



Development and validation of competencies for home-based nursing care: an e-Delphi study

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ABSTRACT

Background: The expected competencies of nurses in home-based care remain unclear. A list of professional competencies that are agreed upon by a panel of content expert are needed to offer some form of standardized expectations among nurses and home-based care stakeholders.

Objectives: To evaluate the content validity of the professional competencies identified for home-based nursing care.

Design: An e-Delphi method was used.

Settings: A purposive sampling of local and international experts in home-based nursing care or community nursing.

Methods: Preliminary competency items were developed inductively from earlier studies and deductively by a steering committee. Sixteen experts performed two rounds of content validation. The Item-Content Validity Index, Scale-Content Validity Index/Average (S-CVI/Ave) and Fleiss' kappa coefficient were evaluated.

Results: In Round One, the list was revised to 49 items. In Round Two, the list was revised to 45 items, categorized into eight domains of practice: (1) client assessment and care planning; (2) nursing care in a home-based setting; (3) management of clients with health conditions, (4) interpersonal relationships and communications; (5) collaboration and teamwork; (6) critical thinking and problem-solving skills; (7) professional development and leadership; and (8) innovation and research. The S-CVI/Ave was 0.95. The overall acceptable clarity was 94.1 %.

Conclusions: This study generated a list of competencies that have reached consensus among a panel of experts. The list offers insights into the expected competencies of home-based care nurses. Further validity and reliability testing is needed to determine the underlying structure of the competencies.

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What is already known?

- The rapid global expansion of home-based care lacks clear nursing competencies.
- Clear competencies are vital as nurses often practice independently in home care.
- Professional competencies offer a foundational framework for global healthcare adoption.

What this paper adds?

- A list of professional competencies for home-based nursing care that is content validated by local and international experts including patients' representatives.
- The competencies offer insights into the scope of practice and expected competencies of home-based care nurses.
- The competencies could align expectations of safe and effective care between nurses, service providers, nursing leaders and patients.

1. Introduction

The demand for home-based care has increased in the last decade to meet the needs of patients with chronic diseases and the aging population in many countries (Chabouh et al., 2023; Mahoney et al., 2022). These patients are often well enough to be cared for within the comfort of their homes. The term home-based care or home health care has been used interchangeably to refer to healthcare services provided in patients' homes (Ganann et al., 2019). To ensure better clarity and focus, this study specifically defines home-based care as the management of patients with chronic diseases or post-discharge adult patients, either in their own homes or in medical posts within their housing districts. This definition would exclude services such as maternal and child and palliative care, as these services would often require specialized nursing care.

Nurses predominantly serve as the main healthcare professionals in home-based care settings, delivering nursing care independently through home visits to patient's homes (Ganann et al., 2019). Nursing practices in home-based care are often regarded as more complex and challenging, surpassing those encountered in ward-based settings (Yu et al., 2023). Nurses experienced a steep transition to practice in home-based care despite several years of ward-based nursing experience (Rusli et al., 2022; Wong et al., 2018). Home-based care nurses also emphasized the need for more support and clarity regarding the expected competencies and scope of nursing practice in home-based care, as traditionally nursing education often focuses on ward-based settings (Andersson et al., 2017). This approach limits nurses' understanding of the expectations and nature of nursing practice in home-based care (van Iersel et al., 2022; Atashzadeh et al., 2023). The paucity of information on the expected competencies in home-based care has also led to conflicting expectations between nurses, patients and service providers, which obscures the limits of what nurses can safely and effectively perform (Bing-Jonsson et al., 2016).

Professional competency is essential in any profession, including nursing. It provides a blueprint regarding the scope of practice and facilitates the development of nurses' competencies to effectively meet the needs of the patients (Lau et al., 2020). A clearly defined set of professional competencies can ensure that nurses meet the requirements and comply with the standards and regulations before they are allowed to deliver care (DeGrande et al., 2018). This compliance would build trust among all stakeholders in the setting, which will facilitate interprofessional collaboration and enhance nurse-patient relationships (Ozaras and Abaan, 2018; Wiechula et al., 2016).

Individual competencies consist of both visible and hidden components. As McClelland (1998) suggests, competencies extend beyond visible components such as knowledge and skills. They also include hidden components such as social role, self-image, traits and motives (McClelland, 1998). Therefore, when identifying and developing a list of competencies for practice, it is essential to consider both externally assessed and self-perceived competencies, as both contribute to a comprehensive understanding and evaluation.

In nursing, there are three key areas of professional competencies, namely: the area of work, attributes that support the area of work and behaviors that support the area of work (Moore et al., 2002). The integration of these areas is particularly important in home-based care, where nurses must not only demonstrate high competence in their nursing skills but also embody positive attributes to effectively address the unique challenges and needs of their patients (Narayan, 2020).

Given the rapid expansion of home-based care across the globe, the uncontrolled environments in which home-based care nurses practice and the challenging transition experience due to greater independence of work, it is essential to identify and validate a set of professional competencies for home-based nursing care. The professional competencies can serve as a foundational guide to inform and support nurses on the expected competencies in delivering safe and effective care. Furthermore, nursing leaders across the globe can adopt and further refine the set of professional competencies to align with the specific practices and regulations of their respective countries or territories.

2. Aims and research questions

The study aimed to identify a set of professional competencies for home-based nursing care and to evaluate the content validity of

the identified competencies. Research questions:

1. What are the professional competencies for home-based nursing care?
2. What are the experts rating on the content validity of the professional competencies for home-based nursing care?

