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CURRICULUM FRAMEWORK FOR ADVANCED PRACTICE NURSING IN SUB-SAHARAN AFRICA: A MULTI-METHOD STUDY

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CURRICULUM FRAMEWORK FOR ADVANCED PRACTICE NURSING IN SUB-SAHARAN AFRICA: A MULTI-METHOD STUDY

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Keywords: Advanced Practice Nursing, Curriculum Framework, Sub-Saharan Africa; Nursing Education, Concept-based Curriculum.

ABSTRACT

Objectives: The implementation of Advanced Practice Nursing (APN) programmes in sub-Saharan Africa (SSA) has been difficult due to lack of context-specific curriculum frameworks or benchmarks to guide institutions in developing and implementing APN programmes. A few APN programmes in SSA were benchmarked on western philosophy and materials, making local ownership and sustainability challenging. This paper presents a sub-Saharan Africa-specific Advanced Practice Nursing (Child Health Nurse Practitioner) curriculum framework developed to guide institutions in developing relevant and responsive Advanced Practice Nursing (APN) curricula.

Design: A sequential multimethod study design consisting of a scoping review, Delphi study, framework development by a curriculum team, and evaluation of the curriculum framework by faculty from 16 universities in SSA.

Setting: the study was a sub-Saharan Africa wide study.

Participants: The study included a multinational, multidisciplinary health professionals and curriculum development experts from 15 Universities in 10 sub-Saharan African countries.

Results: A concept-based Advanced Child Health Nurse Practitioner curriculum framework was developed. The faculty evaluating the curriculum for applicability within their institution and the SSA context unanimously stated that the framework is detailed, evidenced-based and can be adapted for other APN specialty areas.

Conclusion: The Child Health Nursing Practitioner curriculum framework is comprehensive, context-specific, has the potential to respond to the special child healthcare needs of sub-Saharan Africa. It is adaptable for other Advanced Practice Nursing speciality programmes in

sub-Saharan Africa. Nursing leaders should lobby for funding and advocate for the introduction of the CHNP programme as a collaborative process between government, clinical services, communities and educational institutions.

ARTICLE SUMMARY

Strengths of this study

- This study presents the first ever concept-based Advanced Practice Nursing curriculum framework developed to guide institutions in the development of concept-based Advanced Practice Nursing curricula in sub-Saharan Africa.
- The multi-method design allowed for the researcher to choose and follow the processes of curriculum framework development
- Multidisciplinary experts from East, West, Central and Southern Africa Multinational participated in this study giving it a wide coverage.

Limitations of this study

- The curriculum framework has not been implemented yet. The researcher cannot guarantee that there will not be challenges in the implementation.
- Only 17 out of the 50 faculty from 10 sub-Saharan African countries responded to the evaluation questionnaire. The researcher cannot tell if the results would have been different if all the invited institutions had respond.

1. INTRODUCTION

Advanced Practice Nursing legislation was established about seven decades ago in developed countries to respond to inequality and poor access to healthcare by the rural and underserved populations [1–4]. Despite the marked exclusion of the rural, underserved and vulnerable population of sub-Saharan Africa who need APNs to respond to their needs, SSA countries are struggling to develop and implement APN programmes. Botswana, Ghana, Kingdom of Eswatini, Malawi, Liberia, South Africa, and Tanzania have all attempted the introduction of one form or another of APN. Difficulties experienced by these programmes include a lack of local ownership, no or inappropriate legislation to regulate and licensing the APNs, inability to sustain the programme and lack of context specific APN benchmark curricula to guide the development of APN programmes in SSA [4–7].

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It is essential to have context specific APN curriculum framework for SSA. A formal curricula consist of three components: the curriculum framework, the syllabus, and textbook and other teaching and learning resources. The curriculum framework is a document that contains standards for a specific curriculum and indicates the context (natural, human and capital resources available) in which the curriculum developers develop curricula whereas the syllabus comprises the aim, content, outcomes and other information related to specific courses as prescribed in the curriculum framework[8]. Stabback [8] outlined the eight common elements of a standard curriculum framework, thus: current context, educational policy statement, broad learning objectives and outcomes, structure of the educational system, structure of the curriculum content, standards of resources required for implementation, teaching methods and assessment and reporting methods. A well-established principle of the use of a curriculum framework is to leave the formulation of the syllabi and lesson plans to the institutions. This allows for flexibility and innovation at the lower level of curriculum implementation [9].

2. AIM

This study sought to develop an Advanced Practice Nursing (Child Health Nurse Practitioner curriculum Framework to serve as a sub-Saharan Africa context-specific guide for developing responsive Advanced Practice Nursing curricula.

3. METHOD

This study applied a multi-method design [10]. A literature review on child health and APN curriculum development in SSA was conducted. The findings of the review were subjected to expert review and inputs through an online expert Delphi. A seven-member curriculum committee was formed to develop concepts for the concept-based curriculum framework using the results from the review and the Delphi. The principal researcher then compiled the curriculum framework using the results from the preceding phases. The international multidisciplinary health experts who took part in the Delphi study were given the draft curriculum framework to review and state any deviations they identified in the framework from the data they provided. Seventeen curriculum development experts from 15 universities in 10 sub-Saharan African countries evaluated the curriculum framework.

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3.1 The Review

Scoping reviews are either stand-alone or pre-systematic reviews that aim in exploring the breadth and depth (in-part) of a research area using both grey and peer-reviewed literature [11–14]. In this study, we applied the scoping review framework developed by Arksey & O’Malley [15] to establish the current state of Advanced Practice Nursing and child health in sub-Saharan Africa [4]. The findings from the studies included in the review were synthesized according to the first three common elements of a curriculum framework, thus: current context, educational policy statement, statement of broad learning objectives and outcomes [8].

3.2 The Delphi

The Delphi technique is a research method in which experts review documents in series in order to reach consensus on what best fits a particular situation or programme [16–18]. In this study, the first two phases of the Delphi survey were used to reach consensus on the current context, educational policy statement and the broad learning objectives from the review. The Delphi questionnaire was developed from the results of the scoping review, pretested by five Master of Science students and reviewed by two child health nursing education experts for face and content validity. The questionnaire consisted of 80 Likert scale questions and 3 comment items. The questionnaire was divided into three sections: current context, educational policy statement and broad learning objectives. This study adopted a five-item Likert scale cum rating: Strongly disagree (1); Disagree (2); Neutral (3); Agree (4) and Strongly agree (5). Data were analysed using percentages, 80% agreement or disagreement was considered a consensus.

The last two phases were used to gather expert preferences on the last five common elements of a curriculum framework, thus: structure of the educational system, structure of the curriculum content, standard resources required for implementation, teaching methods and assessment methods [8]. In phase three, the experts were asked to list topics, teaching and assessment methods for the six domains described under the broad learning objectives: A (Nursing leadership and governance); B (Quality practice); C (Ethico-legal and professionalism); D (Education and research); E (Advanced child health nursing practice) and F (Attitudes and values). In the last phase, the experts listed the resources necessary for the implementation of the Advanced Practice Nursing programme in sub-Saharan Africa.

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3.3 Development of Concepts

The experts preferred the concept-based curriculum to content, outcome or standard-based curricula because of its ability to provoke critical thinking and problem-solving abilities in students with minimum content. Five purposively selected nursing curriculum experts, a paediatrician and a paediatric nurse in addition to the researcher formed the curriculum committee. Twenty-two concepts were developed using instructions for selecting concepts for a concept-based CHNP curriculum framework developed by the researcher to guide the curriculum committee. This is a twelve-page document comprising the overview of the curriculum structure, the knowledge domains from the scoping review, the results of the Delphi, the stages of developing a concept-based curriculum and a graphical guide for selecting concepts and exemplars for an CHNP curriculum synthesized from Ignatavicius'[19] 12-steps of developing a concept-based curriculum. The concepts were analysed by the team using the components of concept analysis outlined by Johnston [20,21].

3.4 Framework Development

The researcher compiled the framework consisting of the eight common components of a curriculum framework.

3.5 Framework Confirmation and Evaluation

The draft curriculum framework was sent via email to the 27 international multidisciplinary health experts who took part in the last phase of the Delphi. The nineteen (19) of participants who responded stated that the framework accurately represents the data they provided. After the confirmation, seventeen curriculum development experts from 15 universities in 10 sub-Saharan African countries were purposively selected to evaluate the curriculum framework. The participants were included if they were faculty of a Department or School of Nursing in sub-Saharan Africa and had extensive research or practice experience in nursing curriculum development. Comments from the experts were used to finalize the curriculum framework.

3.6 Ethical Considerations

Ethical approval has been acquired from the Human Research Ethics Committee, University of Witwatersrand (Number: M160632) and the Noguchi Memorial Institute of Medical Research Institutional Review Board, University of Ghana. All participants gave their informed consent before participating in this study.

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4. RESULTS

4.1 Current Context

Current context refers to the socioeconomic setting within which an Advanced Practice Nursing (Child Health Nurse Practitioner) policy is made and the programme implemented. The population of sub-Saharan Africa is very poor, for instance, about 70% of the sub-Saharan African population is living on less than \$2.00 (R 26.40) per day, while about 48% live on \$1.25 (R16.27) per day [22,23]. About 34 million children (21.23%) of school-going age are not in primary school.

The poor child health services provided in sub-Saharan Africa has led to the devastating rates of preventable child morbidity and mortality in the region. The impact of disease not only affects the child at a younger age but also expose the children to many health challenges in adulthood. Advanced Practice Nursing programmes that have proven to improve access to cost-effective quality healthcare for the rural, hard to reach, populations [4,24]. Even though some institutions and countries within sub-Saharan Africa have shown interest in APN programmes, they lack contextual benchmarks and role models to guide the development and implementation of ANP programmes [4,24].

4.2 The Educational Policy Statement

This describes the goals of governments and institutions for the Advanced Practice Nursing (Child Health Nurse Practitioner) programme [8]. Educational policy is influenced by local health needs and international policy. Sustainable Development Goal 3 demands that preventable deaths of new-born babies and children under the age of 5 years should be ended [25]. Countries all over the world are expected to end preventable deaths with at most 12 neonatal deaths and 25 under-5 deaths per 1000 live births by 2030. Sustainable Development Goal 3 also requires that there must be universal coverage of quality healthcare, medicine and vaccines, and vital health services at an affordable cost [25]. The goal of the APN programme is to train adequate numbers of Advanced Practice Nurses who are willing to provide patient-centred care for the rural population of sub-Saharan Africa. The expert team unanimously asserted that there must be at least one Child Health Nurse Practitioner at every Primary Health

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Care clinic who is competent in the integrated management of childhood diseases (IMCI) and resuscitation of babies.

4.3 Broad Learning Objectives and Outcomes

The Broad learning objectives and outcomes stipulate what the Advanced Practice Nurse (Child Health Nurse Practitioner) should know and be able to do when he or she completes the programme [8]. The outcomes are expressed in a range of domains, including knowledge, understanding, skills, competencies, values and attitudes. The Child Health Nurse practitioner should be knowledgeable, have competent skills and attitudes in the knowledge domains listed in Table 1.

4.4 Structure of the Educational System

The Structure of the educational system stipulates the general educational system within which the Advanced Practice Nursing programme will be implemented as outlined in Table 2. This section of the curriculum framework specifies the duration of the programme, number of school weeks in an academic year, notional hours and associated credits for the Advanced Practice Nursing (Child health Nurse practitioner) programme.

