

## A methodological study to develop “Clinical Competence Self-Assessment Tool (CCSAT)” to assess perceived clinical competence of upcoming nursing graduates

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### Abstract

**Introduction:** Globally shortage of nurses has always remained an issue<sup>1</sup>. To manage this new inexperienced nursing graduates are increasingly being employed in hospitals. More than 10% of hospital staff nurses are new nursing graduates<sup>2</sup>. Although nurse competence has been evaluated in past studies, the competence levels of nursing students immediately prior to graduation is not explored by many researchers. Thus a methodological study was undertaken to develop a “clinical competence self assessment tool (CCSAT)” to assess perceived clinical competence of upcoming nursing graduates.

**Methods:** Preliminary draft of CCSAT was developed using extensive literature review and structured questionnaire from purposively selected 40 nurse educators and executives. A total of 160 items were generated. A focus group discussion among randomly selected 10 nurses from the above group reduced the number of items from 160 to 153. To further refine and validate the items using modified Delphi technique, a panel of 12 national nursing experts was selected. The initial item pool of 153 items reduced to 94 in three Delphi rounds.

**Results:** A CCSAT with three subscales resulted, 19 items in professional behavior, 21 items in knowledge and 54 items in skills subscale. The Content Validity Index for the final CCSAT was 0.94.

**Conclusion:** Consensus on all the 94 items of CCSAT was obtained among 12 national nursing experts in three Delphi rounds.

**Keywords:** Clinical Competence, Upcoming Nursing graduates, CCSAT, Self Assessment Tool.

### Introduction

Globally shortage of nurses has always remained an issue. As per WHO there is a shortage of almost 4.3 million nurses.<sup>(1)</sup> India is short of 2.4 million nurses. In 2009, India had 1.65 million nurses; the number now dwindled to 1.56 million.<sup>(2)</sup> To manage this shortage, inexperienced nursing graduates are increasingly being employed. More than 10% of hospital staff nurses are nursing graduates.<sup>(3)</sup>

The increasing number of new graduate nurses in hospital directly affects patient care requiring these new hires to be competent in areas of nursing care. However they have limited experience of the complex hospital environment.<sup>(4)</sup>

In a review of 10 years of data, 65% to 76% new nurses did not meet expectations for entry level clinical judgment and majority had difficulty in translating knowledge and theory into practice. For degree of agreement on "overall, new graduate nurses are fully prepared to provide safe and effective care in the hospital setting," 89.9% of nurses educators agreed versus only 10.4% of the hospital nurse executives.<sup>(5)</sup>

Competence in nursing mainly refers to knowledge and/or skills. In addition, competence refers to professional standards.<sup>(6-8)</sup>

To develop CCSAT, a holistic approach of competence - expected level of professional behavior which is a reflection of attitude and morals, nursing skills and knowledge of the graduates is used.<sup>(7-10)</sup>

The assessment of nursing students' clinical competence has confronted educationalists with

problems of validity and reliability over an extended period of time. The studies identifying essential nurse competencies were also mostly descriptive, had small convenience samples, focused on technical skills, and were not developed based on theoretical models.<sup>(10-13)</sup>

Nursing graduates are expected to be competent in a range of skills as physical assessments, wound care, management of tubes and drains, positioning, medication administration, management of intravenous therapy, chest physiotherapy, suctioning and airway management, patient instruction, infection control, and safety.<sup>(12,13)</sup>

Various methods and instruments for competence assessment have been developed. The most common methods are structured and non-structured instruments based on self-assessment. In QNC review self-assessment are the most common form and the most favored approach reported during nursing surveys.<sup>(14)</sup>

In a study done by Shwu-Ru Liou and Ching-Yu Cheng (2014) the “Clinical Competence Questionnaire” was developed for the upcoming nursing graduates. The Cronbach's alpha for the entire CCQ was 0.98. This tool assessed perceived levels of clinical competence of the upcoming nursing graduates in categories professional behavior, basic clinical skills and advanced clinical skills.<sup>(15)</sup>

In India there are many nursing programs.<sup>(16)</sup> This tool is applicable for bachelors in nursing students who are about to complete their graduation within 3 months.

The literature review suggests that there is a scarcity of data related to competence of nursing

graduates. From the perspectives of both safety of the patient and cost incurred on hospitals on new nurses training it becomes imperative to estimate clinical competence.

### Objectives

1. To generate item pool for developing Clinical Competence Self Assessment Tool (CCSAT).
2. To attain consensus among nursing experts for the items of the CCSAT.