3. Methods

The methodological approach of this study was based on a e-Delphi design. The Delphi design was developed to obtain group consensus based on a series of rounds with experts without confrontation (Dalkey and Helmer, 1963). The key difference in the e-Delphi's design lies in utilizing electronic platforms to gather consensus and initiate the Delphi process with thoughtfully pre-selected items from various sources, as opposed to commencing with an open-ended approach (Custer et al., 1999). Prior work has reported that these two differences improve response rates and provide a clear starting structure that is grounded in prior work (Custer et al., 1999).

4. Delphi procedures

The study adopted the three phases of a Delphi-based study by Beiderbeck et al. (2021): preparing, conducting, and analyzing. These phases ensured a comprehensive approach to develop the proposed competencies and evaluate their content validity. The Conducting and Reporting of Delphi Studies (CREDES) was used to ensure adequate reporting of the study (Jünger et al., 2017) (Supplementary 1).

5. Preparing phase

5.1. Identification of competency items

The study undertook an inductive and deductive approach to identify, consolidate and develop the proposed list of competencies for home-based care nursing. The inductive approach was based on three prior studies and a community care nursing competency framework (Ministry of Health, 2020).

The first study was a scoping review of competencies for home-based care nursing that identified ten competencies from 64 articles (Rusli et al., 2023). These competencies offer a broad overview of home-based care nursing competencies. However, on their own, these competencies remain unrefined and require further refinement by nursing experts to fully understand its relevance to practice. The ten competencies were extracted to serve as the underlying structure for the proposed list of competencies.

The second study was a phenomenology study that explored home-based care nurses' lived experiences and perceived competency needs (Rusli et al., 2022). The study identified four themes and nine subthemes: (1) the full spectrum of patient care; (2) autonomy in nursing practice; (3) beliefs in person-centered care; and (4) enhancing supportive systems (Rusli et al., 2022). The essence of experiences shared by the nurses in the study was used to structure the phrasing of the proposed competency items.

The third study was a hybrid systematic-narrative review of instruments used to measure home-based care nurses' competencies (Rusli et al., 2024). The review identified 24 instruments that were used to measure home-based care nurses' competencies. The instruments' domains and items were extracted to generate the proposed domains of the competency list.

The community care competency framework by the Ministry of Health (2020) was developed to understand the roles, responsibilities and competencies of nurses working in community settings, including home-based care. It consists of eight broad competency domains which were used to consolidate all the data extracted from the three studies. The inductive process generated 68 proposed competency items grouped under four domains. Fig. 1 illustrates the inductive process.

The deductive process involved a steering committee comprising two advanced practice nurses in the area of home-based care, two senior home-based care registered nurses, three nurse researchers and two nurse educators from a university. These committee members were involved in the initial needs analysis for this study. They represented acute hospitals from three different healthcare clusters and a nursing university. The role of a steering committee was to provide an independent oversight of the study through strategic recommendations and diverse expertise (Sáenz-Royo et al., 2023). The steering committee were involved in three rounds of review and discussion to refine the 68 proposed list of competencies. The decision to revise or remove any competency items was determined by a majority vote, based on the importance of the competency items within the practice setting and the clarity of the competency items. The deductive process revised the list to 57 competencies items, grouped under eight domains: 1. client assessment and care planning, 2. nursing care in a home-based setting, 3. management of clients with health conditions, 4. interpersonal relationships and communication, 5. collaboration and teamwork, 6. critical thinking and problem-solving skills, 7. professional development and leadership, 8. innovation and research.

5.2. Structure of content validation questionnaire

The questionnaire comprises three parts: 1. Survey description, 2. Demographic sheet and 3. Home Care Competency sheet. The survey description provides participants with information regarding the survey and instructions to complete the content validation. The demographic sheet asked about participants' demographic characteristics. The Home Care Competency sheet outlines the proposed list of competencies alongside a four-point Likert scale (1 = very relevant, 2 = quite relevant, 3 = somewhat relevant, 4 = not

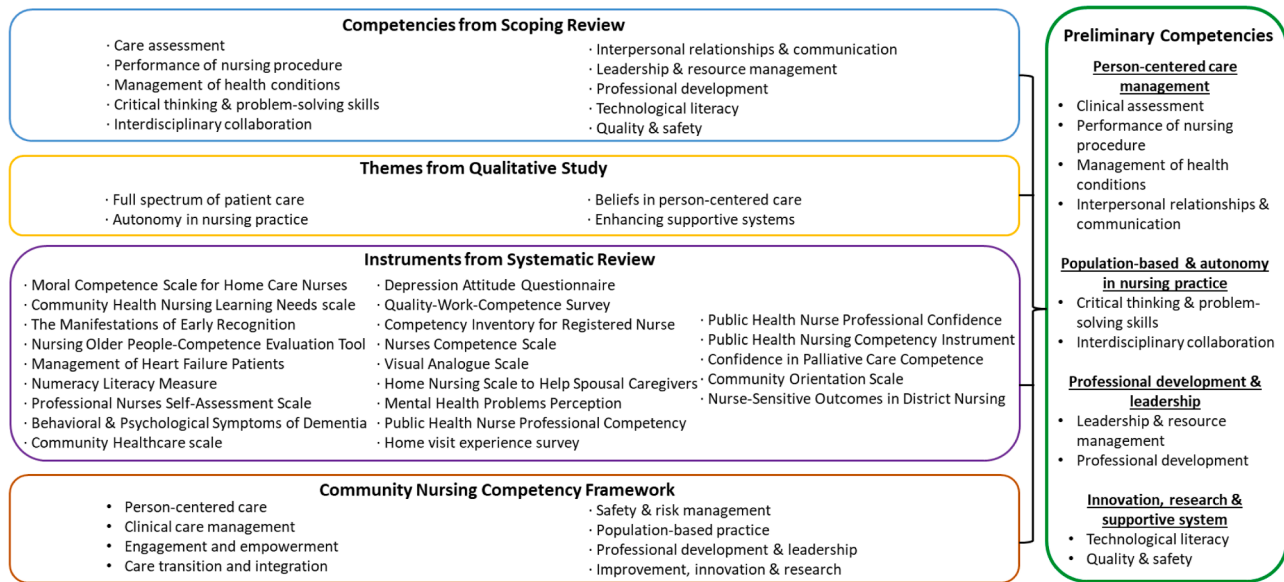


Fig. 1. Development and identification of preliminary competencies.