4.5 Structure of the Curriculum Content

The structure of curriculum content defines the concepts for the Child Health Nurse Practitioner programme. The concepts are presented with definition, scope, characteristic features, attributes, exemplars and interrelated concepts presented in Table 3 adapted from Christmals, Crous and Armstrong [24]. The modules developed in this study are presented in Figure 1.

4.6 Standards of Resources Required for Implementation

Standards of resources describe the level of lecturer qualifications, the workload per lecturer, student qualifications and number per class, materials (textbooks, computers and other equipment) and facilities (classrooms, furniture, fittings).

4.6.1 Lecturer qualifications

Nursing lecturers are expected to have a PhD in nursing is recommended. Consideration is given to a Master of Nursing (coursework and research components). Non-nurse lecturers are also expected to have obtained PhD in a specialist field. Consideration is given to a Master of

Medicine and equivalent qualification if there are no PhD holders. All lecturers in the CHNP programme should have at least a Diploma in Health Science Education.

4.6.2 Student resources

A 4-year degree in nursing with a minimum of 60% cumulative average mark is required for admission into the CHNP programme. Two years' minimum clinical practice after Community/National/Youth Service or internship is the prerequisite clinical practice for gaining admission into the CHNP programme. Mathematics, Computing skills, and English/French Language skills are the required skills necessary for gaining admission into the CHNP programme. Paediatric Nursing, Anatomy, Physiology, Psychology, Sociology, Pharmacology, Microbiology, Community Health Nursing, Family Health Nursing, Communicative Skills, Research Methods and Fundamentals of Nursing are the courses the candidate should have taken in an undergraduate programme to qualify for the CHNP programme. Students are expected to have personal materials such as a laptop computer, prescribed textbooks, and a diagnostic set to promote effective learning.

4.6.3 Library resources

Textbooks, computers, internet services, online learning platform (e.g. Sakai, Moodle), subscription to research database and online books.

4.6.4 Classroom resources needed

LCD projector, comfortable table and chairs for students, good ventilation and temperature regulation system, chalkboard and chalk, white/marker board and markers, good lighting, and good ventilation.

4.6.5 Teacher-student ratio

A lecturer student ratio ranges of 1: 7 to 1:14.

4.7 Teaching methods

Teaching Methods describes the range of teaching approaches that might be employed in the implementation of the framework. Experiential learning and problem-based learning, which is adult education oriented, is to be implemented to inculcate the level of critical thinking, problem-solving and ability to apply concepts to general situations to the Child health Nurse Practitioner lecture. The expert team also proposed small group sessions, self-study and blended learning methods.

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4.8 Assessment and reporting methods.

Assessment and reporting methods describe the modes of assessment, the pass marks and how the student achievements are awarded or certified. Assessment should seek to elicit the Child Health Nurse Practitioner's critical thinking, problem-solving and ability to apply concepts to general situations in the healthcare setting and community served. OBSCE, written tests and examinations, viva-voce and take home assessments were proposed by the expert team.

4.9 Other elements

Other elements of this curriculum framework in addition to the 8 elements of a curriculum framework outlined by Stabback (2007) include clinical practice, internship, licensure and continuous professional development (CPD), and adoption and adaptation instructions.

4.9.1 Clinical Training

Clinical training describes the mode of clinical training (clinical practice for learning and role-taking) by the student enrolled in the Child Health Nurse Practitioner Programme. Simulation laboratory, clinical placement facilities, anatomical models, clinical mentors, simulators, clinical supervisors, resuscitation equipment, diagnostic sets, personal protective equipment, and a qualified skills laboratory technician are materials and resources needed for successful clinical training. Between 800-1000 hours of clinical placement for learning and role-taking is prescribed for the 2-years training programme.

4.9.2 Internship

A one-year internship under the supervision of a paediatrician, if available, is recommended.

4.9.3 Licensure and CPD

Licensing of the Advanced Practice Nurse should be done on the discretion of the nursing council under which he or she is registered.

4.9.4 Adoption and Adaptation of the Child Health Nurse Practitioner Curriculum Framework

The framework should be adopted and adapted to suit each country in sub-Saharan Africa. Changes to this curriculum framework could affect the context, aim, knowledge domains, resources and concepts. Due to the expectations of the Advanced Practice Nurses and the aim

of having the Advanced Practice Nursing programme locally relevant and internationally competitive, changes to the level of training and number of years of training are not advised.

4.10 Confirmation and Evaluation of the Curriculum Framework

4.11 Confirmation

The 27 international multidisciplinary health experts who took part in the last phase of the Delphi study were given the draft curriculum framework to review and state any deviations they identified in the framework from the data they provided. Nineteen (19) of the 27 participants responded to the confirmation questionnaire. They all stated that the curriculum framework accurately represented the data they provided for the study.

4.12 Evaluation

Fifty (50) faculty from 38 institutions in 15 sub-Saharan African countries (Botswana, Ethiopia, Ghana, Kenya, Liberia, Malawi, Nigeria, Lesotho, South Africa, Rwanda, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe) were invited to participate. Seventeen faculty from fifteen nursing education institutions in ten sub-Saharan African countries (Ghana 2, Botswana 1, Swaziland 2, South Africa 1, Nigeria 2, Rwanda 2, Uganda 1, Kenya 2, Malawi 1 and Zambia 1) responded to the evaluation questionnaire before the close of the study. One response was incomplete and was excluded from the study, leaving 16. All the experts stated the framework was applicable in sub-Saharan Africa. Some participants said:

“It is applicable because the framework responds to the needs of the country. However, it will require a change in policy especially in regard to the scope of nurses.”-Rwanda 1

“There is an adequate, easy-to-understand description of the current context, educational policy statement, statement of broad learning objectives, the structure of the Child Health Nurse Practitioner programme.”-Nigeria 1

“It is evidence-based and issues discussed affect us as a country. The issues of high neonatal, infant and child mortality-SDG 3. There is a need for our country to train nurses who will provide quality care to the children as paediatricians do not spend a long time with the children. Our country has 79% of the population residing in rural areas.”-Swaziland 1

The participants also believe that the ACHNP curriculum framework can be adapted for other ANP specialities. A faculty stated that the guidelines provided for adoption and adaptation of the curriculum framework will be very helpful for her institution and country. Three faculty indicated that the curriculum framework will be easily adopted if it is adapted using country-

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specific burden of diseases. Other recommendations include disseminating the framework on compact disks and other electronic formats to make it accessible to the stakeholders of nursing in sub-Saharan Africa. These institutions are major gatekeepers for nursing education programmes in every country. The ability of this programme to make any impact in sub-Saharan Africa will depend, largely, on their approval.

5. DISCUSSION

This is the first postgraduate level concept-based curriculum framework to be developed; it was laborious trying to determine how many concepts were enough and which ones to include. The difficulty in determining how many concepts to be included in the curriculum was also reported by Giddens, Wright & Gray[26] in their state-wide undergraduate concept-based curriculum development.

The APNs are expected to practice extended roles that involve comprehensive assessment and diagnosing, managing of illness and diseases, which require extensive knowledge and skills in the disease process to function effectively. The concepts for Advance Nursing Practice were carefully selected to equip the APN with the needed skills in clinical practice. Fifty percent of the concepts covered the Advance Nursing Practice speciality area. The rest of the included concepts covered research, education and health systems, which comprises vital knowledge, skills and attitudes needed by the Advanced Practice Nurse to function effectively.

For the APNs to be competent in evidence-based practice, they need to be able to generate evidence themselves and be competent in utilizing such evidence. The APN will be expected to do clinical teaching for nursing programmes and to educate the patient in the clinical setting. To do that, the concepts on nursing education are necessary. The APN will acquire enough knowledge, skills and attitudes to teach students and clients effectively in hospital settings. The health system is the larger context within which the APN will practice. To be able to function within the confines of the law and to produce positive effects in practice, the APN needs to understand the health system, the players in it and their demands. Three concepts were included under health systems to guide the APN to understand the health systems. He or she is envisaged as the leader at the community healthcare level, therefore, leadership and governance skills are important for the APN's practice.

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The knowledge domains defined in this study are not that different from the competencies of advanced practice nursing prescribed by the Nursing and Midwifery Board of Ireland [27]: They are also in concordance with the course structure of the Nurse Practitioner programme implemented by the University of British Columbia (2017), with the exception that the University of British Columbia’s programme lays emphasis on pathophysiology and pharmacology. The Royal College of Nursing [29] also emphasised pathophysiology and pharmacology. All other components are the same, with the exception that this curriculum is concept-based and does not encourage the emphasis on content, rather concepts such as decision making and treatment selection, which includes pathophysiology and pharmacology. In a study to explore the fundamental aspects of Advanced Practice Nursing in aesthetic medicine, Greveson [30] reported “developing a nurse-led service; patient assessment and decision making; consultation skills; treatment selection; non-medical prescribing; insurance and record-keeping; audit and research and Continuous Professional Development” as the components of aesthetic medicine Advanced Practice Nursing. These components are consistent with the concepts reported in this study, with a few nomenclature differences.

The concepts developed in this study are of higher thinking and problem solving than those developed for undergraduate nursing by Giddens, as the Advanced Practice Nurses are expected to practice at a higher level than the graduate nurses - advanced assessment, diagnosing, prescribing and management of care [31].

The structure of the education system reported in this study is supported by the Advanced Practice Nursing programmes implemented in the United States of America, United Kingdom, Canada and other parts of the world. The differences are the number of credits for the programme, type of the curriculum and context in which the programme is being implemented. Differences in credits are a result of the different credit systems used in different jurisdictions [1,28]. The structure of the curriculum content has been organized into modules, which are made up of concepts. This is a unique way of curriculum content organization, as the concept-based curricula reported by other authors [19,32,33] were organized into courses. The modular structure of curriculum best suits postgraduate education and reformed higher education from its traditional subject, course, semester nature [34].

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The concept-based epistemological perspective of this curriculum is essential in reducing the content of the Advanced Practice Nursing curriculum, while giving the Child Health Nurse Practitioner the opportunity to acquire the knowledge, skills and attitudes needed to function at a competent level of critical thinking, problem-solving. Less content will also give the CHNPs enough time for clinical practice.

6. CONCLUSION

The Child Health Nursing Practitioner curriculum framework is comprehensive, context-specific, has the potential to respond to the special child healthcare needs of sub-Saharan Africa and is adaptable for other Advanced Practice Nursing speciality programmes in sub-Saharan Africa. The nursing leadership should lobby and professional advocacy for funding and introduction of CHNP programme as a collaborative process between government, clinical services, the public and educational institutions, and propose how this can be done.

7. AUTHOR CONTRIBUTIONS

Both Authors Dr Christmal D. **Christmals** and Dr Susan J. **Armstrong** were involved in study conceptualization, literature review, data collection, data analysis, result interpretation and manuscript writing.

8. ACKNOWLEDGEMENT

We wish to acknowledge Professor Janet Gross and Mr Kizito Aidam for editing this work.

9. CONFLICT OF INTEREST

There were no conflicts of OR COMPETING interest as far as this manuscript is concerned.

10. FUNDING

This study is self-funded.

11. DATA SHARING

Data collected for this study has been deposited in the Mendeley database: Christmals, Christmal (2019), "Dataset_Concepts for Advanced Practice Nursing Curriculum in Sub-Saharan Africa", Mendeley Data, v1 <http://dx.doi.org/10.17632/2kmpt2wg9s.1> [35].

