ISSN: 2476-2377

Research Article

International Journal of Cancer Research & Therapy

Development of a Nursing Professional Excellency Tool for Nursing Officers in Chemotherapy Units at a Tertiary Cancer Care Center, Mumbai

Prathepa Jagdish*, Priya Dadarao Kale, Sindhu Nair and Anita D'Souza

College of Nursing, Tata Memorial Hospital, HBNI, India

***Corresponding Author**
Prathepa Jagdish. College of Nursing, Tata Memorial Hospital, HBNI, India.

Submitted: 2026, Apr 13; **Accepted**: 2026, May 25; **Published**: 2026, Jun 29

Citation: Jagdish, P., Kale, P. D., Nair, S., D'Souza, A. (2026). Development of a Nursing Professional Excellency tool for Nursing Officers in Chemotherapy units at a Tertiary Cancer Care Center, Mumbai. *Int J Cancer Res Ther, 11*(1), 01-15.

Abstract

Introduction: *Nursing is a complex science that involves more than just skills of doing as it also takes an understanding of human experience. Nursing professional excellency tool is used to measure the ability of a nurse to effectively demonstrate a set of attributes such as personal characteristics, professional attitude, values, knowledge and skills to fulfill his/her professional responsibility through their practice. A competent person must possess these attributes and have the motivation and ability to utilize them, and provide safe, effective nursing care to the client. This assessment approach is continuous learning and skill development. Professional excellency tool focuses on the nurse's efficiency which should incorporate essential domains -Cognitive ,Psychomotor ,Values, Fulfillment of professional responsibilities, Motivation and Utilization, Supportive and therapeutic relationships, Safe and effective professional responsibilities and Evidence-based nursing care and characteristics were further categorized as interdependence /self-motivation /initiative, decision making and advocacy, professional practice and leadership communication, confidence, teaching and coaching, optimism, evidence-based management with cancer related symptoms and professional accountability, interpersonal skills, use of technology, education and continuous learning, and patient- centered and holistic care. As several authors have made significant contributions in improving nursing competencies, existing frameworks continue to have strengths and limitations. Recognizing this gap, the researcher designed and developed a Nursing Professional Excellency Tool, based on evidence-based practices to meet the changing demands of modern healthcare systems Primary objectives were development of Nursing Professional Excellency Tool and testing its reliability and to find out the association between demographic data and the Nursing Professional Excellency Tool. Methodology - The study focused on developing and validating the Nursing Professional Excellency Tool for nursing officers in chemotherapy care. A cross-sectional design was used , with a sample size of 60 participants from Tata Memorial Hospital and ACTREC, Mumbai after following IEC approval, CTRI registration and informed consent. The process comprised three stages: identification of core domains and item development through literature review, expert content validation using the Delphi technique (S-CVI/Average = 0.98%), content validity index (CVI) and reliability assessment through Cronbach's alpha by Miller's pyramid framework. Data were gathered through questioning, observation, and low simulation method and analyzed by using descriptive statistics and reliability.*

Results: *The internal consistency of the 32-item Nursing Professional Excellency Tool was evaluated using Cronbach's alpha, which resulted an overall value of 0.815, indicating good reliability and consistent measurement of Nursing Professional excellency tool among nursing officers. Domain wise alpha values ranged from 0.1589 to 0.7193, with the Psychomotor domain showing the highest reliability (α=0.71) and Motivation and Utilization the lowest (α=0.15),whereas Spearman's coefficient analysis indicated that Psychomotor items were largely positively correlated (–13.5% to 56%), with moderate significant correlations (33–56%) confirmed construct consistency. Cognitive and Values domains also showed moderate positive associations, supporting internal coherence and validity. Nursing Professional Excellency Tool scores were significantly associated with Age (p = 0.025), Gender (p = 0.036), and professional designation /Post (p = 0.013), but showed no significant relationship with education (p = 0.395, 0.837) or work experience (p = 0.482).*

Conclusion: *The Nursing Professional Excellency Tool was developed and validated as a reliable (Cronbach's α = 0.815) and valid instrument for assessing Nursing competence. Expert reviews (CVI = 0.98%) item-domain correlations confirmed its content and construct validity. Nursing Professional excellency tool scores were influenced by age, gender, and professional designation or Post , highlighted the demographic effects on Professional excellence. The tool offered a practical framework to identify competency gaps, guide professional development and enhance nursing performance and patient care, supporting its use in research, education, and administrative settings in similar setting and can be utilized as a standardized tool.*

Keywords: Nursing Professional Excellency Tool (NPET), Nursing Officers, Tool

1. Introduction

Nursing is a complex discipline that requires both practical skills and understanding of human Experiences [1]. The nurse has to actively work to develop the skills and knowledge needed to function in a competent capacity . Established the importance for competence in critical care nurses describing competence as a " intangible construct : it cannot be observed directly". Nursing professional excellency tool is used to measure the ability of a nurse to effectively demonstrate a set of attributes such as personal characteristics, professional attitude, values, knowledge and skills to fulfill his/her professional responsibility through their practice [2]. A competent person must possess these attributes and have the motivation and ability to utilize them, and provide safe, effective nursing care to the client [3]. This assessment approach is continuous learning and skill development [4]. Nursing Professional excellency tool focuses on the nurse's efficiency which should incorporate essential domains -Cognitive ,Psychomotor ,Values, Fulfillment of professional responsibilities, Motivation and Utilization, Supportive and therapeutic relationships, Safe and effective professional responsibilities and Evidence-based nursing care and characteristics were further categorized in characteristics as interdependence /self-motivation /initiative, decision making and advocacy, professional practice and leadership communication, confidence, teaching and coaching, optimism, evidence-based management with cancer related symptoms [5-6]. Nursing is a dynamic, practice-based profession that demands the integration of knowledge, technical competency , ethical values, leadership abilities and clinical judgment to deliver safe and patient-centered care [7]. The International Council of Nurses defines professional competence as the effective application of knowledge, skills, and judgment in practice [8]. In highly specialized settings such as chemotherapy units, nurses required not only to demonstrate clinical accuracy but also to exhibit critical thinking, advocacy, communication skills, accountability, Professionalism and adherence to evidence-based standards of practice to ensure patient safety [9]. Conventional evaluation systems primarily focused on theoretical knowledge and isolated skill performance, often overlooking broader dimensions of professional excellency such as motivation, leadership, interpersonal relationships, ethical conduct and contextual decision-making [10]. Whereas, healthcare environments and setup demanded a comprehensive assessment approach that evaluates cognitive, psychomotor, affective, and professional responsibility domains in an integrated manner [11]. To address this gap, the investigators developed a structured Nursing Professional Excellency Tool specifically designed for nursing officers working in chemotherapy units at a tertiary cancer care center in Mumbai. The tool comprehensively measured essential domains including Cognitive competence, Psychomotor skills, Professional Values, fulfillment of professional responsibilities, motivation and utilization, supportive and therapeutic relationships, leadership, communication, decision-making, advocacy, and evidence-based nursing care. It emphasizes continuous professional development, reflective practice and safe chemotherapy management.

