College, Ethiopia[27] and Annals University of Finland[28] where 78.6 and 66.7% of the participants were clinically competent. This discrepancy might be because of the difference in the study participants in the previous study, where participants were graduated health professionals, whereas in the present study, the study participants were graduating nursing students who were lacking work experience. And possibly one of the other reasons is that most of the private colleges in Bangalore are having less than 2 months of clinical posting and do not have parent hospitals because of the increasing number of nursing institutions.

Our study also found that in basic nursing care skills it was found that the mean score of personal hygiene (4.46 ± 1.06) and infection control and BMW management (4.03 ± 1.27) is a little higher than the other skills like medication adminis-

tration (3.87 ± 1.06), admission/discharge (3.02 ± 1.23), respiratory nursing intervention (3.21 ± 1.20), documentation (3.42 ± 1.33), invasive procedure (3.10 ± 1.25), wound care and bandaging (3.91 ± 1.08), infection control and BMW (4.03 ± 1.27), elimination (3.31 ± 1.33), perioperative nursing (3.12 ± 1.25), and handling basic medical equipment (3.63 ± 1.21), where most of the mean score is same. Further in advanced nursing care, the result shows that the mean score of medical and surgical nursing care skills (3.68 ± 1.11) is more than other departments like mental health nursing (2.99 ± 1.40), child health nursing (3.33 ± 1.32), and midwifery and obstetrics (3.03 ± 1.45). But the percentage of independently practicing medical and surgical nursing procedures is less and this could be due to less exposure of students in different medical and surgical specialty areas in different hospitals. These results show that the graduating nurses are not getting enough opportunity to practice advanced nursing procedures in hospitals and similar findings are also reported in a study done in Korea.[29]

The findings of the study are an eye opener. This shows that 85% of the students cannot perform basic nursing procedures independently such as informed consent (27%), catheter care (28.5%), bowel wash (9.5%), NG tube insertion (12%), assisted patients with incentive spirometer (19%), pin-site care dressing (12.5%), using defibrillator (10.5%), and intraoperative care (8.5%), but 60% of the students were able to perform most of the basic nursing procedure such as vital sign monitoring (79.5%), health assessment (66.5%), BMW management (58%), bed making (87.5%), hair care (68%), back care (60%), oral drug administration (62%), nebulization (60%), and recording ECG (57%) independently which is a good finding. But the advanced nursing skills among the students is really surprising where only 20% of the participants could perform the procedures independently such as tracheostomy suctioning and care (10%), care of central venous pressure line (9.0%), arterial blood sampling (9.0%), care of intercostal chest drainage (7.5%), gastrostomy tube feeding (7.0%), care of the patient in mechanical ventilator (7.5%), care of the patient in cardiac catheterization (6.0%), pediatrics vein puncture (6.0%), pediatric BLS (7.5%), intrauterine contraceptive device insertion (3.5%), and care of the patient for electroconvulsive therapy (12.0%). Further, majority of the students were able to perform most of the child health nursing, obstetrics and gynecology, and mental health nursing advanced procedure. This shows that the few graduating nursing students from India may possess an adequate amount of basic nursing skills but most of them are lacking while performing advanced procedures.

There is a limited number of similar studies conducted around the world, and in India, the number is very less. Our study was conducted at Bengaluru, in the state of Karnataka with only eight nursing colleges which are private institutions. So it is very difficult to generalize the result with other studies in India and to conclude that nursing students' skills in India is low. As India is a very big country and there are many states in India, the result will differ statewise, institution-wise, geographical areawise, and private and public institution-wise, and there is a higher chance to get improved nursing competency scores in future studies in different states. In our study,

the percentage of basic nursing skills is a little better than advanced nursing scores. This could be due to most of the nursing colleges in Bengaluru do not have parent hospitals, proper clinical facilities, lack demonstration laboratory infrastructure, and a lack of experienced faculty. Therefore, it is very important for the nursing teachers to come together to strengthen guiding budding nurses as they are the future generation who will serve humanity in India and around the world.

Limitations

The study was conducted at eight nursing institutions which lead to a small sample size and hence the findings of this study cannot be generalized to all nursing college students in Bengaluru. Also, the study was done using online mode thus the practice skills of the graduating students could not be assessed in real-time. In addition, this study is limited to the final year nursing students from private institutions in Bengaluru and did not make any comparison between private versus public nursing institutions.

Conclusion and Recommendations

The graduating nurse's overall CNCQ mean score of basic nursing skills was reasonably high compared with advanced nursing care skills. A significant difference was observed in overall clinical posting duration in both basic and advanced nursing skills with selected demographic variables. There is also a significant difference found in the level of qualification with basic nursing skills. It was observed that basic nursing care skills with clinical duration time had a significant difference with the improved performance skills. The authors hope that these findings will support the stakeholders, teachers, authorities of nursing institutions, and state government to make a significant decision and to give due attention to enhance the clinical practice among graduating nurses to improve in both basic and advanced nursing skills if students are exposed in the clinical area for at least few months. Furthermore, regulatory bodies must check that nursing institutes have sufficient facilities and processes for adequate clinical learning experience in basic and advanced nursing skills training.

Ethical Considerations
Institutional Ethics Committee approval was also taken before the research, and actual data collection, and also permission was obtained from all the nursing colleges. A consent sheet was prepared in English with the descriptions of the impact of the study on the responders and attached the tool on a separate page. Permission was obtained from the Prof. Dr. Suresh K. Sharma, Principal, College of Nursing (All India Institute of Medical Sciences, Jodhpur) to use the prevalidated CNCQ tool.

Authors' Contributions
All authors made a significant contribution to the work reported. R.S. and S.P.U. made study conception and study design, execution, and acquisition of data and S.S. did analysis and interpretation of data. Finally all the authors read, revised, and drafted the manuscript for publication and also gave final approval of the version to be published based on the selected journal to which the article has been submitted.

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