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Table 1: Knowledge Domains of the Advanced Child Health Nurse Practitioner

Domain	Brief Description
Domain A: Nursing Leadership, and Governance	The key responsibilities of APNs in their setting is healthcare governance, leadership, management, advocacy and resource management
Domain B: Quality Practice	This domain covers issues of quality in healthcare delivery and continuous professional development.
Domain C: Ethico-legal Practice and Professionalism	This domain covers the ethos of professional practice. It also refers to all the legal aspects of the Advanced Practice Nurse’s practice
Domain D: Education and Research	This domain covers clinical teaching, community education and research
Domain E: Advanced Child Health Nursing Practice	Advanced Child Health Nurse Practitioners (CHNPs) are expected to conduct assessment (history taking, physical examination, request and interpret laboratory and imaging studies), diagnose children, prescribe treatment (pharmacological and non-pharmacological), admit, discharge, refer and comprehensively manage patients in their practice settings.
Domain F: Attitudes and Values	This domain deals with patient and family centred care and cultural sensitivity.

Table 2: Structure of the educational system

Variable	Description
Level	Master’s level (SAQA NQF level 9)
Ontological Orientation	Andragogy and experiential learning approaches
Epistemological orientation	Concept-based curriculum/learning
Total Credit	360 credits (180 Credits per year)
Number of years	2-years full-time
Number of weeks	40 weeks a year
Number of Hours per week	40 hours a week
Total Clinical Hours	800-1000 hours
Internship	One-year post graduate internship

attributes, exemplars and interrelated concepts in Table 3.

Table 3: Module Credits for Child Health Nurse Practitioner Curriculum

Module (% Of Total Credits)	Concepts	Characteristic Features	Definition	Exemplars	Interrelated Concepts
HEALTH SYSTEM (10%)	Transformational leadership	Execution, partnership, others, communication, self (to set a personal example), Ideal impact, strong motivation, intellectual stimulation, and personal consideration	Transformational leadership is the process in which a leader inspires the followers in developing higher-order goals and motivating them to reach such goals through the refinement of the followers' worldview and attitude.	Large resource management; inter-level patient referral; changing curriculum	Nursing case management; systems thinking; governance
	Governance	Accountable, transparent, responsive, rule of law, stable, equity, empowerment, inclusive, consensus orientation, effectiveness and efficiency	Governance refers to the legally recognised structures and procedures that are created to guarantee "accountability, transparency, responsiveness, rule of law, stability, equity and inclusiveness, empowerment, and broad-based participation" in an organization, institution or society.	Financial audit; financial audit; universal coverage	Systems thinking; transformational leadership
	Systems thinking	Leadership and governance, service delivery, health system financing, health workforce, medical products, vaccines and technologies, health information systems, systems organization, systems network, systems dynamics, systems knowledge	Systems thinking is a quality improvement process in which the understanding of the relationships and interaction between the components of a system is engineered to generate synergy in the system.	Quality improvement project; memorandum of understanding; development of community outreach	Influencing curriculum; clinical assessment; quality of care
GENERIC ADVANCED PRACTICE NURSING CONCEPTS (20%)	Quality of care	Effective, efficient, accessible, acceptable and equitable	Quality is defined as conforming to specified standards of a product or service, i.e. meeting or exceeding the expectations of the population served.	Clinical audit; SMART; universal coverage	Research dissemination; teaching; influencing curriculum
	Clinical assessment	History taking, physical assessment (biopsychosocial, spiritual, emergency) laboratory examination, imaging studies	Clinical assessment is the process of gathering patient information through patient history taking, physical assessment, laboratory examination and imaging studies to guide the clinician's and patient's decision making processes especially in the selection of treatment or referral for an appropriate treatment.	Assessment critically ill children; assessing diarrhoeal diseases; assessing for child abuse	Teaching; quality of care; clinical decision making
	Clinical decision making	Pathophysiology, clinical judgement, diagnosis, current-evidence, clinical expertise and patient preferences and characteristics (uniqueness, criticalness, urgency, stability, risks), variables (certainty, similarity, congruence/conflict)	Clinical decision making, synonymous with clinical diagnosis, is the process of deciding on the health status of the client in order to select the best treatment that responds to the client's condition with the primary purpose of improving the health of the client and community.	Critically ill child; use clinical guidelines; clinical audit	Quality of care; teaching
	Treatment selection	Pharmacological, non-pharmacological (complementary and alternative medicine), pharmacovigilance, cost-effectiveness	Treatment selection is the selection of appropriate and cost-effective treatment that responds to patients' needs for a requisite period of time.	Critically ill child; clinical pathways; diarrhoeal diseases	Quality of care; clinical assessment; clinical decision making; nursing case management
	Nursing case management	Assessment, clinical decision making, treatment selection, referral services, follow-up care and costing of services, primary healthcare, family centred care, referral system, clinical progress, safe, timely, effective, efficient, cost-effective, equitable and patient-centred, payer, level of care, benefits	Case management refers to the actions taken by the Advanced Practice Nurse in coordinating ongoing comprehensive medical services (assessment, clinical decision-making, treatment selection, referral services, follow-up care and costing of healthcare) that responds to the needs of the patient, family or community.	Inter-level patient referral; use of clinical guidelines; clinical audit	Quality of care; clinical assessment; clinical decision making; treatment selection
CHILD HEALTH NURSE PRACTITIONER SPECIALITY CONCEPTS (30%)	Child mortality	Pneumonia, Diarrhoeal disease, malaria, HIV, severe malnutrition and contributing factors (country of birth, preterm birth, poverty, gender, neonate, rural settlement, urban slum settlement, small for age, child abuse)	Child morbidity is the percentage of children who contracted a disease, fell ill or were injured within a specific period in a defined population. Child mortality is the number of child deaths per 1000 live births in a specified geographical or political location.	Managing advert events; managing critically ill children; managing pneumonia	Quality of care; clinical assessment; clinical decision making
	Medical record management	Principles (evidence, legal, confidential, safety, critical information, retention period); Uses (continuity of care, quality improvement, research, medicolegal); Types (paper based, electronic)	Medical record management refers to the organizational policies, regulations and procedures governing the collating, handling, storage and use of patient medical records.	Patient kardex; inter-level patient referral; clinical audit	Nursing research; quality of care

Module (% Of Total Credits)	Concepts	Characteristic Features	Definition	Exemplars	Interrelated Concepts
		electronic); Content (demographic, consent, admission, management, discharge, financial)			
NURSING EDUCATION (10%)	Teaching	Health promotion, health education, clinical teaching, patient education, curriculum, andragogy, learning, assessment, knowledge brokering	Teaching is the process by which the teacher (lecturer, facilitator etc.) guide the student to acquire certain knowledge, skills and attitudes that are intentionally planned through an institutional curriculum.	patient education; clinical nursing education; health promotion	Influencing curriculum; quality of care; transformational leadership
	Influencing curriculum	Advocacy, professional organization, needs analysis, Programme development, Programme evaluation, feedback	Influencing curriculum refers to advocating and positively determining the course of teaching and learning in nursing.	Clinical nursing education; curriculum change; child health advocacy.	Nursing research; teaching; transformational leadership
NURSING RESEARCH (30%)	Nursing Research	Research proposal, data collection, data analysis, interpretation, dissemination, principles (privacy, anonymity and confidentiality, ethical approval, institutional approval)	Nursing research is defined as a “diligent and systematic enquiry to validate and refine existing knowledge and generate new knowledge”.	research proposal development; literature review; writing a research report	Teaching; influencing curriculum; research
	Research dissemination	Institutional factors (dissemination strategy, organizational culture, incentives); Values and skills (academic integrity, plagiarism, academic writing); Types (research report, journal papers, conferences presentation, research brief)	Dissemination is a well-planned process in which research findings are exposed to a wider audience through written and verbal means, for appropriate evaluation and inclusion into policy and healthcare practice to facilitate evidence-based practice.	evidence-based poster development; writing journal article; writing research report;	Nursing research; transformational leadership; influencing curriculum

[Adapted from Christmals, C. D., Crous, L., & Armstrong, S. J. (2019). The Development of Concepts in Concept-Based Advanced Practice Nursing (Child Health Nurse Practitioner) Curriculum for Sub-Saharan Africa. International Journal of Nursing Sciences, 12(3), 1410–1422]

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PROGRAMME OUTCOME: To produce a competent Advanced Practice Nurses who will produce evidence-based, culturally sensitive and cost-effective quality child health care to the underserved populations in sub-Saharan Africa.					
MODULES	HEALTH SYSTEM	GENERIC APN CONCEPTS	CHNP SPECIALTY CONCEPTS	NURSING EDUCATION	NURSING RESEARCH
CONCEPTS	Transformational leadership, Governance, Systems thinking	Quality of care, Clinical assessment, Clinical decision making, Treatment selection, Medical record management	Nursing case management, Child mortality	Teaching, influencing curriculum	Nursing research, Research dissemination
MODULE OUTCOMES	The APN will be able to comprehend national and international health systems and their influence on child health nursing and be able to lead and transform the health system at the local level in order to facilitate the provision of evidence-based, culturally sensitive and cost-effective quality child health care to the underserved populations in sub-Saharan Africa	The CHNP will be able to acquire competent knowledge, skills and attitudes need to provide evidence-based, culturally sensitive and cost-effective quality child health care provided for the underserved populations in sub-Saharan Africa (assess, diagnose, manage and record)	The CHNP will be able to plan, execute and evaluate evidence-based, culturally sensitive and cost-effective quality child health care to the underserved populations in sub-Saharan Africa with the aim of reducing child mortality and improving other healthcare indices	The CHNP will be able to improve evidence-based, culturally sensitive health information to the child, family and community in order to promote, restore or maintain their health status and to inculcate the knowledge, attitudes and behaviours necessary to provide evidence-based, culturally sensitive cost-effective quality child health care to the underserved populations in sub-Saharan Africa through nursing students through clinical teaching.	The CHNP will be able to propose, conduct research and synthesize research findings in order to provide evidence-based, culturally sensitive and cost-effective quality child health care to the underserved populations in sub-Saharan Africa

Figure 1: Structure of the curriculum content

Reporting checklist for quality improvement study.