2. Objectives

The primary objective of the study was to develop a Nursing Professional Excellency Tool for nursing officers working in chemotherapy units at a tertiary cancer care center in Mumbai. The secondary objectives were to evaluate the reliability of the developed tool and to examine the association between nursing professional excellency tool scores and selected demographic variables of the nursing officers . The tool aims to provide a structured framework for evaluating and enhancing nursing excellence, thereby contributing to improved quality of care and patient safety in oncology practice.

3. Materials and Methods

A quantitative study with a cross-sectional design was used to develop and validate a Nursing Professional Excellency Tool for nursing officers working in chemotherapy units. The study was carried out at Tata Memorial Hospital and ACTREC, Mumbai, in selected chemotherapy-related areas including General and Private Daycare units, Chemotherapy (CT), CR wards, and Injection Rooms. A total of 60 nursing officers were selected using purposive sampling.

3.1. Tool Development and Item Generation

The tool was developed by the investigator following an extensive literature review and existing nursing competency frameworks. Domains were identified - cognitive, psychomotor, values, fulfillment of professional responsibilities, motivation and utilization, supportive and therapeutic relationships, safe and effective professional responsibilities, and evidence-based

nursing care [12]. Items reflecting chemotherapy-related clinical competence, professional behavior, leadership, communication, ethical practice, and supportive care were generated.

3.2. Content Validation

Content validation was carried out using the Delphi technique in two rounds with a panel of 15 subject matter experts (12 nursing leaders and 3 Doctors). Experts evaluated each item for relevance, clarity, and representativeness using a four-point Likert scale based on the Souza scale. The Content Validity Index (CVI) was calculated at item (I-CVI) and scale levels (S-CVI/Ave) average [13-14]. Items with I-CVI values below the acceptable threshold were revised or removed. One item from the optimism domain was excluded due to low I-CVI. The final tool demonstrated excellent content validity with an S-CVI/Ave of 0.99, indicating strong expert agreement.

3.3. Reliability and Scoring of the Newly Developed Tool

Reliability was assessed using Cronbach's alpha. The tool was administered through questioning, observation and low-simulation methods and evaluated by using Miller's Pyramid of Clinical Competence (knows, knows how, shows how, does) [15]. Assessment was done based on Miller's Pyramid of Clinical Competence which comprised of four levels: knows, knows how, shows how, and does. Each item was scored accordingly, reflecting knowledge, competence, performance, and action. Each tier served as a foundation for subsequent tiers. The first two tier was evaluating the cognition domain whereas third & fourth tier evaluated the behavioral domain of nursing officers. The criterias provided a clear idea about what to assess and how to assess the competency and professional excellency characteristics in nursing officers. The rating was given according to the nursing officers efficiency. Overall professional excellence scores were interpreted using a five-point performance scale given by Sophia Lee: 0–20 - Needs development ,21–40 - Consistently meets expectations ,41–6 - Often exceeds expectations ,61–80 - Almost always exceeds expectations ,81–10 - Sets a new standard of performance [16].

3.4. Inclusion Criteria

Nursing officers employed at Tata Memorial Centre with a minimum of one year of experience as permanent staff. Nurses holding GNM, Post Basic B.Sc. Nursing, B.Sc. Nursing, PB diploma oncology or M.Sc. Nursing qualifications. Nursing officers working in chemotherapy-related areas (CT, CR, injection room, or daycare units). Nurses able to comprehend and communicate in English.

3.5. Exclusion Criteria

Nurses working in surgical wards, radiation therapy units, operation theatres, or outpatient departments. Nurses who were unwilling or unavailable to participate in the study.

3.6. Data Collection Procedure

Ethical approval was obtained from the Institutional Ethics Committee of Tata Memorial Hospital, and CTRI registration was done prior to data collection. Written informed consent was obtained from all participants. The investigator personally administered the tool once to each participant in the chemotherapy units. Data collection was done in a single session lasting approximately 30–35 minutes per participant. Confidentiality was maintained throughout the study. CTRI No - CTRI/2025/08/092366.

3.7. Item Generation

Item generation aimed to identify nursing professional excellency for the development of a new tool. The tool comprised of domains representing personal and professional characteristics, including cognitive, psychomotor, values, fulfillment of professional responsibilities, motivation and utilization, supportive and therapeutic relationships, safe and effective professional responsibilities, and evidence-based nursing care. These domains were further categorized into interdependence/self-motivation/initiative, decision making and advocacy, professional practice and leadership, communication, confidence, teaching and coaching, optimism, and evidence-based management to prevent or manage cancer-related symptoms, based on contributions from various authors.

The **Cognitive domain** items included: performs initial assessment prior to administration of chemotherapy; knows to check CBC, RFT, LFT values prior to CT administration; monitors for severe adverse effects such as hypersensitivity; checks the dose rightly and administers without error; explain the patient and family about procedure; and confirmation of the prescribed premedication as ordered. **The psychomotor domain** items included: obtains informed consent for each cycle; second witness from senior is obtained; recall routes of exposure of cytotoxic agents to colleagues; follows PPE during administration of chemotherapy; handles cytotoxic agents in biosafety cabinet while preparation; and demonstrates the right cytotoxic waste disposal bin. **The independence/self-motivation/initiative** items included: identifies oral ulceration and manages independently; identifies neutropenia and provides nursing care; and identifies peripheral neuropathies and give nursing care. The **decision making and advocacy** items included: provide information, education and support to patient and families to facilitate decision making and autonomy; and nurse helps the patient to obtain fund.

The **professional practice and leadership** item included: trains/demonstrates IV cannulation/safe chemo administration as mentors. The **communication** items included: communicates with patients and families in oncology units/settings; and explains different pain management strategies in cancer patients. The confidence items included: feels confident in self-competency to handle complications. The values domain items included: respect every patient and provide privacy to patient. fulfillment of professional responsibilities item included: member of ONAI/TNAI. The teaching and coaching items included: encourages juniors for participation in higher education/CNE/presentation;

and pace the teachings as per the patient's/family's readiness .Supportive and therapeutic relationships items included: steps taken to address barriers like language differences, lack of transportation, blood donation; assist patient and families for psychosocial support, spiritual care, prosthetic devices like help of medical social worker, pastor, etc. Optimism items included: working in a cancer environment is still motivating; feels patients will get well. Safe and effective professional responsibilities item included: handling of equipment—can safely use the mechanical devices in the clinical area. The evidence-based nursing care items included: feeding high protein food to patients; discusses/ participates with seniors/friends on the recent development or new chemotherapeutics in patient care.

