

Comparison of the clinical competency of nurses trained in competency-based and object-based approaches in the Democratic Republic of the Congo: A cross-sectional study

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Abstract: In the Democratic Republic of the Congo (DRC), the object-based approach (OBA) still remains mainstream in the basic nursing education program, despite the intention of the Ministry of Public Health to expand the competency-based approach (CBA) nationwide. This study aimed to compare the clinical competency of nurses trained with CBA and OBA. A cross-sectional, mixed study was conducted. We developed a self-assessment questionnaire consisting of an individual demographic information, a clinical competency assessment scale and the General Self-efficacy Scale. Nurses trained with CBA or OBA and currently working in health facilities with two to five years of clinical experience were purposively selected from ten cities across nine provinces in the DRC. We also conducted key informant interviews with the clinical supervisors at health facilities. In a comparison of 160 nurses trained with CBA and 153 with OBA, 3 competency domains ("establishing professional communication", "making decisions about health problems", and "performing nursing interventions") of the 5 domains required for nurses had significantly higher scores in the CBA group. The key informant interviews supported these results while revealing various issues in the basic nursing education program. The results support the strategic direction of the Ministry of Public Health in the DRC to expand CBA. Collaboration among education institutions, health facilities, and administrative bodies is crucial for clinical nurses to fully engage their competencies for the population. Other low- and middle-income countries with scarce resources can refer to the developed and implemented competency assessment method applied in this study.

Keywords: clinical nurses, clinical supervisors, competency assessment, expansion of the competency-based approach, low- and middle-income countries

Introduction

Nurses contribute to realizing the goal of "leave no one behind" and achieving the Sustainable Development Goals and Universal Health Coverage (1). To optimize the nursing workforce, the World Health Organization recommends that a global standard for basic nursing education be established to assure outcomes that are based on evidence and competency (2). Effective educational programs are one of the policy priorities under the Global Strategic Direction for Nursing and Midwifery 2021–2025 (3).

Historically, the object-based approach (OBA) has mainly been applied to the basic nursing education program because of the ease of learning setting and evaluating learning objectives (4). This approach was designed according to a biomedical context, focusing on pathology and technicality to produce healthcare

professionals with high levels of technical skills (5). However, the competency-based approach (CBA) has gained increasing recognition as an effective learning approach to achieve clinical performance goals and has replaced OBA in basic nursing education programs worldwide (6). Competency has been described by Dreyfus as a developmental model of skill acquisition (7), and Schwirian has found a high correlation between the quality of nursing services and clinical competency (8). Bennar has developed a nursing theory based on the Dreyfus model, which established 31 longitudinal and graded competencies in 7 domains (7). Clinical competency is defined as the integration of knowledge, skills, attitude, and the ability to effectively meet the needs of the population to provide safe and appropriate care without any support from supervisors (9). The evaluation of nurses' clinical competency is vital in providing quality-assured nursing services to

a population (10). Several competency assessment instruments have been developed for various countries' contexts, first in high-income countries in the 2000s and later in low- and middle-income countries in 2010s (11-15).

The Democratic Republic of the Congo (DRC) is a French-speaking lower-income country located in sub-Saharan Africa, with a population of 98.3 million as of 2021 (16). Rural residents accounted for 53.7% of the population in 2021 (17). The physician-to-population ratio was 3.6 per 10,000 people and the ratio for nurses and midwives was 10.7 per 10,000 people in 2018 (18). Amid this serious shortage of health workforce in the DRC, nurses have the critical role of providing health care in front line health facilities, especially in rural areas. The Ministry of Public Health in the DRC developed the national clinical competency for nurses in 2005 and updated it in 2009 to respond to the health needs of the population and improve health indicators. The national clinical competency for nurses in the DRC comprises the following five domains: Domain 1 "establishing professional communication", Domain 2 "making decisions about health problems", Domain 3 "performing nursing interventions", Domain 4 "managing resources", and Domain 5 "engaging in professional development" (19). The Ministry of Public Health has promoted its adaptation nationwide; however, as of 2022, approximately 81% (393 of the 487 nursing education institutions under the jurisdiction of the Ministry of Public Health) continue to use OBA because of insufficient budgets and a shortage of educators who are trained in CBA methodology (Data released by the Ministry of Public Health in the DRC).