relevant) to evaluate the relevance of each competency. A four-point scale was selected to prevent the influence of a middle-point or neutral response and to improve responses, a crucial aspect of the Delphi process which requires at least two validation rounds (de Rezende and de Medeiros, 2022). In addition, the Home Care Competency also consisted of a two-point Likert scale (1 = clear and easy to understand, 2 = unclear and difficult to understand) to evaluate the clarity of the competency items. Open-ended sections were also available after each item and after each domain for experts to provide additional feedback.

5.3. Selection of expert panel

Purposive sampling identified the panel of experts with a target sample size of between seven and twenty (Beiderbeck et al., 2021; Chalmers and Armour, 2018). The panel was identified either through recommendations by the steering committee or a search on the nursing schools' websites using keywords such as "community nursing" or researchers who have published in the area of community nursing. These criteria were selected to ensure that the selected experts had actual, documented experience and contribution in community nursing work. Their involvement must be evident through their contributions to education, clinical practice or research within the field. When identifying the panel of experts, the researchers took into account the expert's level of expertise, heterogeneity, and access to experts, aiming to ensure a wide range of experts, all focused on home-based care, to evaluate the list (Beiderbeck et al., 2021). To capture patient needs and perspectives during content validation, the researchers and steering committee decided to involve at least one patient representative (Skovlund et al., 2020). Patient or public engagement in healthcare research is important to gather valuable insights and understand their needs in practice (Harmsen et al., 2022). Table 1 presents the eligibility criteria.

5.4. Conducting phase

An invitational email containing a participant information sheet and research team's contact details was sent to the experts. Experts who agreed to participate were contacted by a research member, to confirm their participation and emphasize the importance of their commitment and timely submission to the rounds of evaluations. Following the confirmation contact, the experts were sent an email containing the content validation questionnaires. In each round, the experts were given two weeks to review and return their evaluations. The data collection was performed between November 2022 and June 2023. Fig. 2 illustrates the preparing and conducting phase of this study.

5.5. Analyzing phase

The data were managed and analyzed using Microsoft Excel and Jamovi (The Jamovi project, 2024). The demographic characteristics of the panel and the level of clarity of each competency item were analyzed and reported using descriptive statistics. The item-content validity index (I-CVI), scale-content validity index/average (S-CVI/Ave) and Fleiss' kappa coefficient (κ) measures were used to evaluate the proportion in agreement for the relevance of each competency. The rating scale for relevance was dichotomized, with ratings of 1 and 2 combined as "not relevant", and ratings of 3 and 4 combined as "relevant". The study adopted an acceptable I-CVI cut-off of > 0.78 (Lynn, 1986; Polit et al., 2007). Competencies with an I-CVI < 0.78 were considered for revision or deletion.

The study also adopted an acceptable S-CVI/Ave cut-off of > 0.90 (Yusoff, 2019). The following Kappa coefficient interpretation were used to understand the degree of agreement among raters: ≤ 0 = no agreement, 0.01 to 0.20 = slight agreement, 0.21 to 0.40 = fair agreement, 0.41 to 0.60 = moderate agreement, 0.61 to 0.80 = substantial agreement and 0.81 to 1.00 = almost perfect agreement (McHugh, 2012). Although kappa coefficient of 0.60 is often considered acceptable for agreement, this study did not adopt this cut-off strictly (McHugh, 2012). As one of the first study to illuminate competencies for home-based care, the involvement of experts from diverse backgrounds suggests varying competency expectation and practices. Thus, broader interpretation of agreement is necessary in this study for better understanding and identification of the range of nursing competencies for home-based care.

Open-ended comments were extracted verbatim and aggregated by a trained research assistant. The competency items were revised, deleted or retained following a review of all data by the research team. The same analysis process was conducted for the subsequent round. Consensus was considered achieved when all the competency items met the I-CVI and S-CVI/Ave cut-off score and both the research team and steering committee members agreed on all the revisions.

Table 1
Experts eligibility criteria.

For nurses, researchers or healthcare professionals:	For patients, family members or caregivers:
<ul style="list-style-type: none"> • Having at least 3 years of experience in home-based nursing care, or • Published at least 2 home-based care-related peer-reviewed research articles, or • Having at least 3 years of experience in managing manpower, recruitment, education or policymaking in the area of community nursing. 	<ul style="list-style-type: none"> • Currently receiving home-based care by a nurse, or • Received home-based care by a nurse in the last 12 months.

Participants were excluded if they were below 21 years of age, incapable of giving informed consent, or unable to communicate or understand in English language.