3.8. Analysis of Variables

The Professional Excellency Tool for Nursing Officers in Chemotherapy Units was a self-created instrument used to evaluate professional competence and excellence among oncology nurses. The tool covered both demographic characteristics and professional excellence areas with key domains of professional excellence. The demographic parameters consisted of computer code number, age, gender, professional education, areas of chemotherapy administration ,number of years of clinical experience in chemotherapy unit, and position in hospital. The professional excellency was assessed in terms of 8 domains and the characteristics .These were - Cognitive domain had -6 items ,Psychomotor domain -6 items , independence /self-motivation /initiative-3 items, decision making and advocacy-2 items, professional practice and leadership -1 item ,communication -2 item ,confidence- 1 item ,values domain-2 item ,fulfillment of professional responsibilities domain-1 item, motivation and utilization domain -2 item ,supportive and therapeutic relationships to a person living with cancer domain - 2 item ,optimism -1 item ,safe and effective professional responsibilities domain -1 item ,evidence-based nursing care -2 item. The questionnaire were given to the participants in English language.

3.9. Statistical Data Analysis Plan

Nursing professional excellency tool each domain features different items and maximum scores, which the assessor recorded on a fact sheet. The total score for this excellency tool was simply the sum of the scores for all 32 items, with a maximum score of 100. The primary endpoint of the study was internal reliability , measured using Cronbach's Alpha. A Cronbach's Alpha value greater than 0.05 was considered unacceptable ,while a value of 0.70 or higher was considered acceptable. We assumed that under the null hypothesis, the Cronbach's Alpha was 0.50, whereas the expected actual value was 0.70. The sample size was determined based on a two-sided F-test. To detect a Cronbach's Alpha of 0.70 for the 32 items, a minimum of 60 nurses were required, with a power of 80% and a significance level (alpha) of 5%. The sample size was calculated using PASS 2021 software.

• Descriptive statistics were utilized to summarize the baseline characteristics of the participants. For continuous data, either the mean and standard deviation (SD) or the median with interquartile range (IQR) was used, depending on the assumption of data symmetry.

• Categorical data were represented using counts and percentages for each category. Cronbach's Alpha was calculated using variance, covariance, and the number of items, and the 95% lower limit was also provided.

The internal reliability for each domain was calculated as well. All statistical tests were two-sided, with a p-value of less than 0.05 considered statistically significant .SPSS version 29 was utilized to perform the statistical analysis. Annova test used to compare NPET scores across more than 2 groups of demographic data, its used to determine statistically significant difference ,compare scores multiple groups. Independent t test –NPET scores ,difference between mean score between 2 groups is statistically significant. Spearmen's –relationship between continuous data and NPET likely due to chance $p<0.05$ 5% probability statistically significant true + relationship When $P<0.01$ only 1% probability by chance correlation ,(+,ve) both directions.

4. Results

4.1. Analysis and Interpretation

Section I - Distribution of Nursing Professional excellency tool (NPET) according Demographic data

Age	Total (n)	Percentage %
18-30	12	20%
31-40	32	53.3 %
41-50	13	21.7%
51-60	2	5%

Table 1: Distribution of Participants According to Age n=60

Gender	Total (n)	Percentage %
Male	6	10%
Female	54	90%

Table 2: Distribution of Participants According to Gender n= 60

Education	Total (n)	Percentage %
GNM	5	8.3%
B.Sc. Nursing	30	50%
Post Basic B.Sc. Nursing	5	8.3%
Diploma in Oncology Nursing	14	23.3%
M.Sc. Nursing	6	10%

Table 3: Distribution of Participants According to Education n = 60

Area of chemotherapy	total (n)	percentage %
CT ward	3	5%
CR ward	8	13.3%
Day care (GDC and PDC)	39	65%
Injection room	10	16.7%

Table 4: Distribution of Participants According to Area of Chemotherapy n=60

Experience	Total (n)	Percentage (%)
1-5 years	32	53.3.%
6-10 years	19	31.7%
10-15 years	6	10%
>15 years	3	5%

Table 5: Distribution of Participants According to Experience n=60

Post	Total (n)	Percentage (%)
Nurse A	32	53.3%
Nurse B	17	28.3%
Nurse C	7	11.7%
Nurse D	4	6.7%
Nurse E	0	0%

Table 6: Distribution of Participants According to Post/Position n=60

Section II - Reliability of the Tool

Internal consistency of the Professional Excellency Tool was assessed using Cronbach's alpha, with values ≥0.70 considered acceptable. Table 7 represents overall Cronbach's alpha for the 32-item tool was 0.815, indicates good reliability. The F-test was significant ($p < 0.001$). Statistical analysis was performed using SPSS version 29 with a significance level of $p < 0.05$. Domain-wise Cronbach's alpha values were as follows: Domain I (Cognitive) $\alpha = 0.549$; Domain II (Psychomotor) $\alpha = 0.719$; Domain III (Values) $\alpha = 0.517$; Domain IV (Fulfillment of Professional Responsibilities) and Domain VII (Safe and Effective Professional Responsibilities) combined $\alpha = 0.320$; Domain V (Motivation and Utilization) $\alpha = 0.158$; Domain VI (Supportive and Therapeutic Relationships) $\alpha = 0.159$; and Domain VIII (Evidence-Based Nursing Care) $\alpha = 0.490$. Lower alpha values in certain domains were likely due to fewer items and the multidimensional nature of professional excellence. Overall, the tool demonstrated acceptable to good internal consistency and is suitable for assessing nursing

professional excellence in chemotherapy settings.