### Methods

**Research Design:** Methodological research design using Modified Delphi (Reactive) technique to refine CCSAT by a national panel of experts (12) from the field of nursing education, practice and psychology.

**Study period:** 2 years (January 2015 - December 2016) – for developing "Clinical Competence Self-Assessment Tool".

**Study population-**using purposive sampling nurse educators and nurse clinicians were selected based on their expertise to generate item pool of CCSAT.

Study was carried out in 4 phases-

1. Item generation
2. Selection of panel of national experts
3. Delphi rounds
4. Final draft of CCSAT

#### Phase 1- Item Generation.

1. Initial item pool was generated through extensive literature review for concept of clinical competence, list of competencies for new nursing graduates, assessment methods and various clinical competence assessment tools used for upcoming nursing graduates.
2. Definition of nurse competence was determined to cover content domains of professional behaviors, knowledge and clinical skills.
3. A list of nurse competencies under each content domain was created.
4. Literature review generated 100 items.
5. A semi structured questionnaire was then administered to a heterogeneous group of 40 nurse educators and nurse clinicians (experience of  $\geq 3$  years) who dealt with nursing graduates at least for one year. It further added 60 items.
6. Numerous components such as item length, reading level, redundancy, positive or negative wording, and grammar were considered when writing items for inclusion in the first draft of the CCSAT ( 160 items).
7. The focus group reviewed 160 items and selected 153 items for further validation which framed "Preliminary Draft of CCSAT".

#### Phase 2-Selection of panel of national experts

1. To establish content validity and refine the tool a Panel of national nursing experts was formed, consisting of 11 nursing experts with 15-20 years of clinical and teaching experience and one clinical

psychologist. Eight were doctoral prepared nursing experts from the field of medical surgical nursing and remaining 3 were nurse educators and nurse clinicians with more than 15 years of experience.

2. The panel members were communicated through telephone and email and once they agreed a hard copy of preliminary draft was sent by post along with a soft copy attached in mail.
3. The panel members were informed of one month time to return the tool.

#### Phase 3- Delphi rounds

##### Delphi – 1

1. All the 12 experts agreed to refine the tool.
2. Modifications suggested in Delphi round 1 – Disagreement for 27% of items was found in Delphi -1. The suggestions were - modification in language, sequencing, use of action verbs, delete items not practiced in India, Classification of items, appropriate sentence formation, delete ambiguous and repeated items. Check Speech and statement type, equal weight age to each domain, clarity of sentence.
3. The responses of all the 12 experts were summarized and the suggestions were incorporated and a new draft was formulated (draft 1 of CCSAT).
4. After incorporating modifications as per experts 111 items were retained.
5. A Delphi round 2 was conducted.
6. All the 12 experts agreed for reassessing the tool with 111 items.
7. Modifications suggested in Delphi round 2 – delete repeated items. Clarity and sequencing categorization of the items following some sequential order, priority based arrangement under each domain.
8. All the suggestions were incorporated and resulted in Draft 2 with 94 items.
9. All 12 experts were approached again.
10. The two experts 5, 6 were unavailable refining the hard copy. But they agreed to review the soft copy. The remaining 10 were again sent a soft as well as a hard copy.
11. Delphi round 3 was conducted.

**Phase 4-** 100% consensus among all experts for all 94 items of CCSAT in Delphi round 3 attained.

**Procedure:** Using reactive Delphi technique the content experts were asked to indicate the extent to which they perceive each individual item to be representative of the domain by circling the most appropriate number in the 4-point rating scale (1= not relevant, 2= slightly relevant, 3=moderately relevant, and 4= strongly relevant).

**The comprehensiveness** of the entire instrument was done by identifying items which experts perceived to be incongruent with its nominated domain and, subsequently, assigning them to an alternative domain with which the items are better matched. Finally, the

panel members were asked to identify the clarity of items construction and wording to ensure that there were no ambiguous and poorly written items. Experts were also asked to evaluate the rating scale for each domain.

After each Delphi round the responses, modifications by the experts were summarized and a new draft of the tool was prepared. Delphi rounds were considered until 100% consensus among all experts achieved, consensus being defined as a "general agreement of a substantial majority"

**Analysis:** The analysis of the Delphi rounds was both quantitative and qualitative. Quantitatively descriptive analysis for demographic details of nurse educators and nurse executives (N=40) was done. The relevance and importance of the 94 items on the developed tool (Draft 2) was analyzed using 4- point Content Validity Index rating scale (1= not relevant, 2= slightly relevant, 3=moderately relevant, and 4= strongly relevant). Qualitatively the researcher summarized the suggestions and comments of the experts.