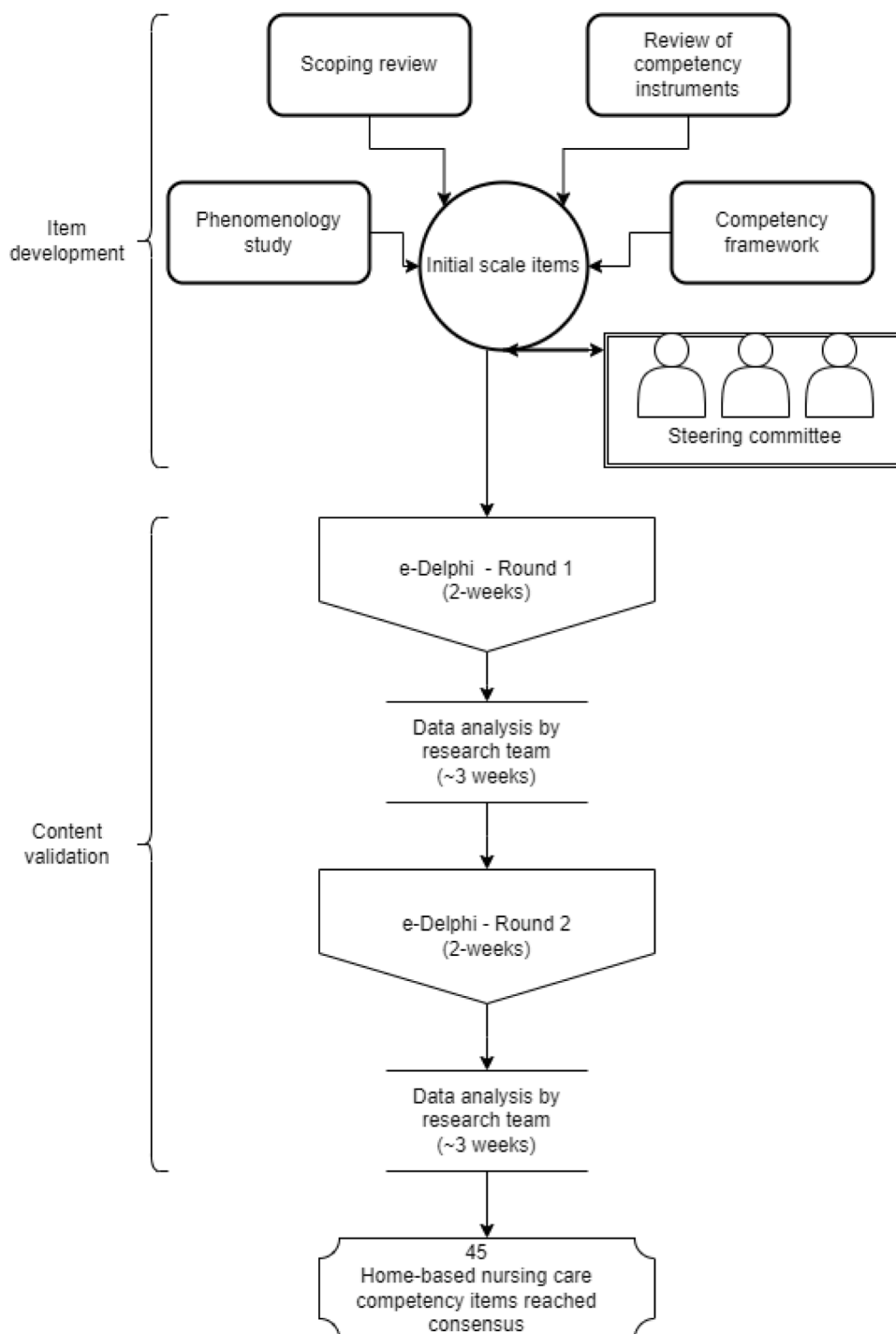


Fig. 2. Development and content validation process.

5.6. Ethical consideration

Prior to recruitment and data collection, ethical approval was sought and obtained from the Institutional Review Board (NUS-IRB-2022-52). Participants were provided with a consent form to voluntarily acknowledge that they agreed to participate in the study. All responses received were immediately deidentified to ensure that the content validation process remains anonymous. To avoid any potential bias and maintaining the confidentiality of participant's responses, only anonymous and aggregated data were used during discussions of the competency items.

6. Results

6.1. Characteristics of the experts

In total, among the 29 invitations, 16 experts agreed to participate and completed the content validation rounds, indicating a response rate of 55.2 %. The majority of the experts were female ($n = 14$), held a position of registered nurse, were based in Singapore ($n = 7$) and had a PhD or doctorate as their highest education level ($n = 6$). The average years of professional nursing experience were 25.15 years ($SD = 13.80$), and the average years of experience in home-based nursing practice were 9.65 ($SD = 7.58$). The experts were based in the following countries: Australia ($n = 2$), Denmark ($n = 1$), Finland ($n = 1$), Ireland ($n = 1$), Malaysia ($n = 1$), Singapore ($n = 7$), United Kingdom ($n = 1$) and United States of America ($n = 2$). Table 2 presents an overview of the participant characteristics.

6.2. Content validity

6.2.1. Round 1

The experts evaluated 57 competency items in Round 1. Seventeen of the competency items had an I-CVI of <0.78 , suggesting low consensus on the relevance of these items for home-based care nursing. Fleiss' kappa showed that there was a slight agreement between the experts, $\kappa = 0.170$, $p < 0.001$. The S-CVI/Ave of the remaining 40 competencies was 0.93. The ratings for clarity were not measurable in Round 1, as they were rated inconsistently by the experts. Given the inconsistency, additional prompts were added in Round 2 to remind the experts to evaluate the clarity of the competencies. All of the experts provided comments and suggestions in the open-ended sections, such as rephrasing, adding, or removing the competencies. One example was the rephrasing of the item from "Communicating options to clients to make decisions based on their own care needs" to "Support clients to make decisions based on their own care needs". This change was based on a suggestion by an expert to better reflect the importance of open communication and a collaborative partnership between nurses and patients, ensuring that decision-making is not one-sided.