P value indicates that the observed differences or relationships in the overall domain scores are highly statistically significant test showed p value < 0.001 indicated significant tool dependability or reliability. Tool is Consistent ,reliable measure of professional excellence. p value calculated by F tes t

Domain	Item	Cronbach's alpha	p value
Overall (Domains)	Q1to Q32	0.815	<0.001
Domain I cognitive	Q1to Q6	0.549	-
Domain II psychomotor	Q7to Q21	0.7193	-
Domain III Values	Q22 and Q23	0.5177	-
Domain IV & VII (fulfillment of professional responsibilities and safe and effective professional responsibilities)	Q24 and Q30	0.3291	-
Domain V Motivation and utilization	Q25 and Q26	0.1589	-
Domain VI supportive and therapeutic relationships	Q27 and Q29	0.4214	--
Domain VII Evidenced based nursing care	Q31to Q32	0.4913	-

Table 7: Coefficient of Reliability for Overall Domains using Cronbach's Alpha n=60

Item	Cronbach's Alpha
Q1	0.8093
Q2	0.8085
Q3	0.8116
Q4	0.8124
Q5	0.8132
Q6	0.8056
Q7	0.8086
Q8	0.8055
Q9	0.8086
Q10	0.8142
Q11	0.8119
Q12	0.8143
Q13	0.8069
Q14	0.8110
Q15	0.8106
Q16	0.8132
Q17	0.8058
Q18	0.8054
Q19	0.8078
Q20	0.8167
Q21	0.8201
Q22	0.8068
Q23	0.8088
Q24	0.8138
Q25	0.8167

Q26	0.8104
Q27	0.8190
Q28	0.8132
Q29	0.8166
Q30	0.8045
Q31	0.8069
Q32	0.8073

Table 8: Co-efficient of Reliability of Items (Internal Consistency) using Cronbach's Alpha n=60

Cronbach's Alpha value greater than 0.50 was considered unacceptable, while value of 0.70 or higher was considered acceptable . Table 8.represented internal consistency of the Professional Excellency Tool assessed using Cronbach's alpha. All items showed a Cronbach's alpha value greater than 0.80, which indicated an excellent internal consistency. This demonstrated that each item strongly contributed to measuring the construct of Professional Excellence among nursing officers and the tool was highly reliable for use in similar setting of chemotherapy units.

Average score	Mean	Sd
Overall, Domain	69.48	9.11
Domain I	14.88	2.36
Domain II	32.82	4.74
Domain III	4.93	1.52
Domain IV and VII	5.4	1.63
Domain V	2.82	1.03
Domain VI	3.35	1.27
Domain VIII	5.28	1.32

Table 9: Domain-wise Mean Scores of NPET n=60

Table 9 represents the overall mean score of participants was 69.48 ± 9.11, indicated that generally good professional performance. Domain-wise, the highest score was in Domain II (32.82 ± 4.74), while the lowest was in Domain IV (3.35 ± 1.27), suggested areas where improvement may be needed. Other domains showed fairly consistent scores, reflecting uniform performance across participants. The results demonstrated that the tool effectively measured nursing professional competencies across multiple domains. Mean shows the overall competency of nurses and SD shows how much scores differ, helping identify areas needing improvement or training. "Domain II had the highest scores, indicating strong competency, while Domain V had the lowest, might be because of less items. Co-efficient of Reliability (Internal Consistency) Domain wise Correlation.

Item	Cronbach's Alpha
Q1	0.4584
Q2	0.4857
Q3	0.5101
Q4	0.5227
Q5	0.5160
Q6	0.5246

Table 10: Co-efficient of reliability for Domain I (Cognitive) using Cronbach's alpha n=60

The Cronbach's alpha values for domain I i.e., cognitive individual items ranged between 45.84% and 52.46%, suggesting that the tool had a moderate level of internal consistency. Among all items, Q6 (52.46%) and Q4 (52.27%) showed comparatively higher contributions to the overall reliability, while Q1 (45.84%) had the lowest contribution. Although the values were below the

commonly recommended cut-off of 70%, they still indicated an acceptable level of reliability for a newly developed scale. These results suggested that the items were fairly consistent in measuring the intended construct and may be reconstructed.

Item	Cronbach's alpha
Q7	0.7057
Q8	0.7047
Q9	0.7041
Q10	0.7145
Q11	0.7088
Q12	0.7188
Q13	0.6887
Q14	0.6947
Q15	0.6928
Q16	0.7056
Q17	0.6985
Q18	0.6907
Q19	0.7051
Q20	0.7163
Q21	0.7237

Table 11: Co-Efficient of Reliability for Domain II (Psychomotor) using Cronbach's Alpha n=60

Item-wise Cronbach's alpha values for Domain II (Psychomotor) ranged from 68.87% to 72.37%, indicating good internal consistency. Most items exceeded the recommended 70% threshold, confirming that the domain consistently measured the intended construct. The alpha values were as follows: Q7 (70.57%), Q8 (70.47%), Q9 (70.41%), Q10 (71.45%), Q11 (70.88%), Q12 (71.88%), Q13 (68.87%), Q14 (69.47%), Q15 (69.28%), Q16 (70.56%), Q17 (69.85%), Q18 (69.07%), Q19 (70.51%), Q20 (71.63%), and Q21 (72.37%). The highest alpha was observed for Q21 (72.37%), feels confident in self-competency to handle complications, while the lowest was for Q13 (68.87%), both remaining within acceptable limits. Removal of any individual item did not significantly affect domain reliability, indicating that all items contributed positively. Overall, these findings support good internal consistency and construct validity of the psychomotor domain.

Item	Cronbach's alpha
Q27	0.4360
Q28	0.2232
Q29	0.3074

Table 12: Co-Efficient of Reliability for Domain VI (Supportive and Therapeutic Relationships using Cronbach's Alpha) n=60

The item-wise Cronbach's alpha value for Domain VI supportive and therapeutic relationships ranged from 22% to 43%, reflecting poor internal consistency. This indicated that the three items only represented in this domain were not adequate and may require refinement to better represent the underlying construct. The low reliability may also be partially attributed to the small number of items, as Cronbach's alpha tends to be sensitive to item count. Further improvements suggest reviewing item phrasing, adding additional relevant items. Co-efficient of reliability of overall Domains and inter-item correlation.

Item	Q1	Q2	Q3	Q4	Q5	Q6
Q1	--					
Q2	0.202	--				
Q3	0.179	.380**	--			
Q4	.310*	0.183	0.031	--		
Q5	0.192	0.22	0.111	0.1	--	
Q6	0.234	0.052	0.207	0.103	0.167	--

Table 13: Inter-Item Correlation and Co-Efficient of Reliability for Domain I (Cognitive) using Sperman's Correlation n=60

*Correlation is significant at 0.05 level (2tailed).** Correlation is significant at the 0.01 level (2 tailed).