Based on the SQUIRE guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the SQUIRE reporting guidelines, and cite them as:

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	Reporting Item	Page Number
Title		
	#1 Indicate that the manuscript concerns an initiative to improve healthcare (broadly defined to include the quality, safety, effectiveness, patientcenteredness, timeliness, cost, efficiency, and equity of healthcare)	1
Abstract		
	#02a Provide adequate information to aid in searching and indexing	1
	#02b Summarize all key information from various sections of the text using the abstract format of the intended publication or a structured summary such as: background, local problem, methods, interventions, results, conclusions	1
Introduction		
Problem description	#3 Nature and significance of the local problem	2

1	Available	#4	Summary of what is currently known about the problem, including	2
2	knowledge		relevant previous studies	
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5	Rationale	#5	Informal or formal frameworks, models, concepts, and / or theories used	3
6			to explain the problem, any reasons or assumptions that were used to	
7			develop the intervention(s), and reasons why the intervention(s) was	
8			expected to work	
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11	Specific aims	#6	Purpose of the project and of this report	3
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14	Methods			
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16	Context	#7	Contextual elements considered important at the outset of introducing	3
17			the intervention(s)	
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20	Intervention(s)	#08a	Description of the intervention(s) in sufficient detail that others could	N/A
21			reproduce it	
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24	Intervention(s)	#08b	Specifics of the team involved in the work	N/A
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26	Study of the	#09a	Approach chosen for assessing the impact of the intervention(s)	N/A
27	Intervention(s)			
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30	Study of the	#09b	Approach used to establish whether the observed outcomes were due to	N/A
31	Intervention(s)		the intervention(s)	
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34	Measures	#10a	Measures chosen for studying processes and outcomes of the	4
35			intervention(s), including rationale for choosing them, their operational	
36			definitions, and their validity and reliability	
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39	Measures	#10b	Description of the approach to the ongoing assessment of contextual	3-5
40			elements that contributed to the success, failure, efficiency, and cost	
41				
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43	Measures	#10c	Methods employed for assessing completeness and accuracy of data	3-5
44				
45	Analysis	#11a	Qualitative and quantitative methods used to draw inferences from the	3-5
46			data	
47				
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49	Analysis	#11b	Methods for understanding variation within the data, including the	N/A
50			effects of time as a variable	
51				
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53	Ethical	#12	Ethical aspects of implementing and studying the intervention(s) and	5
54	considerations		how they were addressed, including, but not limited to, formal ethics	
55			review and potential conflict(s) of interest	
56				
57				
58	Results			
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60				

	#13a	Initial steps of the intervention(s) and their evolution over time (e.g., time-line diagram, flow chart, or table), including modifications made to the intervention during the project	6-11
	#13b	Details of the process measures and outcome	6-11
	#13c	Contextual elements that interacted with the intervention(s)	6
	#13d	Observed associations between outcomes, interventions, and relevant contextual elements	N/A
	#13e	Unintended consequences such as unexpected benefits, problems, failures, or costs associated with the intervention(s).	N/A
	#13f	Details about missing data	6-10
Discussion			
Summary	#14a	Key findings, including relevance to the rationale and specific aims	11
Summary	#14b	Particular strengths of the project	11-13
Interpretation	#15a	Nature of the association between the intervention(s) and the outcomes	N/A
Interpretation	#15b	Comparison of results with findings from other publications	11-13
Interpretation	#15c	Impact of the project on people and systems	12-13
Interpretation	#15d	Reasons for any differences between observed and anticipated outcomes, including the influence of context	11-13
Interpretation	#15e	Costs and strategic trade-offs, including opportunity costs	11-13
Limitations	#16a	Limits to the generalizability of the work	N/A
Limitations	#16b	Factors that might have limited internal validity such as confounding, bias, or imprecision in the design, methods, measurement, or analysis	1
Limitations	#16c	Efforts made to minimize and adjust for limitations	1
Conclusion	#17a	Usefulness of the work	13
Conclusion	#17b	Sustainability	13
Conclusion	#17c	Potential for spread to other contexts	N/A
Conclusion	#17d	Implications for practice and for further study in the field	13

1	Conclusion	#17e	Suggested next steps	13
2				
3	Other			
4	information			
5				
6				
7	Funding	#18	Sources of funding that supported this work. Role, if any, of the funding	13
8			organization in the design, implementation, interpretation, and reporting	
9				

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12 NC 4.0. This checklist was completed on 06. November 2019 using <https://www.goodreports.org/>, a tool made
13 by the [EQUATOR Network](#) in collaboration with [Penelope.ai](#)
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CURRICULUM FRAMEWORK FOR ADVANCED PRACTICE NURSING IN SUB-SAHARAN AFRICA: A MULTIMETHOD STUDY

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CURRICULUM FRAMEWORK FOR ADVANCED PRACTICE NURSING IN SUB-SAHARAN AFRICA: A MULTIMETHOD STUDY

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Keywords: Advanced Practice Nursing, Curriculum Framework, Sub-Saharan Africa, Nursing Education, Concept-based Curriculum.

ABSTRACT

Objectives: The implementation of Advanced Practice Nursing (APN) programmes in sub-Saharan Africa (SSA) has been difficult due to lack of SSA-specific curriculum frameworks or benchmarks to guide institutions in developing and implementing APN programmes. A few APN programmes in SSA were benchmarked on western philosophy and materials, making local ownership and sustainability challenging. This paper presents a sub-Saharan Africa-specific concept-based Advanced Practice Nursing (Child Health Nurse Practitioner) curriculum framework developed to guide institutions in developing relevant and responsive Advanced Practice Nursing (APN) curricula in order to qualify Child Health Nurse Practitioners and contribute to decreased incidence of preventable deaths of children in the sub-Saharan Africa region.

Design: A sequential multimethod study design consisting of a scoping review, Delphi study, framework development by a curriculum team, and evaluation of the curriculum framework by faculty from 15 universities in SSA.

Setting: the study was a sub-Saharan Africa wide study.

Participants: The study included multinational, multidisciplinary health professionals and curriculum development experts from 15 universities in 10 sub-Saharan African countries.

Results: A concept-based Advanced Child Health Nurse Practitioner curriculum framework was developed. The faculty evaluating the curriculum for applicability within their institution and the SSA context unanimously stated that the framework is detailed, evidenced-based and can be adapted for other APN speciality areas.

Conclusion: The Child Health Nursing Practitioner curriculum framework is comprehensive, context-specific and has the potential to respond to the special child healthcare needs of sub-Saharan Africa. It is adaptable for other Advanced Practice Nursing speciality programmes in sub-Saharan Africa. Nursing leaders should lobby for funding and advocate for the introduction of the CHNP programme as a collaborative process between government, clinical services, communities and educational institutions.

ARTICLE SUMMARY

Strengths and limitations of this study

- The multimethod design allowed for the researcher to choose and follow the processes of curriculum framework development
- Multidisciplinary experts from East, West, Cantal and Southern Africa participated in this study giving it a wide coverage and multidisciplinary input.
- Though the use of nominal group technique in addition to the Delphi method would have been more appropriate for the evaluation of scoping review results and providing the content of the curricula, it was not possible due to the vastness of the context and funding limitations.
- The authors cannot guarantee that there will not be challenges in the implementation of the curriculum framework.
- Only 17 faculty from 10 sub-Saharan African countries responded to the evaluation questionnaire – the authors cannot tell if the results would have been different if all the nursing institutions in sub-Saharan Africa responded.

1. INTRODUCTION

Advanced Practice Nursing legislation was established about seven decades ago in developed countries to respond to inequality and poor access to healthcare by the rural and underserved populations [1– 4]. Sub-Saharan African countries are struggling to develop and implement APN programmes even though they need APNs to respond to needs of the excluded rural, underserved and vulnerable population. The population of sub-Saharan Africa is very poor, for instance, about 70% of the sub-Saharan African population is living on less than \$2.00 (R 26.40) per day, while about 48% live on \$1.25 (R16.27) per day [5,6]. About 34 million children (21.23%) of school-going age are not in primary school. The poor child health services provided in sub-Saharan Africa has led to the devastating rates of preventable child morbidity and mortality in the region. The impact of disease not only affects the child at a younger age

but also exposes the children to many health challenges in adulthood. Advanced Practice Nursing programmes have proven to improve access to cost-effective quality healthcare for the rural, hard to reach, populations [4,7].

Sustainable Development Goal 3 demands that preventable deaths of new-born babies and children under the age of 5 years should be ended [8]. Countries all over the world are expected to end preventable deaths with at most 12 neonatal deaths and 25 under-5 deaths per 1000 live births by 2030. Sustainable Development Goal 3 also requires that there must be universal coverage of quality healthcare, medicine and vaccines, and vital health services at an affordable cost [8].

Botswana, Ghana, Kingdom of Eswatini, Malawi, Liberia, South Africa, and Tanzania have all attempted the introduction of one form or another of APN. Difficulties experienced by these programmes include a lack of local ownership, inappropriate or no legislation to regulate and license the APNs, inability to sustain the programme and lack of context-specific APN benchmark curricula to guide the development of APN programmes in SSA [4,9–11]. It is essential to have a context-specific APN curriculum framework for SSA. A formal curriculum consists of three components: the curriculum framework, the syllabus and textbook and other teaching and learning resources. The curriculum framework is a document that contains standards for a specific curriculum and indicates the context (natural, human and capital resources available) in which the curriculum developers develop curricula whereas the syllabus comprises the aim, content, outcomes and other information related to specific courses as prescribed in the curriculum framework [12]. Stabback [12] outlined the eight common elements of a standard curriculum framework thus: current context, educational policy statement, broad learning objectives and outcomes, structure of the educational system, structure of the curriculum content, standards of resources required for implementation, teaching methods and assessment and reporting methods. A well-established principle of the use of a curriculum framework is to leave the formulation of the syllabi and lesson plans to the institutions. This allows for flexibility and innovation at the lower level of curriculum implementation [13].

2. AIM

This study sought to develop an Advanced Practice Nursing (Child Health Nurse Practitioner) curriculum framework to serve as a sub-Saharan Africa context-specific guide for developing responsive Advanced Practice Nursing curricula in order to qualify Child Health Nurse

Practitioners and contribute to decreased incidence of preventable deaths of children in the sub-Saharan Africa region.

3. METHOD

This study applied a multimethod design [14]. A literature review on child health and APN curriculum development in SSA was conducted. The findings of the review were subjected to expert review and inputs through an online expert Delphi. A seven-member curriculum committee was formed to develop concepts for the concept-based curriculum framework using the results from the review and the Delphi. The principal researcher then compiled the curriculum framework using the results from the preceding phases. The international multidisciplinary health experts who participated in the Delphi study were given the draft curriculum framework to review and state any deviations they identified in the framework from the data they provided [15]. Seventeen curriculum development experts from 15 universities in 10 sub-Saharan African countries evaluated the curriculum framework (Figure 1).

3.1 The Review

Scoping reviews are either stand-alone or pre-systematic reviews that aim at exploring the breadth and depth (in-part) of a research area using both grey and peer-reviewed literature [16–19]. In this study, we applied the scoping review framework developed by Arksey & O’Malley [20] to establish the current state of Advanced Practice Nursing and child health in sub-Saharan Africa [4]. The findings from the studies included in the review were synthesised according to the first three common elements of a curriculum framework, thus: current context, educational policy statement, statement of broad learning objectives and outcomes [12].

3.2 The Delphi

The Delphi technique is a research method in which experts review documents in series in order to reach consensus on what best fits a particular situation or programme [21–23]. The Delphi technique could take one to five or more stages depending on how quickly the expert committee reaches consensus [21,22,24,25].

In this study, the Delphi survey was conducted to contextualise the findings of the scoping review and to collect information from the multidisciplinary team on the structure of the educational system, content, teaching and learning methods, and resources needed to implement the Child Health Nurse Practitioner programme in SSA.

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3.2.1 Delphi Phase 1

The Delphi questionnaire was developed from the results of the scoping review by the researchers, pretested by five Master of Science students from five different countries and reviewed by two child health nursing education experts for face and content validity. The questionnaire consisted of 80 Likert scale questions and 3 comment items. The questionnaire was divided into three sections: current context, educational policy statement and broad learning objectives. This study adopted a five-item Likert scale cum rating: Strongly disagree (1); Disagree (2); Neutral (3); Agree (4) and Strongly agree (5). The first phases of the Delphi survey data were analysed using percentages; 80% agreement or disagreement was considered to be consensus.

Delphi Phase 2

Out of the 80 Likert scale questions in phase 1, consensus was reached on 71. The results of phase 1 were presented to the experts. The nine (9) questions on which consensus was not reached were rephrased and reposted for response by the experts. Consensus was then reached on the nine questions in phase 2. The second phase of the Delphi saw an attrition of eleven (11) experts, leaving 27 (21 nurses, five public health practitioners and one medical practitioner) expert participants.