This study aimed to compare the clinical competency of nurses who completed their basic nursing education in either of the two types of approaches — CBA and OBA — under the jurisdiction of the Ministry of Public Health. The difference

between CBA and OBA is that on-campus exercises (situational simulation) are introduced in CBA, while these are not included in OBA. Additionally, CBA uses active learning methods as a teaching method, while OBA uses lecture-based learning methods (Table 1). Furthermore, this study aimed to identify the challenges and constraints in adherence to CBA. We conducted a literature review of PubMed, CINAHL, and ScienceDirect using keyword as "Democratic Republic of the Congo", "competency", and "nurse". However, no relevant previous studies were found. Therefore, we expect the findings of this study to assist the Ministry of Public Health in the DRC in analyzing the issue of nurses' clinical competency and identifying effective policy options.

Materials and Methods

Design, setting, and participants

This is a cross-sectional and mixed methods study. Ten cities in nine out of 26 provinces, namely Bukavu in Sud-Kivu, Goma in Nord-Kivu, Kananga in Kasai-Central, Kinshasa in capital, Kisantu in Kongo Central, Kolwezi in Lualaba, Lubumbashi in Haut-Katanga, Mosango in Kwilu, Muji-Mayi in Kasai-Oriental, and Yassa-Bonga in Kwilu, in the DRC were selected on the basis of transport accessibility (16) and safety considerations. The study participants included nurses working in health facilities, with two to five years of clinical experience, and who had graduated after 2012 from nursing education institutions under the jurisdiction of the Ministry of Public Health in the DRC. The nursing education institutions applying CBA and the ones applying OBA co-exist in the 10 cities in nine provinces. The selected nursing education institutions are located in both urban and rural areas of the DRC, with a total enrolment of approximately 53–

Table 1. Overview of CBA and OBA*

Items	CBA	OBA
Overview of the nursing program	4,878 hours in total (in 4 years) Lesson: 2,380 hours On-campus exercises (situational simulation): 358 hours Clinical training: 2,140 hours	4,593 hours in total (in 4 years) Lesson: 2,293 hours Clinical training: 2,300 hours
Curriculum	Curriculum based on the competencies required of nurses, as defined by the MoH. (Nurses who can provide nursing care for priority diseases and the health needs of the population in the DRC.)	Curriculum based on educational objectives (knowledge, skills, and attitudes) to be achieved at the end of four years of education.
Learning cycle	Lesson On-campus exercises (situational simulation) Clinical training Reflection on post-practice nursing	Lesson Clinical training
Teaching method	Active learning methods (Place nursing students at the center of educational activities and encourage their autonomy)	Lecture-based learning methods

*Data Source: Official documents released by the Ministry of Public Health in the Democratic Republic of the Congo, not available online. CBA: competency-based approach, OBA: object-based approach.

280 students per institution (total enrolment in nursing education institutions). Nursing education institutions can also be categorized as public, private, and religious. We selected 400 participants: 200 nurses trained with CBA and 200 nurses trained with OBA. The purposive sampling method was applied using the list of graduates provided by the Ministry of Public Health; each participant had to be accessible at the time of the study, be able to travel to the questionnaire distribution site, and provide their consent to participate in the study.

To complement and triangulate the information collected in the quantitative study, key informant interviews with selected clinical supervisors at health facilities were also conducted about the differences between the nurses educated by CBA and OBA, as well as challenges in supervising them. In general, most clinical supervisors were educated using OBA. In addition, the health facilities to which those clinical supervisors belong can be classified into three categories: public, private, and religious.

Measurement instrument

We developed an original Congolese competency assessment scale in French for this study based on the national clinical competency for nurses in the DRC, consisting of five domains (Table 2). This self-assessment instrument regarding the frequency of implementation of each clinical competency adopted a 7-point Likert scale (0 = not at all, 1 = very rarely, 2 = occasionally, 3 = sometimes, 4 = very often, 5 = almost always, and 6 = always). The instrument was pilot tested and finalized to ensure clarity, after which minor changes were made to the wording of some questions.