## Results

**Participants:** For developing the initial preliminary draft of CCSAT, items were generated from literature review and inputs from 40 nurse educators and nurse executives purposively selected. Majority of them 35(87.5%) were females. Almost half 16(40%) of the subjects were assistant professors. 6(15.0%) were associate professors and 4(10%) were professors and 1(2.5%) each was skill lab trainer, nursing superintendent and senior nursing officer. For the job setting majority 35(87.5%) were from nursing educational centre and 4(10%) from skill lab and hospital settings. Almost one fourth 9(22.5%) had 3 years of experience, 6(15.0%) had 8 years of experience and 8 (20%) had more than 10 years of experience. 5(12.5%) had 4 years of experience. 9(22.5%) of the study subjects were B.Sc. Nursing however 7(17.5%) were from medical surgical nursing specialization and

6(15%) each from field of community health nursing, obstetrics and gynecology, pediatrics and mental health nursing. More than half 24(60%) of the subjects had handled the nursing graduates for up to 5 years. However remaining 16(40%) handled nursing graduates from 5-15 years of duration. Majority 37(92.5%) of the subjects expressed that clinical competence to be assessed at point of graduation. However majority 32(80%) opined that graduates do not possess adequate clinical competence and 8(20%) said that graduates do possess clinical competence at the point of graduation.

From literature review and subjects input 160 items resulted. A focus group discussion was then conducted to review and refine the generated 160 items by 10 subjects selected randomly from the 40 subjects. The participants were told that whatever discussion is happening will remain confidential and no names will appear in the research report; their identity will be kept anonymous. Tape recording of the discussion was not done as none of the participants agreed for that. Discussion findings were summarized and items reduced from 160 to 153, resulted in **preliminary draft of CCSAT:** For refining it a panel of 12 national experts was selected. There was an intense disagreement on 27% of the items (n=42) in Delphi round 1. Eight experts scored not relevant for those items. All those 42 items were deleted. In Delphi round 2 there was a disagreement on 15% of the items (n=17). Four experts scored not relevant or slightly relevant for those items. In Delphi round 3 all the 94 items received 100% consensus among all experts (Table 1). The relevance and importance of the 94 items using a 4- point Content Validity Index rating scale was judged based on all the items receiving a rating of 3 or 4. Item Content Validity Index rating for 88 items was calculated as 1.0 and for remaining 6 items as 0.91 however the proportion relevant per expert was 1.00 for 8 experts and for remaining 4 it and was 0.98. The calculated Scale Content Validity Index is 0.94.

**Table 1: 94 Items representing "Clinical Competence Self-Assessment Tool"**

### Subscale 1- professional behavior

Categories of content		Items
Professional conduct, ethics and personal development	1.	Maintains appearance, attire and conduct.
	2.	Follows ethical and legal standards.
	3.	Observes cultural differences in care.
	4.	Considers patient rights.
	5.	Accepts patient's and family's view.
	6.	Follows patients and family's rights.
	7.	Recognizes and maximizes opportunity for self-learning.
	8.	Continues lifelong learning and professional development.
	9.	Apply measures and resources to solve problems.
	10.	Focus on quality assurance.
Awareness of maintaining therapeutic environment for the client care.	11.	Follow safe and nonthreatening environment.
	12.	Recognizes and reports a medication error.
	13.	Ensure functionality of routine and life saving equipments.

Emphasize on Communication with client and health team members.	14.	Communicate appropriately with patients and families.
	15.	Communicate appropriately with health care team members.
	16.	Believe in health team interaction.
	17.	Applies appropriate information technology and computer skills.
Implement critical thinking in patient care.	18.	Apply critical thinking to solve problems.
	19.	Accept constructive criticism.

### Subscale 2: Knowledge

Knowledge of basic health sciences	20.	Basic health sciences.
Knowledge of nursing science	21.	Terminologies used in fundamental of nursing.
	22.	Terminologies of medical surgical nursing.
	23.	Nursing process and its steps.
	24.	Principles of asepsis.
Theory pertaining to common nursing procedures	25.	Principles of medication administration.
	26.	Recognize adverse and expected drug reactions.
	27.	Safety precautions when using and maintaining oxygen therapy.
	28.	Purposes of endotracheal and tracheotomy tubes
	29.	Purposes of mechanical ventilation
	30.	Assess the need for chest physiotherapy.
	31.	Know indications, location and purposes of chest tube insertion.
	32.	Principles of infusion therapy.
	33.	Calculate infusion rates.
	34.	Indications and care of central lines.
	35.	Blood typing and cross matching of the blood.
	36.	Immunity.
	37.	Common communicable diseases.
	38.	National immunization schedule.
	39.	Maintaining cold chain.
	40.	Adverse effects and contraindications of common vaccines.