3.2.2 Delphi Phases 3 and 4

The last two phases were used to gather expert preferences on the last five common elements of a curriculum framework, thus: structure of the educational system, structure of the curriculum content, standard resources required for implementation, teaching methods and assessment methods [12]. In phase three, the experts were asked to list topics, teaching and assessment methods for the six domains described under the broad learning objectives: A (Nursing leadership and governance); B (Quality practice); C (Ethico-legal and professionalism); D (Education and research); E (Advanced child health nursing practice) and F (Attitudes and values).

In the last phase, the experts listed the resources necessary for the implementation of the Advanced Practice Nursing programme in sub-Saharan Africa. All the twenty-seven experts who completed phase two also completed phases three and four, with a response rate of 100 percent.

3.3 Development of Concepts

The experts who participated in the Delphi preferred the concept-based curriculum to content, outcome or standard-based curricula because of its ability to provoke critical thinking and

problem-solving abilities in students with minimum content. Five purposively selected nursing curriculum experts, a paediatrician and a paediatric nurse in addition to the researcher formed the curriculum committee. Twenty-two concepts were developed using instructions for selecting concepts for a concept-based CHNP curriculum framework developed by the researcher to guide the curriculum committee. This is a twelve-page document comprising the overview of the curriculum structure, the knowledge domains from the scoping review, the results of the Delphi, the stages of developing a concept-based curriculum and a graphical guide for selecting concepts and exemplars for a CHNP curriculum synthesised from Ignatavicius'[26] 12-steps of developing a concept-based curriculum. The concepts were analysed by the team using the components of concept analysis outlined by Johnston [27,28].

3.4 Framework Development, Confirmation and Evaluation

The principal researcher compiled the framework consisting of the eight common components of a curriculum framework listed in 1.0. The draft curriculum framework was sent via email to the 27 international multidisciplinary health experts who participated in the last phase of the Delphi. Nineteen (19) of participants who responded stated that the framework accurately represents the data they provided. After the confirmation, seventeen curriculum development experts from 15 universities in 10 sub-Saharan African countries were purposively selected to evaluate the curriculum framework. The participants were included if they were faculty of a Department or School of Nursing in sub-Saharan Africa and had extensive research or practice experience in nursing curriculum development. Comments from the curriculum development experts were used to finalise the curriculum framework.

3.5 Patient and Public Involvement

No patient involved

3.6 Ethical Considerations

Ethical approval has been acquired from the Human Research Ethics Committee, University of Witwatersrand (Number: M160632) and the Noguchi Memorial Institute of Medical Research Institutional Review Board, University of Ghana. All participants gave their informed consent before participating in this study.

4. RESULTS

4.1 Current Context

Current context refers to the socioeconomic setting within which an Advanced Practice Nursing (Child Health Nurse Practitioner) policy is made and the programme implemented. The population of sub-Saharan Africa is very poor, for instance, about 70% of the sub-Saharan African population is living on less than \$2.00 (R 26.40) per day, while about 48% live on \$1.25 (R16.27) per day [5,6]. About 34 million children (21.23%) of school-going age are not in primary school.

The poor child health services provided in sub-Saharan Africa have led to the devastating rates of preventable child morbidity and mortality in the region. The impact of disease not only affects the child at a younger age but also exposes the children to many health challenges in adulthood. Advanced Practice Nursing programmes have proven to improve access to cost-effective quality healthcare for the rural, hard to reach, populations [4,7].

Even though some institutions and countries within sub-Saharan Africa have shown interest in APN programmes, they lack contextual benchmarks and role models to guide the development and implementation of ANP programmes [4,7].

4.2 The Educational Policy Statement

This describes the goals of governments and institutions for the Advanced Practice Nursing (Child Health Nurse Practitioner) programme [12]. Educational policy is influenced by local health needs and international policy. Sustainable Development Goal 3 demands that preventable deaths of new-born babies and children under the age of 5 years should be ended [8]. Countries all over the world are expected to end preventable deaths with at most 12 neonatal deaths and 25 under-5 deaths per 1000 live births by 2030. Sustainable Development Goal 3 also requires that there must be universal coverage of quality healthcare, medicine and vaccines, and vital health services at an affordable cost [8]. The goal of the APN programme is to train adequate numbers of Advanced Practice Nurses who are willing to provide patient-centred care for the rural populations of sub-Saharan Africa. The expert team unanimously asserted that there must be at least one Child Health Nurse Practitioner who is competent in the integrated management of childhood diseases (IMCI) and resuscitation of babies at every Primary Health Care clinic.

4.3 Broad Learning Objectives and Outcomes

The broad learning objectives and outcomes stipulate what the Advanced Practice Nurse (Child Health Nurse Practitioner) should know and be able to do when he or she completes the programme [12]. The outcomes are expressed in a range of domains, including knowledge, understanding, skills, competencies, values and attitudes. The Child Health Nurse practitioner should be knowledgeable, have competent skills and attitudes in the knowledge domains listed in Table 1.

Table 1: Knowledge Domains of the Advanced Child Health Nurse Practitioner

Domain	Brief Description
Domain A: Nursing Leadership and Governance	The key responsibilities of APNs in their setting are healthcare governance, leadership, management, advocacy and resource management
Domain B: Quality Practice	This domain covers issues of quality in healthcare delivery and continuous professional development.
Domain C: Ethico-legal Practice and Professionalism	This domain covers the ethos of professional practice. It also refers to all the legal aspects of the Advanced Practice Nurse’s practice
Domain D: Education and Research	This domain covers clinical teaching, community education and research
Domain E: Advanced Child Health Nursing Practice	Advanced Child Health Nurse Practitioners (CHNPs) are expected to conduct assessment (history taking, physical examination, request and interpret laboratory and imaging studies), diagnose children, prescribe treatment (pharmacological and non-pharmacological), admit, discharge, refer and comprehensively manage patients in their practice settings.
Domain F: Attitudes and Values	This domain deals with patient and family centred care and cultural sensitivity.

4.4 Structure of the Educational System

The structure of the educational system stipulates the general educational system within which the Advanced Practice Nursing programme will be implemented as outlined in Table 2. This section of the curriculum framework specifies the duration of the programme, number of school weeks in an academic year, notional hours and associated credits for the Advanced Practice Nursing (Child Health Nurse Practitioner) programme.

Table 2: Structure of the Educational System

Variable	Description
Level	Master’s level (SAQA NQF level 9)
Ontological orientation	Andragogy and experiential learning approaches
Epistemological orientation	Concept-based curriculum/learning
Total credit	360 credits (180 credits per year)
Number of years	2-years full-time
Number of weeks	40 weeks a year

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Number of hours per week	40 hours a week
Total clinical hours	800 -1000 hours
Internship	One-year post graduate internship

4.5 Structure of the Curriculum Content

The structure of curriculum content defines the concepts for the Child Health Nurse Practitioner programme. The concepts are presented with definition, scope, characteristic features, attributes, exemplars and interrelated concepts presented in Table 3 adapted from Christmals, Crous and Armstrong [7]. The modules developed in this study are presented in Figure 2.

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Table 3: Module Credits for Child Health Nurse Practitioner Curriculum

Module (% Of Total Credits)	Concepts	Characteristic Features	Definition	Exemplars	Interrelated Concepts
HEALTH SYSTEM (10%)	Transformational leadership	Execution, partnership, others, communication, self (to set a personal example), ideal impact, strong motivation, intellectual stimulation, and personal consideration	Transformational leadership is the process in which a leader inspires the followers in developing higher-order goals and motivating them to reach such goals through the refinement of the followers' worldview and attitudes.	Scarce resource management; inter-level patient referral; changing curriculum	Nursing case management; systems thinking; governance
	Governance	Accountable, transparent, responsive, rule of law, stable, equity, empowerment, inclusive, consensus orientation, effectiveness and efficiency	Governance refers to the legally recognised structures and procedures that are created to guarantee "accountability, transparency, responsiveness, rule of law, stability, equity and inclusiveness, empowerment, and broad-based participation in an organisation, institution or society.	Financial audit; clinical audit; universal coverage	Systems thinking; transformational leadership
	Systems thinking	Leadership and governance, service delivery, health system financing, health workforce, medical products, vaccines and technologies, health information systems, systems organisation, systems network, systems dynamics, systems knowledge	Systems thinking is a quality improvement process in which the understanding of the relationships and interaction between the components of a system is engineered to generate synergy in the system.	Quality improvement project; memorandum of understanding; development of community outreach	Influencing curriculum; clinical assessment; quality of care
GENERIC ADVANCED PRACTICE NURSING CONCEPTS (20%)	Quality of care	Effective, efficient, accessible, acceptable and equitable	Quality is defined as conforming to specified standards of product or service, i.e. meeting or exceeding the expectations of the population served.	Clinical audit; NIMART; universal coverage	Research dissemination; teaching; influencing curriculum
	Clinical assessment	History taking, physical assessment (biopsychosocial, spiritual, emergency) laboratory examination, imaging studies	Clinical assessment is the process of gathering patient information through patient history taking, physical assessment, laboratory examination and imaging studies to guide the clinician's and patient's decision making processes especially in the selection of treatment or referral for an appropriate treatment.	Assessment critically ill children; assessing for diarrhoeal diseases; assessing for child abuse	Teaching; quality of care; clinical decision making
	Clinical decision making	Pathophysiology, clinical judgement, diagnosis, current-evidence, clinical expertise and patient preferences and characteristics (uniqueness, criticalness, urgency, stability, risks), variables (certainty, similarity, congruence/conflict)	Clinical decision making, synonymous with clinical diagnosis, is the process of deciding on the health status of the client in order to select the best treatment that responds to the client's condition with the primary purpose of improving the health of the client and community.	Critically ill child; use of clinical guidelines; clinical audit	Quality of care; teaching
	Treatment selection	Pharmacological, non-pharmacological (complementary and alternative medicine), pharmacovigilance, cost-effectiveness	Treatment selection is the selection of appropriate and cost-effective treatment that responds to patients' needs for a requisite period of time.	Critically ill child; clinical pathways; diarrhoeal diseases	Quality of care; clinical assessment; clinical decision making; nursing case management
	Nursing case management	Assessment, clinical decision making, treatment selection, referral services, follow-up care and costing of services, primary healthcare, family centred care, referral system, clinical progress, safe, timely, effective, efficient, cost-effective, equitable and patient-centred, payer, level of care, benefits	Case management refers to the actions taken by the advanced Practice Nurse in coordinating ongoing comprehensive medical services (assessment, clinical decision-making, treatment selection, referral services, follow-up care and costing of health care) that responds to the needs of the patient, family or community.	Inter-level patient referral; use of clinical guidelines; clinical audit	Quality of care; clinical assessment; clinical decision making; treatment selection