Based on the original Congolese assessment scale of

clinical competency, the surface and content validity of the developed scale were reviewed by experts, including Congolese administrators from the Department of Health Science Education in the Ministry of Public Health, supervisors from health facilities, and educators from nursing education institutions. Reliability was also verified, and Cronbach's alpha coefficient was 0.92.

The French version of the General Self-efficacy Scale was included in the questionnaire in addition to the clinical competency assessment. This is because general self-efficacy influences knowledge acquisition, skills development, and career progression in nursing (20-22). It is a valid indicator of competency because it may influence the behaviors that nurses perceive (23). The scale's reliability and validity were confirmed (24-26). Individual demographic information was also included in the questionnaire. For the semi-structured key informant interviews with clinical supervisors, an interview guide was developed in French.

Data collection and ethical considerations

Data were collected from January to September 2021. The research team was divided into ten groups, each comprising one national administrator from the Department of Health Science Education in the Ministry of Public Health and two local collaborators from the basic nursing education division in the provincial health authority. Participants completed the clinical competency assessment and the General Self-efficacy Scale by themselves. For the qualitative data collection, the research group conducted the interviews in French with the supervisors of the nurses.

Ethical approval was obtained from the ethics committees of the National Center for Global

Table 2. National clinical competencies for nurses in the Democratic Republic of the Congo

Domain	Description
Competency 1. Establishing professional communication	Initiate professional communication with a client and/or a small group in situations involving simple daily life issues Maintain a trusting relationship with an adult client, a family, and/or a small group Interact with a client, family, and/or extended group Establish professional communication
Competency 2. Making decisions about health problems	Identify the steps of the nursing process Identify health problems in simple and common situations Use the nursing approach Make decisions regarding health issues
Competency 3. Performing nursing interventions	Conduct nursing interventions in simple and common situations related to daily life Perform nursing interventions in simple and routine situations in internal medicine and surgery Perform nursing interventions in simple and routine situations in gynecology, obstetrics, pediatrics, and mental health and in complex situations in internal medicine and surgery
Competency 4. Managing resources	Identify the resources available Use the resources Manage the necessary resources Manage all resources
Competency 5. Engaging in professional development	Hold the position of a healthcare professional Participate in professional development activities Build a professional identity Engage with a development professional

Health and Medicine, Japan, in August 2019 (NCGM-G-004023-00) and the Ministry of Public Health, DRC, in October 2019 (No137/CNES/BN/PMMF/2019). The questionnaire and key informant interviews were administered after obtaining informed consent.

Data analysis

The quantitative data analysis was performed using SPSS Windows 28.0.1.0 Program (SPSS: An IBM Company, Chicago, IL, USA). Mann-Whitney's *U* test was used to compare the two groups of nurses in terms of demographic characteristics, general self-efficacy, and clinical competency. Pearson's correlation coefficient was used to check the degree of correlation between general self-efficacy and clinical competency. In all cases, statistical significance was set at $p < 0.05$.

Key informant interviews were recorded and transcribed into text files. Transcripts were analyzed manually by reading and were related to the quantitative data. In accordance with the descriptive method of the qualitative study, phrases from the interview records were coded and reviewed. The codes were further analyzed to distinguish similarities and differences to form categories (27).

Results

Quantitative study

Quantitative responses were obtained from a total of 367 participants: 186 in the CBA group and 181 in the OBA group. Of these, 54 did not meet the inclusion criteria and were excluded, resulting in a total of 313 nurses (160 in the CBA group and 153 in the OBA group) to be included in the analysis.

The sample comprised 141 men (45.1%) and 170 women (54.3%); the average age was 27.7 ± 6.42 standard deviation (SD) years, and the average years of experience was 3.4 ± 1.08 SD. There were 238 nurses (76.0%), 35 chief nurses (11.2%), and 33 nursing directors (10.5%). There were no significant differences between the CBA and OBA groups regarding gender, age, years of experience, and position in the health facilities. In total, 100 (62.5%) and 131 (85.8%) nurses worked at a primary health facility in the CBA and OBA groups, respectively. The rate of CBA and OBA groups, respectively, by facility type were 46 (28.8%) vs. 46 (30.1%) in public, 56 (35.0%) vs. 23 (15.0%) in Catholic, and 50 (31.3%) vs. 81 (52.9%) in private (Table 3).