The experts also highlighted that there may be slight differences in nursing practice across their healthcare system; this includes comments such as "not practice at the moment" for competency in managing intravenous infusions in clients' homes. Conflicting comments were also noted regarding items within the domains of critical thinking and problem-solving skills. For instance, one expert commented,

Table 2
Demographic table.

Demographics ($n = 16$)	Mean (SD)/ n (%)
Age (Years)	47.93 (SD = 11.71)
Gender	
Male	2 (12.5)
Female	14 (87.5)
Ethnicity	
Chinese	7 (43.8)
Malay	2 (12.5)
White	6 (37.5)
Others	1 (6.3)
Currently based in	
Australia	2 (12.5)
Denmark	1 (6.3)
Finland	1 (6.3)
Ireland	1 (6.3)
Malaysia	1 (6.3)
Singapore	7 (43.8)
United Kingdom	1 (6.3)
United States of America	2 (12.5)
Current position	
Professor Emerita	1 (6.3)
Professor	1 (6.3)
Associate professor	3 (18.8)
Senior Lecturer/ Lecturer	3 (18.8)
Researcher	1 (6.3)
Registered Nurse	5 (31.3)
Caregiver	2 (12.5)
Highest education level ($n = 15$)	
Bachelor's Degree	5 (31.3)
Master's Degree	3 (18.8)
PhD/Doctorate	6 (37.5)
Others:	1 (6.3)
Years of experience in professional nursing ($n = 13$)	25.15 years (SD = 13.80)
Years of experience in home-based nursing care practice/research ($n = 14$)	9.65 years (SD = 7.58)

“Are you referring to nursing diagnosis? Nurses do not diagnose unless referring to advanced practice nurses,” while another expert suggested adding “making independent decisions related to a client’s care” as a competency item.

Following thorough discussions and revision by the research team, incorporating both statistical results and open-ended comments, the list of professional competencies were revised to 49 items for round 2.

6.2.2. Round 2

The experts evaluated 49 competencies in Round 2. Two competency items had an I-CVI of < 0.78 . The remaining 47 competencies had an S-CVI/Ave of 0.95. Fleiss’ kappa showed that there was a fair agreement between the experts, $\kappa = 0.230$, $p < 0.001$, an

Table 3
Round 2 content validation.

Item no.	Competency	I-CVI	Clarity %
Domain 1	Client assessment and care planning		
1	Perform a health assessment of a client in home-based care.	1.00	100.0
2	Identify deviation from the normal when performing health assessment for a client.	0.94	91.7
3	Recognize signs of early deterioration in client.	1.00	91.7
4	Take client’s social background into account when making care plans. (e.g., leisure activities or employment status)	1.00	100.0
5	Connect clients with relevant services to assess client’s financial situation.	0.88	91.7
6	Assess the spiritual care needs of the client. (e.g., religious beliefs)	0.88	100.0
7	Assess risk of fall in client’s home.	1.00	100.0
8	Formulate an individualised care plan based on a client’s needs and resources.	1.00	100.0
9	Use validated and reliable tools to assess my clients. (e.g., Abbreviated Mental Test)	1.00	75.0
Domain 2	Nursing care in a home-based setting		
10	Educate clients to use objective data to identify any deviation from the normal. (e.g., vital signs).	0.94	91.7
11	Provide safe and quality nursing care in the home-based setting.	1.00	100.0
12	Educate clients and caregivers to perform nursing procedures safely in the home-based setting. (e.g., NGT feeding).	0.88	91.7
13	Educate clients and caregivers on safe manual handling including lifting and transferring.	0.94	91.7
14	Document on a client’s care plan.	1.00	83.3
15	Having the required knowledge to interpret common laboratory results (e.g., Full blood count, renal panel)	0.81	83.3
16	Communicate the information of laboratory results to clients and caregivers.	0.88	83.3
Domain 3	Management of clients with health conditions		
17	Provide care for clients with chronic conditions. (e.g., Type II Diabetes, Hypertension)	1.00	91.7
18	Educate clients on self-management of common chronic conditions	1.00	91.7
19	Assess clients’ and caregivers’ mental health needs by using appropriate tools.	0.88	91.7
20	Provide education on medication management to clients and caregivers. (e.g., side-effects)	0.88	83.3
21	Initiate a conversation with clients and caregivers about Advanced Care Planning (ACP).	1.00	100.0
22	Recommend appropriate referrals where necessary. (e.g., speciality care or rehabilitation)	0.94	100.0
Domain 4	Interpersonal relationship and communication		
23	Communicate in a sensitive manner according to client’s, family members’ or caregiver’s feelings.	1.00	100.0
24	Discuss care plans options with clients, families and caregivers.	1.00	100.0
25	Support clients to make decisions based on their own care needs.	1.00	100.0
26	When a client is non-adherent to their care plan, I am able to seek to discuss and understand client’s situation.	1.00	91.7
27	Considerate of different cultural contexts when communicating with clients and caregivers from diverse cultural communities.	0.94	100.0
28	Support clients and caregivers as they transit between palliative and end of life care.	0.94	91.7
Domain 5	Collaboration and teamwork		
29	Contribute to multi-disciplinary discussions to ensure care plans are appropriately implemented. (e.g., Doctors or Allied Health professionals)	1.00	91.7
30	Escalate care concerns timely to my team members.	1.00	100.0
31	Direct a client to relevant patient’s or caregiver’s support groups in the community.	0.94	100.0
32	Collaborate in the follow up care with other stakeholders to ensure care continuity of clients.	1.00	100.0
Domain 6	Critical thinking and problem-solving skills		
33	Aware of my values and beliefs when presenting care choices to clients.	1.00	100.0
34	Be positive and persevere when facing problems or difficult situations	0.94	91.7
35	Reflect and analyse my actions to improve my work.	1.00	100.0
36	Consider multiple possibilities before making any decision.	0.94	91.7
37	Carry out client care independently.	0.94	100.0
38	When assessing a client’s health condition, I am able to identify key nursing problems.	0.94	100.0
Domain 7	Professional development and leadership		
39	Make initiatives for improvements in client care.	0.94	83.3
40	Take full responsibility of my learning to improve my competency.	0.94	91.7
41	Support my new colleagues within my area of responsibility.	0.81	91.7
42	Aware of career pathways as a home-based care nurse for career advancement.	0.94	91.7
Domain 8	Innovation and research		
43	Use health informatics or technology to support client care management. (e.g., electronic health record or telemedicine)	1.00	100.0
44	Able to actively participate in research-related activities.	0.88	83.33
45	Incorporate relevant research evidence into nursing practice.	1.00	100.0
	S/CVI; Average agreement	0.95	94.1