Module (% Of Total Credits)	Concepts	Characteristic Features	Definition	Exemplars	Interrelated Concepts
CHILD HEALTH NURSE PRACTITIONER SPECIALITY CONCEPTS (30%)	Child mortality	Pneumonia, diarrhoeal disease, malaria, HIV, severe malnutrition and contributing factors (country of birth, preterm birth, poverty, gender, neonate, rural settlement, urban slum settlement, small for age, child abuse)	Child morbidity is the percentage of children who contracted a disease, fell ill or were injured within a specific period in a defined population. Child mortality is the number of child deaths per 1000 live births in a specified geographical or political location.	Managing adverse events; managing critically ill children; managing pneumonia	Quality of care; clinical assessment; clinical decision making
	Medical record management	Principles (evidence, legal, confidential, safety, critical information, retention period); Uses (continuity of care, quality improvement, research, medicolegal); Types (paper-based, electronic); Content (demographic, consent, admission, management, discharge, financial)	Medical record management refers to the organisational policies, regulations and procedures governing the collating, storage and use of patient medical records.	Patient kardex; inter-level patient referral; clinical audit	Nursing research; quality of care
NURSING EDUCATION (10%)	Teaching	Health promotion, health education, clinical teaching, patient education, curriculum, andragogy, learning, assessment, knowledge brokering	Teaching is the process by which the teacher (lecturer, tutor, etc.) guides the student to acquire certain knowledge, skills and attitudes that are intentionally planned through an instructional curriculum.	Patient education; clinical nursing education; health promotion	Influencing curriculum; quality of care; transformational leadership
	Influencing curriculum	Advocacy, professional organisation, needs analysis, programme development, programme evaluation, feedback	Influencing curriculum refers to advocating and determining the course of teaching and learning in nursing.	Clinical nursing education; curriculum change; child health advocacy.	Nursing research; teaching; transformational leadership
NURSING RESEARCH (30%)	Nursing Research	Research proposal, data collection, data analysis, interpretation, dissemination, principles (privacy, anonymity and confidentiality, ethical approval, institutional approval)	Nursing research is defined as a “diligent and systematic inquiry to validate and refine existing knowledge and generate new knowledge”.	Research proposal development; literature review; writing a research report	Teaching; influencing curriculum; research dissemination
	Research dissemination	Institutional factors (dissemination strategy, organisational culture, incentives); values and skills (academic integrity, plagiarism, academic writing); types (research report, journal papers, conferences presentation, research brief)	Dissemination is a well-planned process in which research findings are exposed to a wider audience through written and verbal means, for appropriate evaluation and inclusion into policy and health care practice to facilitate evidence-based practice.	Evidence-based poster development; writing journal article; writing research report;	Nursing research; transformational leadership; influencing curriculum

[Adapted from Christmals, C. D., Crous, L., & Armstrong, S. J. (2019). The Development of Concepts for a Concept-Based Advanced Practice Nursing (Child Health Nurse Practitioner) Curriculum for Sub-Saharan Africa. *International Journal of Caring Sciences*, 12(3), 1410–1422]

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4.6 Standards of Resources Required for Implementation

Standards of resources describe the level of lecturer qualifications, the workload per lecturer, student qualifications and number per class, materials (textbooks, computers and other equipment) and facilities (classrooms, furniture, fittings).

4.6.1 Lecturer qualifications

Nursing lecturers are expected to have a PhD in nursing. Consideration is given to a Master of Nursing (coursework and research components). Non-nurse lecturers are also expected to have obtained PhD in a specialist field. Consideration is given to a Master of Medicine and equivalent qualification if there are no PhD holders. All lecturers in the CHNP programme should have at least a Diploma in Health Science Education.

4.6.2 Student resources

A 4-year degree in nursing with a minimum of 60% cumulative average mark is required for admission into the CHNP programme. Two years' minimum clinical practice after Community/National/Youth Service or internship is the prerequisite clinical practice for gaining admission into the CHNP programme. Mathematics, computing skills, and English/French language skills are required for gaining admission into the CHNP programme. Paediatric Nursing, Anatomy, Physiology, Psychology, Sociology, Pharmacology, Microbiology, Community Health Nursing, Family Health Nursing, Communicative Skills, Research Methods and Fundamentals of Nursing are the courses the candidate should have taken in an undergraduate programme to qualify for the CHNP programme. Students are expected to have personal materials such as a laptop computer, prescribed textbooks, and a diagnostic set to promote effective learning.

4.6.3 Library resources

Textbooks, computers, internet services, online learning platform (e.g. Sakai, Moodle), subscription to research database and online books.

4.6.4 Classroom resources needed

Liquid-crystal Display (LCD) projector, comfortable table and chairs for students, good ventilation and temperature regulation system, chalkboard and chalk, white/marker board and markers, good lighting, and good ventilation.

4.6.5 Teacher-student ratio

A lecturer student ratio between the ranges of 1: 7 to 1:14.

4.7 Teaching methods

Teaching methods describe the range of teaching approaches that might be employed in the implementation of the framework. Experiential learning and problem-based learning, which is adult education oriented, is to be implemented to inculcate the level of critical thinking, problem-solving and ability to apply concepts to general to situations. The expert team also proposed small group sessions, self-study and blended learning methods.

4.8 Assessment and reporting methods.

Assessment and reporting methods describe the modes of assessment, the pass marks and how the student achievements are awarded or certified. Assessment should seek to elicit the Child Health Nurse Practitioner's critical thinking, problem-solving and ability to apply concepts to general situations in the healthcare setting and community that is served. Objective Structured Clinical Examination (OSCE), written tests and examinations, viva-voce and take-home assessments were proposed by the expert team.

4.9 Other elements

Other elements of this curriculum framework in addition to the eight (8) elements of a curriculum framework outlined by Stabback (2007) include clinical practice, internship, licensure and continuous professional development (CPD), and adoption and adaptation instructions.

4.9.1 Clinical Training

Clinical training describes the mode of clinical training (clinical practice for learning and role-taking) by the student enrolled in the Child Health Nurse Practitioner Programme. Simulation laboratory, clinical placement facilities, anatomical models, clinical mentors, simulators, clinical supervisors, resuscitation equipment, diagnostic sets, personal protective equipment, and a qualified skills laboratory technician are materials and resources needed for successful clinical training. Between 800-1000 hours of clinical placement for learning and role-taking is prescribed for the 2-year training programme.

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4.9.2 Internship

A one-year internship under the supervision of a paediatrician, if available, is recommended.

4.9.3 Licensure and CPD

Licensing of the Advanced Practice Nurse should be done at the discretion of the nursing council under which he or she is registered.

4.9.4 Adoption and Adaptation of the Child Health Nurse Practitioner Curriculum Framework

The framework should be adopted and adapted to suit each country in sub-Saharan Africa. Changes to this curriculum framework could affect the context, aim, knowledge domains, resources and concepts. Due to the expectations of the Advanced Practice Nurses and the aim of having the Advanced Practice Nursing programme locally relevant and internationally competitive, changes to the level of training and number of years of training are not advised. Resistance from the medical profession, limited human and fiscal resources and lack of political will are some of the challenges that need to be surmounted in the implementation of this programme.

4.10 Confirmation and Evaluation of the Curriculum Framework

4.10.1 Confirmation

The 27 international multidisciplinary health experts who took part in the last phase of the Delphi study were given the draft curriculum framework to review and state any deviations they identified in the framework from the data they provided. Nineteen (19) of the 27 participants responded to the confirmation questionnaire. They all stated that the curriculum framework accurately represented the data they provided for the study.

4.10.2 Evaluation

Fifty (50) faculty from 38 institutions in 15 sub-Saharan African countries (Botswana, Ethiopia, Ghana, Kenya, Liberia, Malawi, Nigeria, Lesotho, South Africa, Rwanda, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe) were invited to participate. Seventeen faculty from fifteen nursing education institutions in ten sub-Saharan African countries (Ghana 2, Botswana 1, Swaziland 2, South Africa 1, Nigeria 2, Rwanda 2, Uganda 1, Kenya 2, Malawi 1 and Zambia 1) responded to the evaluation questionnaire before the close of the study. One response was

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incomplete and was excluded from the study, leaving 16. All the 16 curriculum development experts stated the framework was applicable in sub-Saharan Africa. Some participants said:

“It is applicable because the framework responds to the needs of the country. However, it will require a change in policy especially in regard to the scope of nurses.”- Rwanda 1

“There is an adequate, easy-to-understand description of the current context, educational policy statement, statement of broad learning objectives, the structure of the Child Health Nurse Practitioner programme.”- Nigeria 1

“It is evidence-based and issues discussed affect us as a country. The issues of high neonatal, infant and child mortality-SDG 3. There is a need for our country to train nurses who will provide quality care to the children as paediatricians do not spend a long time with the children. Our country has 79% of the population residing in rural areas.”- Swaziland 1

The participants also believe that the ACHNP curriculum framework can be adapted for other ANP specialities. A faculty stated that the guidelines provided for adoption and adaptation of the curriculum framework will be very helpful for her institution and country. Three faculty indicated that the curriculum framework will be easily adopted if it is adapted using country-specific burden of diseases. Other recommendations include disseminating the framework on compact disks and other electronic formats to make it accessible to the stakeholders of nursing in sub-Saharan Africa. These institutions are major gatekeepers for nursing education programmes in every country. The ability of this programme to make any impact in sub-Saharan Africa will depend, largely, on their approval.

5. DISCUSSION

This is the first postgraduate level concept-based curriculum framework to be developed; it was laborious trying to determine how many concepts were sufficient and which ones to include. The difficulty in determining how many concepts to be included in the curriculum was also reported by Giddens, Wright & Gray[29] in their state-wide undergraduate concept-based curriculum development.

The APNs are expected to practice extended roles that involve comprehensive assessment and diagnosing and management of illness and diseases. This requires extensive knowledge of the disease process and the essential skills to function effectively. The concepts for Advanced Nursing Practice were carefully selected to equip the APN with the needed skills in clinical practice. Fifty percent of the concepts covered the Advanced Nursing Practice speciality area.

The remaining concepts that were included covered research, education and health systems, which implies the need for vital knowledge, skills and attitudes by the Advanced Practice Nurse to function effectively.

For the APNs to be competent in evidence-based practice, they need to be able to generate evidence themselves and be competent in utilising such evidence. The APN will be expected to do clinical teaching for nursing programmes and to educate the patient in the clinical setting. To do that, the concepts on nursing education are necessary. The APN will acquire enough knowledge, skills and attitudes to teach students and clients effectively in hospital settings. The health system is the larger context within which the APN will practice. To be able to function within the confines of the law and to produce positive effects in practice, the APN needs to understand the health system, the players in it and their demands. Three concepts were included under health systems to guide the APN to understand the health systems. He or she is envisaged as the leader at the community healthcare level, therefore, leadership and governance skills are important for the APN’s practice.

The knowledge domains defined in this study are not that different from the competencies of advanced practice nursing prescribed by the Nursing and Midwifery Board of Ireland [30]: They are also in alignment with the course structure of the Nurse Practitioner programme implemented by the University of British Columbia[31], with the exception that the University of British Columbia’s programme lays emphasis on pathophysiology and pharmacology. The Royal College of Nursing [32] also emphasised pathophysiology and pharmacology. All other components are the same, with the exception that this curriculum is concept-based and does not encourage the emphasis on content, rather concepts such as decision making and treatment selection, which includes pathophysiology and pharmacology.

In a study to explore the fundamental aspects of Advanced Practice Nursing in aesthetic medicine, Greveson [33] reported “developing a nurse-led service; patient assessment and decision making; consultation skills; treatment selection; non-medical prescribing; insurance and record-keeping; audit and research and continuous professional development” as the components of aesthetic medicine Advanced Practice Nursing. These components are consistent with the concepts reported in this study, with a few nomenclature differences.

The concepts developed in this study are of higher thinking and problem solving than those developed for undergraduate nursing by Giddens, as the Advanced Practice Nurses are expected to practice at a higher level than the graduate nurses – advanced assessment, diagnosing, prescribing and management of care [34].