### Subscale 3: Skill competencies

Health assessment	41.	Taking patients health history.
	42.	Performing physical examination.
	43.	Interpreting common lab reports.
Nursing care skills	44.	Doing hand washing.
	45.	Carrying out activities of daily living.
	46.	Providing comfort devices.
	47.	Performing preoperative and postoperative care.
	48.	Assisting in mobility.
	49.	Applying 10 rights for medication administration.
	50.	Calculating medication accurately.
	51.	Changing IV fluids.
	52.	Administering Intra Venous injection.
	53.	Administering Intra Muscular injection.
	54.	Administering Sub Cutaneous injection.
	55.	Giving test dose of a drug.
	56.	Collecting blood sample.
	57.	Initiation and monitoring of TPN.
	58.	Putting patient on oxygen therapy.
	59.	Applying a pulse oximeter.
	60.	Providing tracheostomy care.

	61.	Performing suctioning.
	62.	Doing chest tube care.
	63.	Inserting a nasogastric tube and doing feeding.
	64.	Applying local heat applications.
	65.	Applying local cold applications.
	66.	Administering moist inhalations.
	67.	Perform nebulisation.
	68.	Instilling ear and eye drops.
	69.	Doing bandaging.
	70.	Providing care to a patient with splint.
	71.	Assisting in giving bed pan, urinal.
	72.	Inserting a urinary catheter and performing catheter care.
	73.	Giving perineal care.
	74.	Performing bowel wash.
	75.	Performing colostomy care.
	76.	Introducing a suppository.
	77.	Assisting in setting up of OT.
	78.	Assisting in minor operations.
	79.	Preparing different lotions.
	80.	Packing of OT drums.
	81.	Making diet requisition.
	82.	Collecting specimens.
	83.	Assisting in advance diagnostic procedures.
	84.	Doing wound dressing.
	85.	Carrying out segregation of biomedical waste.
	86.	Disinfecting articles.
Observation and communication skills	87.	Observing vital signs.
	88.	Assessing fluid and electrolytes.
	89.	Assessing nutritional needs of the patients.
	90.	Assessing elimination needs of the patient.
	91.	Developing nursing care plan as per priority.
	92.	Answering questions for patients or families.
	93.	Counseling patients.
	94.	Writing reports

## Discussion

After three Delphi rounds the 12 national nursing experts achieved consensus on 94 items to be included in CCSAT with three subscales – professional behavior, knowledge and skills.

The holistic concept for clinical competence where it is expressed in terms of professional behavior which is a reflection of attitude and morals, nursing skills and knowledge was used and was defined beforehand for reference of experts.<sup>(7-10)</sup>

Delphi technique is defined as a method to obtain the most reliable consensus of opinion of a group of experts, by a series of intensive questionnaires interspersed with controlled feedback.<sup>(17)</sup> In this study a national panel of selected 12 nursing experts refined a preliminary draft of the CCSAT.

The literature describes numerous modifications of the basic Delphi technique. The 'reactive Delphi technique' involves asking respondents to react to previously prepared information rather than to generate

lists of items.<sup>(18)</sup> In this study also the selected 12 national panel experts were asked to react to a preliminary draft of CCSAT generated with the help of extensive literature review, researchers' knowledge and a structured questionnaire and a focus group discussion.

In Delphi approach after response of participants the data is summarized and a new questionnaire is designed based solely on the results obtained from the first application. Repeat rounds of this process are carried out until consensus of opinion, or a point of diminishing returns, has been reached. Similar approach was followed resulting in three drafts- preliminary, draft-1 and draft-2 and three Delphi rounds were conducted after which 100% consensus among experts was achieved.

## Conclusion

The 12 nursing experts using reactive Delphi technique in this study achieved consensus on a 94 item clinical competence self assessment tool with three

subscales- professional behavior, knowledge and skills to assess perceived clinical competence of upcoming nursing graduates. The reliability and validity of CCSAT is to be assessed and evaluated further.

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