e.g. = example; I-CVI = Item content validity index; NGT = Nasogastric Tube; S/CVI = Scale/Content Validity Index.

improvement from Round 1. The average acceptable level of statement clarity across all competencies was 93.7 %. The competency with the lowest acceptable statement clarity (75 %) was “Able to perform blood taking in a home-based setting,” while 23 competencies had 100 % agreement for statement clarity.

The open-ended comments in Round 2 largely addressed the relevance of the competency items to the practice setting and highlighted the similarities in concepts among the competency items. Several experts highlighted more competency items that did not apply to their practice setting and provide suggestions to combine competency items that had related concepts. For example, in competency item 5: “Connect clients with relevant services to assess client’s financial situation”, one expert provided the following comment:

“It depends on the context of the country. In [Country X] all services are paid by the state.” this comment was echoed by another expert who commented: “My only concern is that home-care often differs between municipalities and especially between countries. In [Country X] we do not have any self-pay services...so maybe you need to discuss the context-specifics in the group.”

Similarly, the research team examined the data and comments before removing five competency items that did not meet the cut-off criteria. Minor revisions to the wording of the competency items were also made. This process brings the number of competencies for home-based nursing care to 45 items (Table 3). The S-CVI/Ave of these items was 0.95 and the average acceptable level of statement clarity was 94.1 %. The research team and steering committee agreed that a third round of content validation was not necessary given the high degree of consensus among the experts in Round 2. An overview of the competency domains is presented in Fig. 3.

7. Discussion

Professional competencies in nursing are important to ensure that nursing care is provided safely and effectively. This study identified, developed and evaluated the content validity of a set of professional competencies for home-based nursing care. The set of professional competencies was developed using a multiprong strategy which facilitated the collective incorporation of diverse pieces of evidence from the literature and recommendations by a steering committee. This strategy ensured that any over-commitment to any single piece of evidence was prevented and that the development process considered the perspective from real-world practice. The use of an e-Delphi’s approach to validate the content of professional competencies by experts from different geographical location ensured that a global perspective was being considered.

The evaluation by a panel of international experts offers a macro-level overview of the expected home-based nursing care competencies across the various regions of the globe. This process increases the potential for the competencies to be adopted internationally, contingent on additional testing (Mikkonen et al., 2022). The selection of experts involved a purposive sampling approach to ensure diverse representation, including the inclusion of patient representatives to incorporate perspectives from all sides. Furthermore, the process was able to reveal variations in the types of competencies that nurses are expected or permitted to perform across the

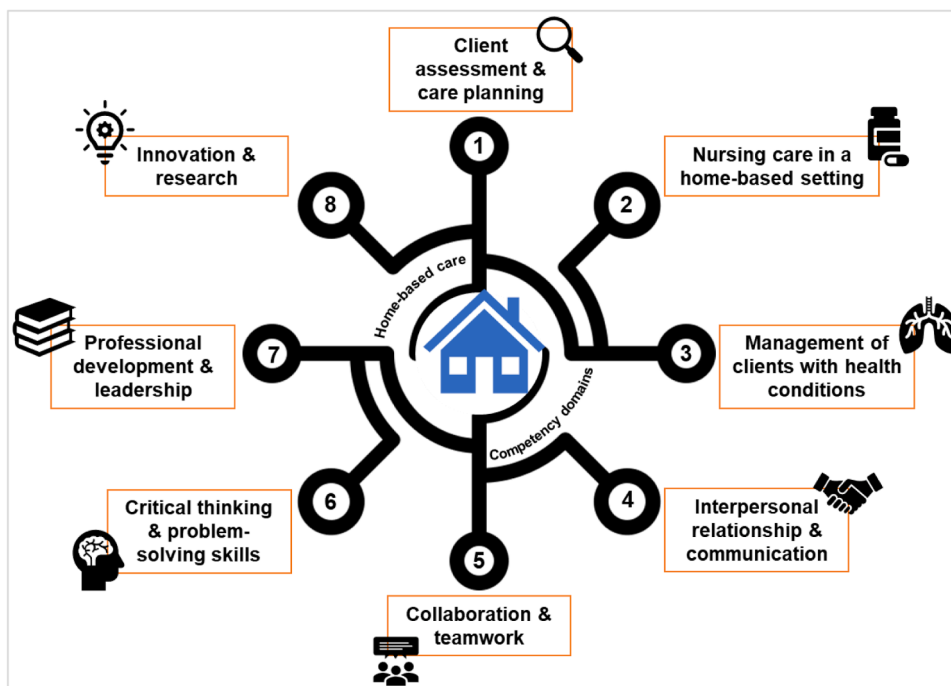


Fig. 3. Overview of home-based nursing care competency domains.

different settings. These differences may be due to the trainings that nurses' received or due to the safety regulation of each setting. Thus, further refinement of the competencies for home-based care are necessary to align them with the expectations and requirements of each setting. Nevertheless the main purpose of content validation was to ensure that the competencies are relevant to the expectations in home-based care practice.