The structure of the education system reported in this study is supported by the Advanced Practice Nursing programmes implemented in the United States of America, United Kingdom, Canada and other parts of the world. The differences are the number of credits for the programme, type of curriculum and context in which the programme is being implemented. Differences in credits are a result of the different credit systems used in different jurisdictions [1,31]. The structure of the curriculum content has been organised into modules which are made up of concepts. This is a unique way of curriculum content organisation, as the concept-based curricula reported by other authors [26,35,36] were organised into courses. The modular structure of curriculum best suits postgraduate education and reformed higher education from its traditional subject, course, semester nature [37].

The concept-based epistemological perspective of this curriculum is essential in reducing the content of the Advanced Practice Nursing curriculum, while giving the Child Health Nurse Practitioner the opportunity to acquire the knowledge, skills and attitudes needed to function at a competent level of critical thinking and problem-solving. Less content will also give the CHNPs enough time for clinical practice.

Though the authors put in measures to ensure the rigor in this study, the study is not without limitations. Though the use of a nominal group technique in addition to the Delphi method would have been more appropriate for the evaluation of scoping review results and providing the content of the curricula, it was not possible due to the vastness of the context and funding limitations. In addition, only 17 faculty from 10 sub-Saharan African countries responded to the evaluation questionnaire. The authors cannot tell if the results would have been different if all the nursing institutions in sub-Saharan Africa evaluated the framework for applicability. Also, the authors cannot guarantee that there will not be challenges in the implementation of the curriculum framework.

6. CONCLUSION

The Child Health Nursing Practitioner curriculum framework is comprehensive, context-specific, has the potential to respond to the special child healthcare needs of sub-Saharan Africa

and is adaptable for other Advanced Practice Nursing speciality programmes in sub-Saharan Africa. The nursing leadership should lobby and professional advocate for funding and introduction of the CHNP programme as a collaborative process between government, clinical services, the public and educational institutions; and propose how this can be done. Child mortality is a global phenomenon. The CHNP could be adapted for other contexts in which human resources for primary health care for children is lacking.

7. AUTHOR CONTRIBUTIONS

Both authors, Dr Christmal D. **Christmals** and Dr Susan J. **Armstrong** were involved in study conceptualisation, literature review, data collection, data analysis, result interpretation and manuscript writing.

8. ACKNOWLEDGEMENT

We wish to acknowledge Professor Janet Gross, Mr Kizito Aidam and Lesley Fletcher for editing this work.

9. CONFLICT OF INTEREST

There were no conflicts of OR COMPETING interest as far as this manuscript is concerned.

10. FUNDING

This study is self-funded.

11. DATA SHARING

Data collected for this study has been deposited in the Mendeley database: Christmals, Christmal (2019), “Dataset_Concepts for Advanced Practice Nursing Curriculum in Sub-Saharan Africa”, Mendeley Data, v1 <http://dx.doi.org/10.17632/2kmpt2wg9s.1>.

[Word Count: 3997]

Figure legend:

Figure 1: Summary of Methods

Figure 1 presents the flow of the methods used in this study. The scoping review, followed by the Delphi, then concept development, curriculum framework development, confirmation and evaluation.

Figure 2: Structure of the curriculum content

The content of the framework is presented in five modules as presented in table 2. The modules consist of: Health systems generic APN concepts, CHNP speciality concepts, nursing education and nursing research.

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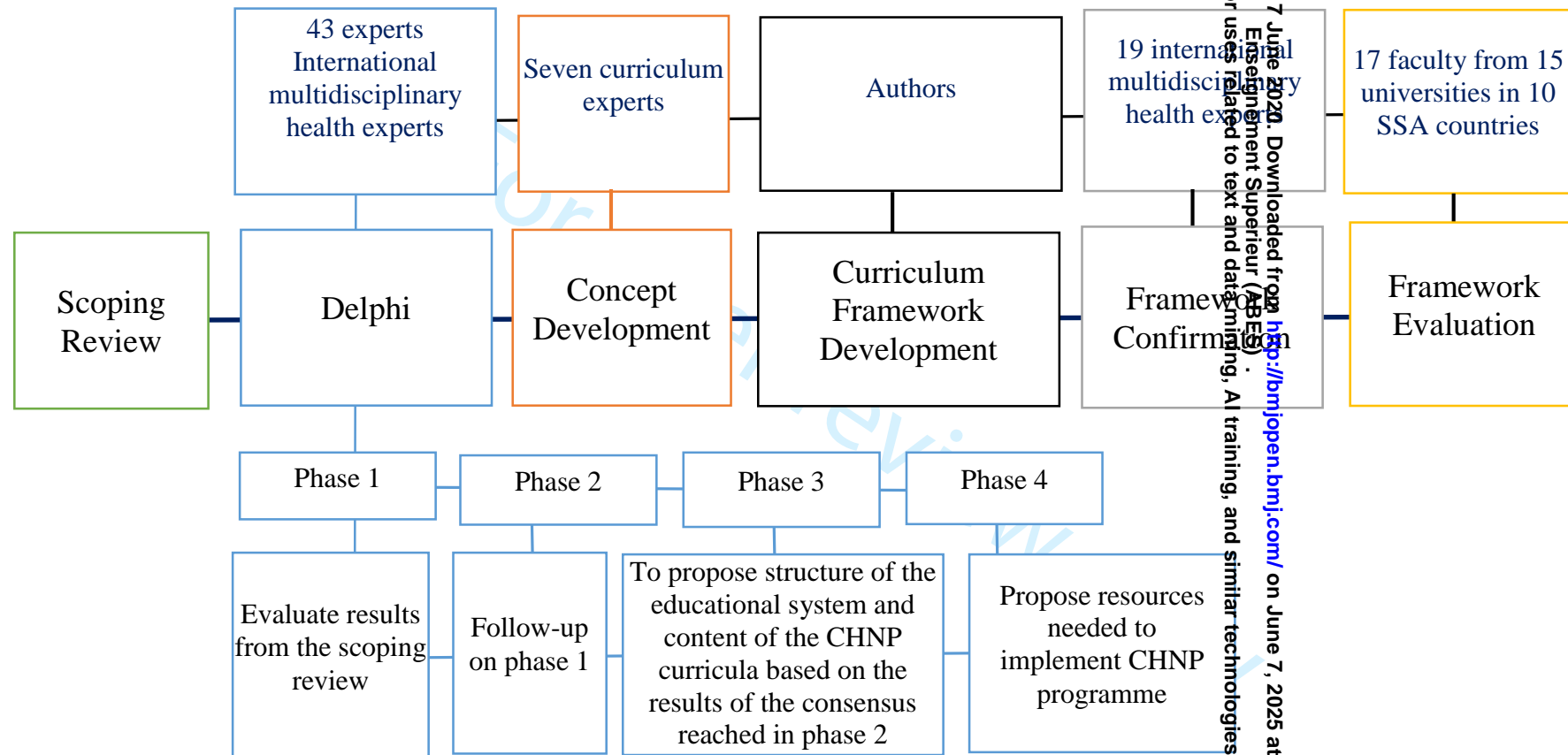


Figure 1: Summary of methods

PROGRAMME OUTCOME: To produce competent Advanced Practice Nurses who will produce evidence-based, culturally sensitive and cost-effective quality child health care to the underserved populations in sub-Saharan Africa.

MODULES	HEALTH SYSTEM	GENERIC APN CONCEPTS	CHNP SPECIALTY CONCEPTS	NURSING EDUCATION	NURSING RESEARCH
CONCEPTS	Transformational leadership, governance, systems thinking	Quality of care, clinical assessment, clinical decision making, treatment selection, medical record management	Nursing case management, child mortality	Teaching, influencing curriculum	Nursing research, research dissemination
MODULE OUTCOMES	The APN will be able to comprehend national and international health systems and their influence on child health nursing and be able to lead and transform the health system at the local level in order to facilitate the provision of evidence-based, culturally sensitive and cost-effective quality child health care to the underserved populations in sub-Saharan Africa	The CHNP will be able to acquire knowledge, competent skills and attitudes need to provide evidence-based, culturally sensitive and cost-effective quality child health care provided for the underserved populations in sub-Saharan Africa (assess, diagnose, manage and record)	The CHNP will be able to plan, execute and evaluate evidence-based, culturally sensitive and cost-effective quality child health care to the underserved populations in sub-Saharan Africa with the aim of reducing child mortality and improving other healthcare indices	The CHNP will be able to impart evidence-based, culturally sensitive health information to the child family and community in order to promote, restore or maintain their health status and to inculcate the knowledge, attitudes and behaviours necessary to provide evidence-based, culturally sensitive cost-effective quality child health care to the underserved populations in sub-Saharan Africa into nursing students through clinical teaching.	The CHNP will be able to propose, conduct research and synthesize research findings in order to provide evidence-based, culturally sensitive and cost-effective quality child health care to the underserved populations in sub-Saharan Africa

Figure 2: Structure of the curriculum content

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Based on the SQUIRE guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

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	Reporting Item	Page Number
Title		
	#1 Indicate that the manuscript concerns an initiative to improve healthcare (broadly defined to include the quality, safety, effectiveness, patientcenteredness, timeliness, cost, efficiency, and equity of healthcare)	1
Abstract		
	#02a Provide adequate information to aid in searching and indexing	1
	#02b Summarize all key information from various sections of the text using the abstract format of the intended publication or a structured summary such as: background, local problem, methods, interventions, results, conclusions	1
Introduction		
Problem description	#3 Nature and significance of the local problem	2

1	Available	#4	Summary of what is currently known about the problem, including	2
2	knowledge		relevant previous studies	
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5	Rationale	#5	Informal or formal frameworks, models, concepts, and / or theories used	3
6			to explain the problem, any reasons or assumptions that were used to	
7			develop the intervention(s), and reasons why the intervention(s) was	
8			expected to work	
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10				
11	Specific aims	#6	Purpose of the project and of this report	3
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14	Methods			
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16	Context	#7	Contextual elements considered important at the outset of introducing	3
17			the intervention(s)	
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20	Intervention(s)	#08a	Description of the intervention(s) in sufficient detail that others could	N/A
21			reproduce it	
22				
23				
24	Intervention(s)	#08b	Specifics of the team involved in the work	N/A
25				
26	Study of the	#09a	Approach chosen for assessing the impact of the intervention(s)	N/A
27	Intervention(s)			
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30	Study of the	#09b	Approach used to establish whether the observed outcomes were due to	N/A
31	Intervention(s)		the intervention(s)	
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34	Measures	#10a	Measures chosen for studying processes and outcomes of the	4
35			intervention(s), including rationale for choosing them, their operational	
36			definitions, and their validity and reliability	
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39	Measures	#10b	Description of the approach to the ongoing assessment of contextual	3-5
40			elements that contributed to the success, failure, efficiency, and cost	
41				
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43	Measures	#10c	Methods employed for assessing completeness and accuracy of data	3-5
44				
45	Analysis	#11a	Qualitative and quantitative methods used to draw inferences from the	3-5
46			data	
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49	Analysis	#11b	Methods for understanding variation within the data, including the	N/A
50			effects of time as a variable	
51				
52				
53	Ethical	#12	Ethical aspects of implementing and studying the intervention(s) and	5
54	considerations		how they were addressed, including, but not limited to, formal ethics	
55			review and potential conflict(s) of interest	
56				
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58	Results			
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	#13a	Initial steps of the intervention(s) and their evolution over time (e.g., time-line diagram, flow chart, or table), including modifications made to the intervention during the project	6-11
	#13b	Details of the process measures and outcome	6-11
	#13c	Contextual elements that interacted with the intervention(s)	6
	#13d	Observed associations between outcomes, interventions, and relevant contextual elements	N/A
	#13e	Unintended consequences such as unexpected benefits, problems, failures, or costs associated with the intervention(s).	N/A
	#13f	Details about missing data	6-10
Discussion			
Summary	#14a	Key findings, including relevance to the rationale and specific aims	11
Summary	#14b	Particular strengths of the project	11-13
Interpretation	#15a	Nature of the association between the intervention(s) and the outcomes	N/A
Interpretation	#15b	Comparison of results with findings from other publications	11-13
Interpretation	#15c	Impact of the project on people and systems	12-13
Interpretation	#15d	Reasons for any differences between observed and anticipated outcomes, including the influence of context	11-13
Interpretation	#15e	Costs and strategic trade-offs, including opportunity costs	11-13
Limitations	#16a	Limits to the generalizability of the work	N/A
Limitations	#16b	Factors that might have limited internal validity such as confounding, bias, or imprecision in the design, methods, measurement, or analysis	1
Limitations	#16c	Efforts made to minimize and adjust for limitations	1
Conclusion	#17a	Usefulness of the work	13
Conclusion	#17b	Sustainability	13
Conclusion	#17c	Potential for spread to other contexts	N/A
Conclusion	#17d	Implications for practice and for further study in the field	13