Inter-item correlation analysis of Domain I (Cognition; Q1–Q6) using Spearman's correlation showed associations ranging from 3.1% to 38.0%. The strongest correlation was between Q2 and Q3 (38.0%, $p < 0.01$), indicating a statistically significant moderate positive relationship. A significant positive association was also observed between Q1 and Q4 (31.0%, $p < 0.05$). Moderate but non-significant correlations were noted between Q1 and Q6 (23.4%) and Q2 and Q5 (22.0%), while weaker correlations were observed between Q3 and Q4 (3.1%) and Q4 and Q5 (10.0%). Overall, most item pairs demonstrated positive associations, supporting the internal homogeneity of the cognition domain and its contribution to measuring the intended construct

Item	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21
Q7	--														
Q8	0.249	--													
Q9	0.121	0.158	--												
Q10	0.142	0.197	-0.032	--											
Q11	0.044	0.198	0.01	.299*	--										
Q12	0.134	0.17	0.184	-0.063	0.09	--									
Q13	.293*	.267*	0.184	0.128	0.058	.296*	--								
Q14	.372**	0.197	0.155	0.081	-0.002	0.165	.560**	--							
Q15	0.145	0.063	.349**	0.177	0.134	-0.019	0.186	.289*	--						
Q16	0.221	0.207	0.099	0.112	0.039	0.019	0.175	.330*	0.207	--					
Q17	0.091	0.118	.378**	0.111	.263*	0.048	0.218	0.119	.390**	-0.029	--				
Q18	0.132	0.238	0.123	0.147	0.143	0.156	0.224	0.227	.333**	.255*	0.206	--			
Q19	0.111	.356**	0.139	0.09	.347**	0.035	0.218	0.08	0.124	0.063	0.211	.304*	--		
Q20	-0.04	0.014	0.242	0.074	0.08	.279*	0.107	-0.043	0.11	0.084	0.103	0.205	0.089	--	
Q21	0.072	-0.131	0.061	0.013	0.052	-0.135	0.052	0.104	.295*	.315*	0.194	0.147	-0.106	0.053	--

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Table 14: Inter-Item Correlation and Co-Efficient of Reliability Domain II (Psychomotor) using Sperman's Correlation

Inter-item correlation analysis of Domain II (Psychomotor; Q7–Q21) using Spearman's correlation showed predominantly positive associations, with coefficients ranging from –13.5% to 56.0%. The strongest correlation was observed between Q13 and Q14 (56.0%, $p < 0.01$). Significant moderate correlations were also found between Q17–Q15 (39.0%, $p < 0.01$) and Q19–Q8 (35.6%, $p < 0.01$). Other significant associations included Q11–Q10 (29.9%, $p < 0.05$), Q12–Q20 (27.9%, $p < 0.05$), Q16–Q14 (33.0%, $p < 0.05$), Q18–Q15 (33.3%, $p < 0.01$), and Q21–Q15 (29.5%, $p < 0.05$). Weaker correlations (<20%) were noted for Q7–Q11 (4.4%) and Q10–Q19 (9.0%), indicating item uniqueness. Weak, non-significant negative correlations were observed for Q10–Q9 (–3.2%) and Q21–Q8 (–13.1%). Overall, the findings indicate good internal homogeneity, with moderate correlations supporting consistent measurement of the construct while lower correlations reflected adequate content diversity.

Item	Q22	Q23
Q22	--	
Q23	0.342**	--

Table 15: Inter -Item Correlation and Co-Efficient of Reliability Domain III (Values)using Sperman's Correlation n=60

Correlation was significant at 0.001 level (2-tailed) for Domain III Values inter-item correlation.

The inter-item correlation analysis between Q22 and Q23, calculated using Spearman's correlation showed that a coefficient

of 0.342 (34.2%) which was statistically significant at the 0.01 level ($p<0.01$). This indicated a moderate positive association between the two items, suggested that participants who scored high on Q22 were also likely to score high on Q23. The significant relationship implied that both items measured closely related aspects of the underlying construct, thereby contributing to the internal consistency of the domain.

Item	Q24	Q30
Q24	--	
Q30	0.234	---

Table 16: Inter -Item Correlation and Co-efficient of Reliability of Domain IV and VII (Fulfilment of Professional Responsibilities and Safe and Effective Professional Responsibilities) using Sperman's Correlation n=60

* Correlation is significant at the level 0.05 level (2-tailed)for Domain IV and VII Fulfilment of professional responsibilities and Safe and effective professional responsibilities inter item correlation.

The Spearman's correlation coefficient between Q24 and Q30 was 0.234, which corresponds approximately 23.4% positive association between the two items. This indicated that higher scores on Q24 were associated with slightly higher scores on Q30. However, since the percentage was relatively low, the relationship was weak, suggested that the two items were only related and represented different domains of the construct.

Item	Q25	Q26
Q25	--	
Q26	0.069	--

Table 17: Inter-Item Correlation and Coefficient of Reliability Domain V (Motivation and Utilization using Sperman's Correlation) n=60

*Correlation was significant at the level 0.05 level (2 tailed) for Domain V Motivation and utilization item-item correlation. The inter–item correlation analysis for Q25 and Q26 demonstrated a Spearman's correlation coefficient of 0.069, corresponding to approximately 6.9% positive association between the two items. This indicated a weak positive relationship, suggesting that participants who scored higher on Q24 showed only a minimal tendency to score higher on Q30. The low percentage reflected that these two items were largely independent and measured distinct aspects of the construct.

Item	Q27	Q28	Q29
Q27	---		
Q28	0.166	--	
Q29	0.127	0.244	--

Table 18: Inter -Item Correlation and Co-Efficient of Reliability Domain VI (Supportive and Therapeutic Relationship using Sperman's Correlation) n=60

*Correlation was significant at the 0.05 level (2-tailed) for Domain VI Supportive and therapeutic relationship inter -item correlation. The inter–item correlation for Q27,Q28, and Q29 indicated a positive relationship among all three items. The correlation between Q27 and Q28 was found to be 16.6%, showing a weak positive association. Q27 and Q29 had a correlation of 12.7%, which also represents a weak but positive relationship. The strongest correlation was noted between Q28 and Q29 at 24.4%, suggested a positive association. These findings implied that while all three items were positively related and measured the same construct, had a unique information, thereby enhancing the comprehensiveness of the tool.

Item	Q31	Q32
Q31	---	
Q32	0.286*	----

Table 19: Inter -Item Correlation and Co-Efficient of Reliability Domain VIII (Evidenced-based Nursing care using Sperman's Correlation)

* Correlation was significant at the 0.05 level (2-tailed) for Domian VIII Evidenced-based nursing care inter -item correlation. The inter –item correlation analysis between Q31 and Q32 showed a Spearman's correlation coefficient of 0.286, which corresponded to approximately 28.6% positive association. This indicated a low to moderate positive relationship, suggesting that participants who scored higher on Q31 tends to score somewhat higher on Q32 as well. The result indicated statistical significance, shows that the relationship is not likely due to chance. Overall, the correlation suggested that while the items were related, they still measured distinct aspects of the construct, contributing unique information to the tool.