The two rounds of content validation by a panel of experts achieved consensus for 45 competency items, categorized into eight domains: 1. Client assessment and care planning; 2. Nursing care in home-based setting; 3. Management of clients with health conditions; 4. Interpersonal relationships and communications; 5. Collaboration and teamwork; 6. Critical thinking and problem-solving skills; 7. Professional development and leadership; and 8. Innovation and research. These domains embraced the three areas of nursing competencies mentioned earlier: scope of practice, attributes that support the scope of practice and behaviors that support the scope of practice (Moore et al., 2002). To continue a coherent flow of this discussion, the subsequent sections will be structured around these three areas of nursing competencies.

7.1. Scope of practice

The list of professional competencies generated by this study reinforces the notion that home-based care nurses are expected to perform a diverse range of nursing care independently. The scope of practice in home-based care was encapsulated within three domains. The domain on "client assessment and care planning", focuses on nurses' competence to perform different types of care assessments for patients in home-based care. This assessment includes identifying early signs of deterioration and performing physical and psychosocial assessments to understand the health and well-being status of patients. These competencies echoed Horner's (2022) study that highlighted the importance for nurses in home-based care to be competent in performing care assessments. In home-based care, nurses are often the primary link for the patient to the healthcare system, and the healthcare team relies on the assessment findings provided by the nurses to formulate and recommend care plans for the patients (Rusli et al., 2022). Therefore, a thorough care assessment is essential to promptly identify and address patient's care needs, thereby preventing any further deterioration of their condition. These domains also align closely with an element in the community care competency framework by the Ministry of Health (2020): "Client assessment and care planning". This element highlights the importance for community nurses, including home-based care nurses, in performing biopsychosocial and environmental assessment to develop personalized care plan for patients. However, it is crucial for nurses to refrain from conducting assessments solely as a routine procedure, nurses should also apply strong clinical reasoning skills to uncover hidden or indirect cues that might otherwise be missed (van Belle et al., 2020).

The domains on "nursing care in home-based setting", and "management of clients with health conditions", suggests that nurses in home-based care are expected to demonstrate proficiency beyond the usual nursing skills that are expected in a ward-based setting. Nurses are expected to excel in patient education and be skilled in managing patients with multiple chronic conditions independently. These domains echoes Hinck's (2024) theoretical framework for home-based care, particularly the statement on "nurse autonomy". It underscores the need for home-based care nurses to independently identify medical problem, determine when to seek help, and assess the type of help required. Unlike in hospital settings, where an oncoming shift nurse or daily physician visits are available to verify the medical problems, home-based care nurses must rely on their own clinical judgement and management in patient care (Hinck, 2022). They are also expected to initiate conversations about end-of-life care with patients and family members, all while working in an unfamiliar environment. Although patients in home-based care are generally stable, they often present with complex social and health conditions (Hobensack et al., 2023).

Therefore, Cannaby et al. (2020) highlighted that nurse working in community or public health settings, including home-based care, would typically require advanced training to develop awareness of factors to look out for. Another essential scope of practice of home-based nursing care is involving patients and their family members in the delivery of care and decision-making. Engaging them in this process was suggested to empower them and foster a heightened sense of individual capability that would lead to positive behaviors and improved health outcomes (Cardoso Barbosa et al., 2021).

7.2. Attributes that support the scope of practice

Personal attributes refer to the inherent characteristics and traits of an individual, such as communication skills, strong work ethics and empathy. The list of attributes that are expected of home-based care nurses are listed in three domains: "interpersonal relationships and communication"; "collaboration and teamwork"; and "critical thinking and problem-solving".

Strong personal attributes are important for nurses in home-based care to build positive relationships and trust with patients and their family members. Trust between patients and nurses is instrumental in building good nurse-patient rapport. This rapport helps to establish a therapeutic alliance, which, in turn, enhances health outcomes and encourages patient engagement with care plans (Molina-Mula and Gallo-Estrada, 2020). In a qualitative study by Narayan (2022), nurses suggested that sharing the caring power by respecting patient's concerns and preferences when developing care plans and sharing small aspects of their own personal experiences can help to build trust and strengthen the interpersonal relationships. However, home-based care institutions and nursing leaders must be aware that building trusting relationships places high emotional demands on nurses, which can lead to burnout (Elst et al., 2016). Therefore, to mitigate this, it is important that home-based care nurses are provided with proper support to set boundaries, such as separating work from private life and avoiding becoming overinvolved, to cope with these emotional demands effectively (Elst et al., 2016).

One of the primary challenges that nurses faced in home-based care was the differences in the values and beliefs between patients and them (Makhtar et al., 2023). This challenge could be overcome through active listening and open communication so that nurses

would be able to empathize with patients' situations and provide support that meets patients' needs (Haley et al., 2017). This likely explains, why competency related to strong communication skills emerged as one of the key attributes that reached consensus during the content validation.