The mean overall scores for general self-efficacy were 34.5 and 32.3 for the CBA and OBA groups, respectively ($p < 0.01$) (Table 4). In the general self-efficacy and competency domains, Pearson's correlation coefficients were 0.35 for the CBA group and 0.44 for the OBA group (Table 5).

A comparison of the CBA and OBA groups based on the 5 domains comprising 69 competencies showed significant differences in 3 domains: Domain 1

Table 3. Demographic characteristics (n = 313)

Variables	Number (%)			Mean \pm SD	p value
	Total	CBA	OBA		
Education program	313 (100.0%)	160 (51.1%)	153 (48.9%)		
Gender					0.507
Women	170 (54.3%)	84 (52.5%)	86 (56.2%)		
Men	141 (45.1%)	75 (46.9%)	66 (43.1%)		
Age (years)				27.7 \pm 6.42	0.936
20–29	224 (71.6%)	120 (75.0%)	104 (68.0%)		
30–39	66 (21.1%)	29 (18.1%)	37 (24.2%)		
40–49	19 (6.1%)	9 (5.6%)	10 (6.5%)		
50–59	2 (0.6%)	1 (0.6%)	1 (0.7%)		
Level of healthcare facility					< 0.001
Primary	231 (73.8%)	100 (62.5%)	131 (85.8%)		
Secondary	82 (26.2%)	60 (37.5%)	22 (14.4%)		
Type of healthcare facility					0.020
Public	92 (29.3%)	46 (28.8%)	46 (30.1%)		
Catholic	79 (25.2%)	56 (35.0%)	23 (15.0%)		
Private	131 (41.9%)	50 (31.3%)	81 (52.9%)		
Years of experience				3.4 \pm 1.08	0.241
2	79 (25.2%)	47 (29.4%)	32 (20.9%)		
3	103 (32.9%)	49 (30.6%)	54 (35.3%)		
4	71 (22.7%)	34 (21.3%)	37 (24.2%)		
5	60 (19.1%)	30 (18.8%)	30 (19.6%)		
Position					0.676
Nurse	238 (76.0%)	123 (76.9%)	115 (75.2%)		
Chief	35 (11.2%)	17 (10.6%)	18 (11.8%)		
Director	33 (10.5%)	19 (11.9%)	14 (9.2%)		

Mann-Whitney *U* test. CBA: competency-based approach, OBA: object-based approach, SD: standard deviation.

"establishing professional communication", Domain 2 "making decisions about health problems", and Domain 3 "performing nursing interventions". However, no significant differences were found in Domain 4 "managing resources" and Domain 5 "engaging in professional development" (Table 6).

Comments of clinical supervisors

A total of 20 clinical supervisors responded to the key informant interviews. Many of them reported that the most observable differences between the CBA and OBA groups pertained to their communication skills toward patients.

CBA group communicates with the patient first and then explains how the nursing care will be provided. In contrast, OBA group provides nursing care without any

explanation to the patient. (Supervisor 1)

CBA group communicates with patients and families in a respectful manner. (Supervisor 2)

Differences in their decision-making process were also observed by the clinical supervisors.

CBA group consults a physician or other healthcare professional about the need for treatment, but OBA group does not do this. (Supervisor 3)

Differences were also identified with respect to performing nursing interventions.

OBA group performs the procedure immediately with only a few observations when a patient arrives, whereas CBA group takes longer to perform the procedure because it collects various types of information before providing nursing care. (Supervisor 4)

The interviewees also expressed their challenges in

Table 4. General self-efficacy score (n = 313)

	Full points	Mean	SD	Median	Range	p value
CBA	40	34.5	3.68	35	22–40	< 0.001
OBA		32.3	4.51	33	15–40	

Mann-Whitney U test. CBA: competency-based approach, OBA: object-based approach, SD: standard deviation.

Table 5. Correlation between general self-efficacy and clinical competency (n = 313)

Domains	CBA		OBA	
	Pearson's correlation coefficient	p value	Pearson's correlation coefficient	p value
1. Establishing professional communication	0.42	< 0.001	0.51	< 0.001
2. Making decisions about health problems	0.41	< 0.001	0.38	< 0.001
3. Performing nursing interventions	0.28	< 0.001	0.31	< 0.001
4. Managing resources	0.14	0.093	0.31	< 0.001
5. Engaging in professional development	0.36	< 0.001	0.26	< 0.001
Total points of each domain	0.35	< 0.001	0.44	< 0.001

CBA: competency-based approach, OBA: object-based approach.