Section III:
Association of Demographic data with Nursing Professional Excellency tool

Age (years)	n	Mean (SD)	p Value
18-30	12	64.75	
31-40	32	69.84	0.025
41-50	13	70.08	
51-60	3	82	

Table 20: Association of NPET with Age n=60

Nursing Professional excellence tool with age, was statistically significant (p =0.025). (p value calculated by using One-Way ANOVA)

Gender	n	Mean (SD)	p value
Male	6	76.8	0.036
Female	54	68.7	

Table 21: Association of NPET with Gender n= 60

The Nursing Professional Excellency tool was statistically significant with gender (p = 0.036). (p value calculated by using One-Way ANOVA)

Education	N	Mean (SD)	P value
GNM	5	73.6	
0.395			
B.Sc. Nursing	30	68.23	
Post Basic B.Sc. Nursing	5	65.4	
Diploma in oncology Nursing	14	70.57	
M.Sc. Nursing	6	73.67	

Table 22: Association of NPET with Education n= 60

Nursing Professional excellence tool scores was not statistically significant with education (p = 0.395). (p value calculated by using One-Way ANOVA)

Area of Chemotherapy	n	Mean (SD)	p value
CT ward	3	69	
0.837			
CR ward	8	68.38	
Day Care -GDC and PDC	39	70.26	
Injection Room	10	67.5	

Table 23: Association of NPET with Area of Chemotherapy n=60

Nursing Professional excellency tool scores was not statistically significant with education (p = 0.837). (p value calculated by using One-Way ANOVA)

Experience	n	Mean (SD)	p value
1-5 years	32	68.47	0.482
6-10 years	19	71.95	
11-15 years	6	69.33	
>15 years	3	65	

Table 24: Association of NPET with Experience n= 60

Nursing Professional excellency tool score was not statistically significant with experience (p = 0.482). (p value calculated by using One-Way ANOVA)

Post	n	Mean (SD)	p value
Nurse A	32	66.9	0.013
Nurse B	17	71.7	
Nurse C	7	69.3	
Nurse D	4	81.3	
Nurse E	0	0	

Table 25: Association of NPET with Post /Position n = 60

Nursing Professional excellence tool scores was statistically significant with post (p = 0.013)

Score range	Frequency (n)	Percentage %
0-20	0	0%
21-40	0	0%
41-60	9	15%
61-80	42	70%
81-100	9	15%

Table 26: Conversion of NPET Total Scores for Tool Evaluation

• No participants scored below 40, which means everyone met or exceeded the expected level of performance.
• 15% of participants (n=9) scored in 41–60 range, indicated they often exceed expectations but still have some aspect for improvement.
• The majority (70%, n=42) scored in 61–80 range, indicated most participants almost always demonstrate Nursing professional excellence.
• Top higher scored participants (15%, n=9) scored between 81–100, setting a new benchmark for excellence.

4.2. Evaluation of Tool

The Nursing Professional Excellency Tool demonstrated good discriminatory capacity when applied to the study participants. The distribution of scores showed that 70% of participants (n = 42) scored in the 61–80 range, indicated that the tool effectively captured a high and realistic level of Professional excellence. The presence of 15% of participants (n = 9) in the top performance category (81–100) reflected that the tool is sensitive enough to identify individuals who consistently demonstrated exceptional professional behaviors. The fact that no participant scored below 40 indicated that the tool appropriately reflects professional competence . The spread of participants across category also confirmed that the tool is capable of differentiating varying levels of professional excellence rather than clustering all participants into a single category. The results indicated that the tool is a reliable measure for assessing Nursing Professional excellence. It's ability to identify average, high, and exceptional performers make it suitable for use in competency evaluation, professional development planning, and recognition of practice within nursing education and clinical settings in chemotherapy areas.

5. Disscussion

Nursing Professional Excellency refers to the domains and the characteristics such as Cognitive ,Psychomotor ,Values, fulfillment of professional responsibilities ,Motivation and Utilization ,Supportive and therapeutic relationships and evidenced-based nursing care with characteristics as personal and professional independence/ ,self-motivation /initiative ,decision making and advocacy ,professional practice and leadership ,communication ,confidence ,teaching and coaching ,optimism and evidence based management to prevent or manage cancer related symptoms. The study conducted by Sigrid Wangensteen tested the validity of the Nurse Competence Scale with 593 new nurses. The original tool had 7-domain 73-item model which was not supported. Analysis done led to a shorter 46-item Norwegian version with five domains. The Nurse Competence Scale demonstrated strong reliability across its domains: Planning and Delivery of Care $\alpha = 0.89$, Teaching Functions $\alpha = 0.89$, Professional Leadership $\alpha = 0.92$, Research Utilization and Nursing Values $\alpha = 0.87$ and Professional Awareness- $\alpha = 0.73$ indicated consistent measurement of core nursing competencies. In this study ,the Nursing Professional Excellency Tool demonstrated good internal consistency, with a Cronbach's alpha value of 0.815, Domain I - Cognitive domain $\alpha = 0.5491$ domain , II- Psychomotor was the most reliable $\alpha = 0.7193$, followed by domain III -Values $\alpha = 0.517$ and 15% of participants (n=9) scored in 41–60 range, indicated they often exceed expectations but still have some aspect for improvement. The majority (70%, n=42) scored in 61–80 range, indicated most participants almost always demonstrate Nursing professional excellence [17]. Developed and validated the Arabic version of the Nurse Professional Competence Short Version (NPC-SV-A) among 518 undergraduate nursing students in Saudi Arabia. The 33-item scale included six domains with high reliability: Nursing Care Administration & Documentation- $\alpha = 0.89$, Techno-Medical Care $\alpha = 0.84$, Nursing Care Innovation, Administration & Management - $\alpha = 0.86$, Value-Centered Nursing Care - $\alpha = 0.88$, Pedagogy in Nursing Care - $\alpha = 0.87$, and Delivered Nursing Care - $\alpha = 0.83$, with an overall Cronbach's alpha of 0.89.