Effective collaborative work facilitates efficient patient care and prompt prevention of potential errors (Saint-Pierre et al., 2018). In home-based care, nurses often take the lead in planning individual care plans as they have a good understanding of the patient's conditions and needs (Rusli et al., 2023). Hence, nurses are expected to have strong collaboration skills to coordinate care between different healthcare professionals and partners. Collaboration skills are closely tied to the need for nurses to possess good critical thinking and problem-solving abilities, as it will enable them to lead collaborative efforts effectively (Cannaby et al., 2020). Furthermore, these abilities will allow nurses to be able to consider multiple possibilities before making a decision and will allow them to be adaptable to the uncontrolled practice environment of home-based care (Chen et al., 2022).

7.3. Behaviors that support the scope of practice

Nurses' behaviors are crucial in competency development, as one's actions or attitudes are pivotal in shaping their skills and capabilities. Behaviors listed in the domains of "professional development and leadership"; "innovation and research" are important not only for home-based care practice but also for nursing in general. Positive behaviors such as engaging in self-directed learning, reflective learning and being accountable, contribute to the continuous growth and improvement of nurses' professional competencies and patient care (Oldland et al., 2020). Additionally, nurses should also participate in activities that provide valuable insights into the advantages or barriers of new initiatives (Arndt et al., 2023). These participation are pivotal for nurses to keep up with the rapid shifts in patients' caring needs and the incorporation of new technology in nursing care.

7.4. Study limitations

Several study limitations must be acknowledged. Firstly, the opinion of the experts in this study may not be representative of all experts in home-based nursing care. Additionally, the study found that the geographical and practice difference among the experts posed some challenges in validating the competencies. These differences highlighted the importance of carefully interpreting and adapting the competencies to align with the specific settings and practices. However, the maximum variation sampling approach and recruitment of experts from different geographical locations ensures that the study was able to capture the widest range of perspectives possible.

Secondly, the rating for clarity in Round 1 was not measurable due to inconsistent ratings and responses. However, efforts were made to improve the collection of ratings in Round 2 through additional prompts. Furthermore, the open-ended section was able to capture several comments regarding the clarity of the items in Round 1.

Thirdly, the kappa statistics from both rounds suggested only slight to fair agreement among the experts. Three key factors could have contributed to the low kappa statistics namely i) the lack of familiarity and understanding among the experts regarding the expected professional competencies for home-based care nursing, given that the study is one of the first to outline professional competencies for home-based care nursing, ii) the cultural, contextual and subjectivity differences among the experts as the experts came from various practice settings and location which could have led them to have inconsistent understanding and application of the proposed professional competencies and iii) the differing levels of experience and involvement among the experts in research studies requesting their expert opinion. Despite this, it is important for more data in this area to evaluate and refine the list of competencies, which could lead to a greater understanding and consensus regarding the expected professional competencies for home-based nursing care.

Fourthly, this study only examines the content validity of the professional competencies. Further examination is still needed to understand the structural validity of these items especially for nurses operating in different healthcare systems. Nevertheless, this study presented a consolidated list of professional competencies that have achieved an acceptable level of consensus among a panel of experts.

7.5. Implication to practice and future research

There are several implications of this study. First, the list of professional competencies for home-based nursing care identified in this study is among the first to offer evidence-based insights for the healthcare community. The list is important as it informs nurses, healthcare professionals and patients on the scope of practice that nurses are expected to be competent in before practicing in home-based care. Nurses, themselves can use this list to seek for professional development to improve their readiness for home-based care practice. Future research can examine the validity and reliability of these competencies across different healthcare systems to ensure that nurses adhere to professional competencies that are relevant to their specific practice environment. Additionally, further exploration is needed to understand the applicability of these competencies in other areas of home-based care nursing that were excluded from this study due to their specialized requirements, particularly maternal, child and palliative nursing care.

Second, the professional competencies play a vital role to inform nurse leaders in the development of education programs such as professional development or pre-employment training to support nurses in home-based care. These programs could ensure that nurses are equipped with the right level of competency to deliver safe and effective care to patients in a home-based setting. Future research could adopt the professional competencies to develop scales that measure nurses' level of competencies and identify areas that nurses require greater support from the institution or nurse educators.

Third, the professional competencies offer foundational insights that can inform the design of career pathways for home-based care nurses. Clear guidance on advancement opportunities may improve the recruitment and retention of nurses in this setting. As home-based care continues to expand globally, a well-defined career outlook that is guided by the expected professional competencies could help to strengthen the workforce to meet the caring demands of the patients.

8. Conclusion

There is an emergent need to identify the professional competencies for home-based nursing care to ensure the delivery of safe and effective nursing care to patients. This study employed a multiprong approach to identify, develop and validate the content of a professional competency list. The e-Delphi design enabled a panel of experts to reach a consensus on 45 professional competencies categorized under eight domains that are relevant to home-based nursing care practice. The professional competencies not only offer insights into the scope of practice for home-based care nurses, but also create opportunities for nursing leaders and policymakers to develop and implement support systems for nurses to practice in home-based care.

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CRediT authorship contribution statement

Khairul Dzakhirin Bin Rusli: Writing – original draft, Visualization, Formal analysis, Data curation, Conceptualization. **Ying Lau:** Writing – review & editing, Visualization, Formal analysis, Conceptualization. **Siew Tiang Lau:** Writing – review & editing, Visualization. **Laura Schmidt Tham:** Writing – review & editing, Visualization. **Michelle Mong Nee Kee:** Writing – review & editing, Visualization, Data curation. **Qi Wen Ng:** Writing – review & editing, Visualization, Data curation. **Shu Fen Ong:** Writing – review & editing, Visualization, Data curation. **Strickland Karen:** Writing – review & editing, Visualization, Conceptualization. **Sok Ying Liaw:** Writing – original draft, Visualization, Funding acquisition, Formal analysis, Conceptualization.

Declaration of competing interest

All authors declare that they have no conflict of interest.

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Supplementary materials

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