Table 6. Comparison of the competencies of nurses trained in CBA and OBA (n = 313)

Domains: Number of competencies	Total score (Mean ± SD) Score range for each competency (Mean ± SD: minimum – maximum) (Full points for each competency = 7)		p value
	CBA	OBA	
Domain 1: Establishing professional communication: 19 competencies	117.1 ± 12.2 5.61 ± 1.82 – 6.76 ± 0.70	109.6 ± 15.6 5.14 ± 2.06 – 6.41 ± 1.16	< 0.001
Domain 2: Making decisions about health problems: 18 competencies	112.0 ± 22.4 5.89 ± 1.50 – 6.70 ± 0.74	103.7 ± 29.7 5.41 ± 1.91 – 6.26 ± 1.22	< 0.001
Domain 3: Performing nursing interventions: 10 competencies	63.9 ± 7.3 5.97 ± 1.44 – 6.58 ± 0.88	62.2 ± 6.8 5.78 ± 1.47 – 6.59 ± 0.89	< 0.001
Domain 4: Managing resources: 11 competencies	64.8 ± 11.1 5.08 ± 2.18 – 6.46 ± 1.10	63.9 ± 10.5 5.08 ± 2.07 – 6.12 ± 1.25	0.255
Domain 5: Engaging in professional development: 11 competencies	66.9 ± 8.7 5.25 ± 1.73 – 6.81 ± 0.72	64.6 ± 10.0 5.41 ± 1.83 – 6.64 ± 0.99	0.071

Mann-Whitney U test. CBA: competency-based approach, OBA: object-based approach, SD: standard deviation.

supervising nurses educated with CBA.

Our observations of educators' performance from education institutions were unsatisfactory in terms of teaching methods. (Supervisor 5)

Some supervisors have taken CBA in-service training, but their level of understanding is limited, and what they learned in the training is not reflected in their lesson plans and content. (Supervisor 6)

There are few instructional materials to implement and prepare lessons that are effective and aligned with CBA. (Supervisor 7)

Few supervisors have taken CBA in-service training, and the majority have not yet had the opportunity to take part in it. (Supervisor 8)

The objective of CBA training is often not shared in advance between the nursing education institutions and the health facility. As a result, supervision is insufficient during clinical training at health facilities. (Supervisor 9)

Discussion

Based on our literature review, this is the first study to examine the clinical competency of nurses working in health facilities in the DRC using the newly developed clinical competency assessment tool that aligns with the DRC's context.

The total clinical competency and self-efficacy of the CBA group were statistically higher than those of the OBA group. This implies that nurses who were educated with CBA had higher confidence in their abilities to handle themselves when faced with difficulties in a clinical setting than those in the OBA group. These results are consistent with the findings of Lauder *et al.*, who found that nurses trained in CBA have higher learning effects on clinical skills (28). The results are also consistent with those of Uys *et al.*, who found that nurses trained through CBA gained greater competency in their practice settings (29).

Out of five competency domains, the CBA group had significantly higher mean scores in the following three domains: Domain 1 "establishing professional communication", Domain 2 "making decisions about health problems", and Domain 3 "performing nursing interventions". According to Oliver and Butler, clinical practice in nursing requires competencies in clinical judgment, reasoning, and decision-making (30); the results of Domains 2 and 3 are consistent with these findings. The key informant interviews supported these results. Many supervisors expressed that the CBA group had better communication skills toward patients, a better decision-making process, and performed nursing interventions better. The statistical significance of Domain 1 suggests that the CBA group was more confident in handling difficult situations through communication strategies and skills than the OBA group. Communication skills are important to ensure

patient safety (31). Inadequate communication between patients and nurses is reported to cause anxiety in both parties (32). Nurses with effective communication skills can provide interventions that correspond to specific health and disease conditions (33). The results of this study imply that the introduction and promotion of CBA has contributed to strengthening nurses' critical clinical competencies in the DRC. In contrast, no significant differences were found for Domain 4 "managing resources" and Domain 5 "engaging in professional development". No significant differences in Domain 4 may be because the participants in this study had limited experience and skills in resource management as they had graduated two to five years before data collection. This result is consistent with the fact that management ability comprises factors such as experience and interpersonal skills (34). The lack of significant differences in Domain 5 could indicate that professional development is not related to CBA or OBA but is primarily driven by external conditions, such as support systems from clinical supervisors and the working environment. Thus, competencies related to Domains 4 and 5 must be complemented with continuous education (35).