Exploratory factor analysis explained 67.52% of total variance, confirming that the scale reliably measured clinical, administrative, pedagogical, and value-based competencies. While ,the Nursing Professional Excellency Tool developed in this study demonstrated an overall alpha of 0.8157 ($p < 0.001$), with domain-specific alphas ranged from 0.1589 to 0.7193. Domain II – Psychomotor $\alpha = 0.7193$ and Domain I – Cognitive $\alpha = 0.5491$ showed the strongest reliability, corresponding to the clinical and technical domains of the NPC-SV-A. Lower consistency was noted in Domain V – Motivation/Utilization $\alpha = 0.1589$ and Domain IV – Professional Responsibilities/Safe Practice $\alpha = 0.3291$, reflecting similar challenges to those observed in innovation, value-centered, and interprofessional domains of the Arabic scale. These findings suggested that the Nursing Professional Excellency Tool effectively assesses multiple domains of nursing competence, identified areas needed to be focused for development, and can be applied to evaluate and enhance professional skills in specialized clinical settings such as chemotherapy units. Flinkman in the Nurse Competence Scale (NCS) stated high reliability across its seven domains and reported Cronbach's alpha values were 0.79 for Helping Role domain , 0.89 for Teaching–Coaching domain , 0.77 for Diagnostic Functions domain , 0.74 for Managing Situations domain , 0.86 for Therapeutic Interventions domain , 0.82 for Ensuring Quality domain , and 0.92 for Work Role domain . These consistent high values, most above 0.80, indicated strong internal consistency and confirmed that the NCS reliably measured competence in each area. The authors also noted that content validity was supported through expert evaluation with Content Validity Index (CVI) of 0.83 with pilot studies, and use in multiple countries, reinforcing its value as a comprehensive instrument for assessing nursing competence. Whereas the Nursing Professional Excellency Tool, demonstrated good internal consistency with a Cronbach's alpha value of 0.815 and content validity i.e. item I-CVI value greater than 0.78 and was considered acceptable and CVI measured for nursing professional excellency tool was 0.98% and highest alpha value for Psychomotor domain item wise was greater than 0.80 with an assurance that it will be utilized .

Liou and Cheng developed the Clinical Competence Questionnaire (CCQ) for baccalaureate nursing students, which included two domains: Nursing Professional Behaviors and Skill Competencies. It consisted of 47-item scale which showed over all excellent reliability $\alpha = 0.98$ with domains Nursing Professional Behaviors -α of 0.95 and Skill Competency - α 0.97. After removing one item, the 46-item version still retained the same high reliability, confirmed the CCQ as a consistent and reliable tool for assessing nursing competence. Similarly in this study of Nursing Professional Excellency Tool consisted of 32 items with 8 domains resulted in a good internal consistency with overall Cronbach's alpha value of 0.815 with domain IV and VII - Fulfillment of professional responsibilities and safe and effective professional responsibilities had a $\alpha = 0.32$, domain V Motivation and Utilization lowest internal consistency $\alpha = 0.158$ while Domain VI - Supportive and therapeutic relationship had $\alpha = 0.1589$ and domain VII -Evidenced based nursing care had $\alpha = 0.49$. The F-test yielded a p-value of < 0.001, indicating significant tool dependability or reliability. These findings indicated that the newly developed instrument had a consistent and reliable measure of professional excellence for nursing officers working in chemotherapy units [18].

Srivastava conducted a study and developed the Comprehensive Nursing Competence Assessment Questionnaire (CNCAQ) to assess the perceived clinical competence of final-year nursing graduates. The tool comprised of 36 items across four domains- Routine nursing care, Basic nursing procedures, Advanced nursing procedures and Infusion/transfusion-related procedures. The overall reliability of the CNCAQ was excellent, with a Cronbach's alpha of 0.963, indicating a high internal consistency. Domain-specific alphas were also high - Technical competence $\alpha = 0.91$,Advanced competence $\alpha = 0.91$, Ethical competence $\alpha = 0.90$,

Care management competence α = 0.82 and safety competence (α = 0.89). Test-retest reliability was strong, with intraclass correlation coefficients ranging from 0.82 to 0.99, all statistically significant at $p < 0.001$. These findings confirmed that the CNCAQ as a reliable and valid instrument for evaluating nursing graduate's clinical competence. In this study of development of Nursing Professional Excellency tool scored overall domain alpha was 0.815 and inter item correlation with the domains calculated by spearman's correlation at 0.05 level(2 tailed) and at 0.01 level (2tailed). Domain II Psychomotor (Q7–Q21) showed mostly positive associations, ranging from 4.4% to 56.0%. The strongest correlation was between Q13 and Q14 (56.0%, $p<0.01$), with moderate positive correlations observed for Q17–Q15 (39.0%, $p<0.01$) and Q19–Q8 (35.6%, $p<0.01$).The results suggest that the domain reliable and assesses psychomotor competence, balances relatedness among items with coverage of multiple domains to support the instrument's internal homogeneity and theoretical aspect.

Developed a 15-item competency-based assessment tool for nurses on chemotherapy. The instrument demonstrated strong overall reliability α ≥ 0.8 and high content validity (S-CVI = 96%), effectively evaluated nurse's cognitive, psychomotor, and emotional competencies. Domain-specific reliability values were: Cognitive α = 1.0 ,Psychomotor α = 1.0, Inclusion of Patient Relatives α = 0.741, Supportive and Therapeutic Relationships α = 0.952, Independence and Self-Motivation α = 1.0, Evidence-Based Management of Cancer-Related Symptoms α = 1.0, Collaboration with Interprofessional Team α = 1.0, Teaching and Coaching α = 1.0, Handling of Equipment α = 1.0, Health Education to Patients and Families α = 0.1 Decision-Making and Advocacy α = 0.1, Optimism α = 0.983, Communication α = 1.0 ,Confidence α = 1.0 , and Professional Practice and Leadership α = 0.556 . Further changes in the domain characteristics carried out and yielded a wider picture of professional excellency tool. The inclusion of the study had the specific personal and professional characteristics in domains and removing the emotional competencies from the tool to justify the tool reliability. Whereas in Nursing professional excellency tool's domain 1V fulfillment of professional responsibilities and VII Safe and effective professional responsibilities showed the Spearman's correlation coefficient between this domain was 0.234, which corresponded approximately to 23.4% positive association between the two items. This indicated that higher scores on this domain were associated. Fisher and Ross (2006)(6) said that traditional nursing evaluations often overlooked qualities like empathy, communication, and teamwork. Whereas Nursing Professional Excellency focused on soft skill development such as communication and convincement while dealing with patient care which helps for accreditation process of the institution. Yueh-Ping Liu and Dana Jensen focused on the development of a nursing-specific Mini-Clinical Evaluation Exercise (Mini-CEX) aimed to assess the competencies of new nurses in postgraduate year training programs in Taiwan. The key domains of the Mini-CEX in the study included communication, professionalism, clinical decision-making, and physical examination skills [19]. It does not fully address non-clinical competencies such as leadership, stress management, or interdisciplinary collaboration, which were essential in comprehensive nursing practice whereas the Nursing Professional excellency tool focused on the characteristics of communication ,decision making, advocacy, leadership and professional responsibilities.

Assessed competences in 841 Austrian RNs using the NPC-SF-AUT. Highest-rated domains were Inclusive decision-making Factor 4; mean = 90.33, SD = 9.78 and Process-guided nursing care Factor 3; mean = 89.04, SD = 10.43, while Health promotion and safeguarding Factor 1; mean = 84.65, SD = 10.84 and multi-professional development Factor 2; mean = 81.15, SD = 12.78 scored lowest. Items with lower scores included implementing evidence-based knowledge, group patient education, disaster response, and use of ICT, whereas basic nursing care, ethical patient care, and handling sensitive data were rated highest. Competence was significantly influenced by work experience, further education, and training. Whereas, the Nursing Professional Excellency Tool demonstrated an overall mean score of 69.48 (SD = 9.11). Domain-wise scores were highest in Domain II – Psychomotor (mean = 32.82, SD = 4.74) and Domain I – Cognitive (mean = 14.88, SD = 2.36), while lower scores were observed in Domain V – Motivation/Utilization (mean = 2.82, SD = 1.03) and Domain VI – Supportive/Therapeutic Relationships (mean = 3.35, SD = 1.27). High-scoring domains aligned with Austrian RNs' strengths in process-guided care, decision-making, and ethical practice, whereas lower-scoring domains in both studies reflect challenges in interprofessional collaboration, health promotion, and motivation, highlighting areas for targeted development. These comparisons support the validity and relevance of the Nursing Professional Excellency Tool in assessing comprehensive nursing competence and identifying gaps for professional development .

6. Conclusion

This study focused on developing and validating a Nursing Professional excellence tool for nursing officers working in oncology settings and measuring their competencies across eight domains-Cognitive ,Psychomotor ,Values, fulfillment of professional responsibilities ,Motivation and Utilization ,Supportive and therapeutic relationships and evidenced-based nursing care. The overall internal consistency of the tool was good and reliable with alpha 0.815. The results showed high competence and excellency in psychomotor, cognitive and values domain and needs some improvement in other domains as well. The tool aligned well with the quality and safety standards recommended by NABH. The results justified the use of the developed tool as reliable and valid instrument for measuring professional competencies. High Cronbach's alpha values in the cognitive, psychomotor, and values domains confirm strong internal consistency, while good inter-item and domain-wise correlations ensure that each item contributes meaningfully to the overall construct. The tool's comprehensive coverage of multiple domains indicated that it captures the

concept in a holistic manner, making it suitable for assessing the performance in different clinical settings. These psychometric results confirmed that the tool could be used not only for research and educational purposes but also as a step towards establishing standardized benchmarks for nursing practice and professional growth in Nursing profession [20].

References

1. Axley, L. (2008, October). Competency: A concept analysis. In *Nursing forum* (Vol. 43, No. 4, pp. 214-222). Malden, USA: Blackwell Publishing Inc.
2. ÇALIŞKAN, F., & Şenyuva, E. (2022). A valid and reliable tool to assess nursing professional competences: The Nursing Professional Competence Scale. *Bakırköy Tıp Dergisi, 18*(2), 177-188.
3. Cao, H., Song, Y., Wu, Y., Du, Y., He, X., Chen, Y., ... & Yang, H. (2023). What is nursing professionalism? A concept analysis. *BMC nursing, 22*(1), 34.
4. Fukada, M. (2018). Nursing competency: Definition, structure and development. *Yonago acta medica, 61*(1), 001-007.
5. Benner, P. (1984). From novice to expert excellence and power in clinical nursing practice. *AJN The American Journal of Nursing, 84*(12), 1479.
6. Fisher, M. J., Graff, J. C., Hill, C., LaMothe, J., Nelson, S. R., Kent, K. A., & Betz, C. L. (2025). Innovating nursing education through partnership with individuals with intellectual and developmental disabilities. *Journal of Nursing Education, 64*(2), 75-80.
7. Committee on the Robert Wood Johnson Foundation Initiative on the Future of Nursing, at the Institute of Medicine. (2011). *The future of nursing: Leading change, advancing health*. National Academies Press.
8. Companionship, A. B. B. (2024). Winner of Special Appreciation–Dr. Pranab Kumar Basu. *Indian Journal of Palliative Care, 30*(2), 95.
9. Green, S. M. C. (2023). *Developing a complex intervention to support medication adherence in cancer* (Doctoral dissertation, University of Leeds).
10. Flinkman, M., Leino-Kilpi, H., Numminen, O., Jeon, Y., Kuokkanen, L., & Meretoja, R. (2017). Nurse Competence Scale: a systematic and psychometric review. *Journal of advanced nursing, 73*(5), 1035-1050.
11. Liou, S. R., & Cheng, C. Y. (2014). Developing and validating the Clinical Competence Questionnaire: A self-assessment instrument for upcoming baccalaureate nursing graduates. *Journal of Nursing Education and Practice, 4*(2), 56.
12. Finnbakk, E., Wangensteen, S., Skovdahl, K., & Fagerström, L. (2015). The Professional Nurse Self-Assessment Scale: Psychometric testing in Norwegian long term and home care contexts. *BMC nursing, 14*(1), 59.
13. Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quiñonez, H. R., & Young, S. L. (2018). Best practices for developing and validating scales for health, social, and behavioral research: a primer. *Frontiers in public health, 6*, 149.
14. Souza, A. C. D., Alexandre, N. M. C., & Guirardello, E. D. B. (2017). Psychometric properties in instruments evaluation of reliability and validity. *Epidemiologia e servicos de saude, 26*, 649-659.
15. Miller, G. E. (1990). The assessment of clinical skills/competence/performance. *Academic medicine, 65*(9), S63-7.
16. Hall, J. A., Chen, W., Bhayana, K., Lee, P., Moroni, E. A., Butler, P. D., & Delacruz, C. (2021). Quantifying the pipeline of ethnically underrepresented in medicine physicians in academic plastic surgery leadership. *Annals of plastic surgery, 87*(4), e51-e61.
17. Abuadas, M. H. (2023, February). The Arabic nurse professional competence-short version scale (NPC-SV-A): Transcultural translation and adaptation with a cohort of Saudi nursing students. In *Healthcare* (Vol. 11, No. 5, p. 691). MDPI.
18. Srivastava, S., Pandurangan, H., & Kumar, A. (2024). Development and validation of a comprehensive nursing competence assessment questionnaire (CNCAQ) to determine the perceived clinical competence of nursing graduates. *Nursing & Midwifery Research Journal, 20*(2), 96-111.
19. Liu, Y. P., Jensen, D., Chan, C. Y., Wei, C. J., Chang, Y., Wu, C. H., & Chiu, C. H. (2019). Development of a nursing-specific Mini-CEX and evaluation of the core competencies of new nurses in postgraduate year training programs in Taiwan. *BMC medical education, 19*(1), 270.
20. Kellerer, J. D., Rohringer, M., & Deufert, D. (2023). Evaluation of Austrian nurses' competence and factors related to it: an exploratory cross-sectional study. *J Nurs Educ Pract, 13*(3), 28-38.