The key informant interviews revealed various problems with the basic nursing education in the DRC such as lack of teaching staff and teaching materials, inadequate understanding of CBA among educators and clinical supervisors in health facilities, and a lack of cooperation between nursing education institutions and health facilities. To improve the quality of basic nursing education offered at both nursing education institutions and health facilities, consideration should be given to the ongoing monitoring and evaluation of the implementation of CBA at all levels of the health system. It is necessary to raise awareness of CBA among clinical supervisors in health facilities and strengthen their pedagogical capacities. Additionally, it is essential to establish a framework for collaboration between nursing education institutions and health facilities. To make CBA mainstream and strengthen the basic nursing education system in the DRC, these suggestions should be reflected in policies and strategic and operational plans at all levels of the health system.

Although competency assessments using instruments that reflect the country's context have been conducted in various countries, there are still some research gaps. First, competency assessment reports from low-income countries, especially from sub-Saharan and French-speaking African countries, are extremely limited (36,37). Second, most of the assessments target students undergoing basic nursing education (38-40), not clinical nurses who actually provide care services at health facilities. Third, typical assessment instruments are self-administrative (41), which are relatively handy but the results are less objective. Our study is epoch-making in that it

fills various research gaps: *i*) the country-specific assessment tool was developed by the Ministry of Public Health itself in the DRC, a low-income French-speaking country in sub-Saharan Africa, *ii*) the assessment targeted clinical nurses to evaluate their competencies in their daily health care provision, and *iii*) the self-administrative clinical competency instrument, the General Self-efficacy Scale, and key informant interviews with clinical supervisors at health facilities were combined into one assessment package to improve objectivity. Objective Structured Clinical Examination (OSCE) is well known to assess competency based on objective testing through direct observation, and 360-degree feedback is another well-known method of objective performance evaluation. However, routine implementation of OSCE or 360-degree feedback is time- and resource-consuming for the Ministry of Health in a low-income country such as the DRC, where basic human resources and budget are scarce. The combined assessment method in this study is simpler to develop and implement; thus, other low- and middle-income countries can refer to it to assess their own nurses' clinical competencies that are critical to improving the quality of health care.

The results of this study support the strategic direction of the Ministry of Public Health in the DRC. However, for nurses in health facilities to fully perform the competencies acquired in education institutions and to meet the needs of the population, it is desirable for education institutions, health facilities, and the administrative bodies responsible for them to cooperate to improve the quality of basic and continuous nursing education. The establishment of supporting rules and regulations by professional governing bodies is also critical (42). In the DRC, these efforts have begun and may serve as a reference for other low- and middle-income countries facing challenges (43) in similar health systems and basic nursing education systems.

The main limitation of this study is its purposive sampling method. Therefore, the generalizability of the results must be carefully considered. In addition, broader challenges and constraints to develop and sustain competent nurses in the nursing education system and health system could be identified through interviews with educational professionals. Likewise, because competency development also depends on the working environment and colleagues at health facilities after graduation from education institutions, analyses of these aspects should also be considered in future studies.

Conclusions

The clinical competencies of nurses trained with CBA and OBA in the DRC were compared using practical instruments developed by the Ministry of Public Health in the DRC. Of the five competencies, nurses trained

with CBA scored significantly higher in the areas of establishing professional communication, making decisions about health problems, and performing nursing interventions. This reveals the significance of the national expansion of CBA in the DRC. It is necessary to implement continuous education for complementing nurses' competencies, to increase the number of educators trained in CBA methodology, to improve educational materials and equipment, and to promote the understanding of CBA in clinical practice. The practical combined assessment method, its assessment results, and suggested policy directions of this study can be referred by other low- and middle-income countries to assess their own nurses' competencies and improve the quality of health care in the long term.

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