1	Conclusion	#17e	Suggested next steps	13
2				
3	Other			
4	information			
5				
6				
7	Funding	#18	Sources of funding that supported this work. Role, if any, of the funding	13
8			organization in the design, implementation, interpretation, and reporting	
9				

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12 NC 4.0. This checklist was completed on 06. November 2019 using <https://www.goodreports.org/>, a tool made
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CURRICULUM FRAMEWORK FOR ADVANCED PRACTICE NURSING IN SUB-SAHARAN AFRICA: A MULTIMETHOD STUDY

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CURRICULUM FRAMEWORK FOR ADVANCED PRACTICE NURSING IN SUB-SAHARAN AFRICA: A MULTIMETHOD STUDY

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Keywords: Advanced Practice Nursing, Curriculum Framework, Sub-Saharan Africa, Nursing Education, Concept-based Curriculum.

ABSTRACT

Objectives: The implementation of Advanced Practice Nursing (APN) programmes in sub-Saharan Africa (SSA) has been difficult due to lack of SSA-specific curriculum frameworks or benchmarks to guide institutions in developing and implementing APN programmes. A few APN programmes in SSA were benchmarked on western philosophy and materials, making local ownership and sustainability challenging. This paper presents a sub-Saharan Africa-specific concept-based Advanced Practice Nursing (Child Health Nurse Practitioner) curriculum framework developed to guide institutions in developing relevant and responsive Advanced Practice Nursing (APN) curricula in order to qualify Child Health Nurse Practitioners and contribute to a decreased incidence of preventable deaths of children in the sub-Saharan African region.

Design: A sequential multimethod study design consisting of a scoping review, Delphi study, development of a framework by a curriculum team, and evaluation of the curriculum framework by faculty from 15 universities in SSA.

Setting: the study was a sub-Saharan Africa wide study.

Participants: The study included international multidisciplinary health professionals and curriculum development experts from 15 universities in 10 sub-Saharan African countries.

Results: A concept-based Advanced Child Health Nurse Practitioner curriculum framework was developed. The faculty evaluating the curriculum for applicability within their institutions and the SSA context unanimously stated that the framework is detailed, evidenced-based and could be adapted for other APN speciality areas.

Conclusion: The Child Health Nursing Practitioner curriculum framework is comprehensive, context-specific and has the potential to respond to the special child healthcare needs of sub-Saharan Africa. It is adaptable for other Advanced Practice Nursing speciality programmes in sub-Saharan Africa. Nursing leaders should lobby for funding and advocate for the introduction of the CHNP programme as a collaborative process between government, clinical services, communities and educational institutions.

ARTICLE SUMMARY

Strengths and limitations of this study

- The multimethod design allowed the researcher to choose and follow the processes of curriculum framework development
- Multidisciplinary experts from East, West, Central and Southern Africa participated in this study giving it a wide coverage and multidisciplinary input.
- Though the use of nominal group technique in addition to the Delphi method would have been more appropriate for the evaluation of scoping review results and providing the content of the curricula, it was not possible due to the vastness of the context and funding limitations.
- The authors cannot guarantee that there will not be challenges in the implementation of the curriculum framework.
- Only 17 faculty from 10 sub-Saharan African countries responded to the evaluation questionnaire – the authors cannot tell if the results would have been different if all the nursing institutions in sub-Saharan Africa responded.

1. INTRODUCTION

Advanced Practice Nursing legislation was established about seven decades ago in developed countries to respond to inequalities and poor access to healthcare by the rural and underserved populations [1– 4]. Sub-Saharan African (SSA) countries are struggling to develop and implement APN programmes even though they need APNs to respond to needs of the excluded rural, underserved and vulnerable populations [5]. The population of sub-Saharan Africa is very poor, for instance, about 70% of the sub-Saharan African population lives on less than \$2.00 (R 26.40) per day, while about 48% live on \$1.25 (R16.27) per day [6,7]. About 34 million school-aged children (21.23%) are not in primary school. The poor child health services provided in sub-Saharan Africa have led to the devastating rates of preventable child morbidity and mortality in the region. The impact of disease not only affects the child at a younger age

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but also exposes the children to many health challenges in adulthood. Advanced Practice Nursing programmes have proven to improve access to cost-effective quality healthcare for the rural, hard to reach, populations [4,8].

Sustainable Development Goal 3 demands that preventable deaths of new-born babies and children under the age of 5 years should be ended [9]. Countries all over the world are expected to end preventable deaths with at most 12 neonatal deaths and 25 under-5 deaths per 1000 live births by 2030. Sustainable Development Goal 3 also requires that there must be universal coverage of quality healthcare, medicine and vaccines, and vital health services at an affordable cost [9].

Botswana, Ghana, Kingdom of Eswatini, Malawi, Liberia, South Africa, and Tanzania have all attempted the introduction of one form or another of APN. Difficulties experienced by these programmes include a lack of local ownership, inappropriate or no legislation to regulate and license the APNs, inability to sustain the programme and lack of context-specific (SSA-specific) APN benchmark curricula to guide the development of APN programmes [4,10–12]. It is essential to have a context-specific APN (Child Health Nurse Practitioner) curriculum framework for SSA. A formal curriculum consists of three components: the curriculum framework; course syllabi and textbooks; and other teaching and learning resources. The curriculum framework is a document that contains standards for a specific curriculum and indicates the context (natural, human and capital resources available) in which the curriculum developers develop curricula whereas the syllabus comprises the aim, content, outcomes and other information related to specific courses as prescribed in the curriculum framework [13]. Stabback [13] outlined the eight common elements of a standard curriculum framework thus: current context, educational policy statement, broad learning objectives and outcomes, structure of the educational system, structure of the curriculum content, standards of resources required for implementation, teaching methods and assessment and reporting methods. A well-established principle of the use of a curriculum framework is to leave the formulation of the syllabi and lesson plans to the institutions. This allows for flexibility and innovation at the lower level of curriculum implementation [14].

2. AIM

This study sought to develop an Advanced Practice Nursing (Child Health Nurse Practitioner) curriculum framework to serve as a sub-Saharan Africa context-specific guide for developing responsive Advanced Practice Nursing curricula to qualify Child Health Nurse Practitioners

and contribute to decreased incidence of preventable deaths of children in the sub-Saharan Africa region.

3. METHOD

This study applied a multimethod design [15]. A literature review on child health and APN curriculum development in SSA was conducted. The findings of the review were subjected to expert review and inputs through an online expert Delphi. A seven-member curriculum committee was formed to develop concepts for the concept-based curriculum framework using the results from the review and the Delphi. The principal researcher then compiled the curriculum framework using the results from the preceding phases. The international multidisciplinary health experts who participated in the Delphi study were given the draft curriculum framework to review and state any deviations they identified in the framework from the data they provided. Seventeen curriculum development experts from 15 universities in 10 sub-Saharan African countries evaluated the curriculum framework (Figure 1)[16].

3.1 The Review

Scoping reviews are either stand-alone or pre-systematic reviews that aim at exploring the breadth and depth (in-part) of a research area using both grey and peer-reviewed literature [17–20]. In this study, we applied the scoping review framework developed by Arksey and O’Malley [21] to establish the current state of Advanced Practice Nursing and child health in sub-Saharan Africa [4]. The findings from the studies included in the review were synthesised according to the first three common elements of a curriculum framework, thus: current context, educational policy statement, statement of broad learning objectives and outcomes [13].

3.2 The Delphi

The Delphi technique is a research method in which experts review documents in series in order to reach consensus on what best fits a particular situation or programme [22–24]. The Delphi technique could take one to five or more stages depending on how quickly the expert committee reaches consensus [22,23,25,26].

In this study, the Delphi survey was conducted to contextualise the findings of the scoping review and to collect information from the multidisciplinary team on the structure of the educational system, content, teaching and learning methods, and resources needed to implement the Child Health Nurse Practitioner programme in SSA.

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3.2.1 Delphi Phase 1 and 2

The Delphi questionnaire was developed from the results of the scoping review by the researchers, pretested by five Master of Science students from five different countries and reviewed by two child health nursing education experts for face and content validity. The questionnaire consisted of 80 Likert scale questions and 3 comment items. The questionnaire was divided into three sections: current context, educational policy statement and broad learning objectives. This study adopted a five-item Likert scale cum rating: Strongly disagree (1); Disagree (2); Neutral (3); Agree (4) and Strongly agree (5). The first phases of the Delphi survey data were analysed using percentages; 80% agreement or disagreement was considered to be a consensus.

3.2.2 Delphi Phase 2

Out of the 80 Likert scale questions in phase 1, consensus was reached on 71. The results of phase 1 were presented to the experts. The nine (9) questions on which consensus was not reached were rephrased and reposted for response by the experts. Consensus was then reached on the nine questions in phase 2. The second phase of the Delphi saw attrition of eleven (11) experts, leaving 27 (21 nurses, five public health practitioners and one medical practitioner) expert participants.

3.2.3 Delphi Phases 3 and 4

The last two phases were used to gather expert preferences on the last five common elements of a curriculum framework, thus: structure of the educational system, structure of the curriculum content, standard resources required for implementation, teaching methods and assessment methods [13]. In phase three, the experts were asked to list topics, teaching and assessment methods for the six domains described under the broad learning objectives: A (Nursing leadership and governance); B (Quality practice); C (Ethico-legal and professionalism); D (Education and research); E (Advanced child health nursing practice) and F (Attitudes and values).

In the last phase, the experts listed the resources necessary for the implementation of an Advanced Practice Nursing programme in sub-Saharan Africa. All twenty-seven experts who completed phase two also completed phases three and four, with a response rate of 100 per cent.

3.3 Development of Concepts

The experts who participated in the Delphi preferred the concept-based curriculum to content, outcome or standard-based curricula because of its ability to provoke critical thinking and

problem-solving abilities in students with minimum content. The curriculum committee was made up of seven purposively selected experts including five nursing curriculum experts, a paediatrician and a paediatric nurse: (1) a professor of nursing education with expertise in curriculum development across the globe especially in the USA, Haiti, Ghana, Uganda, eSwatini and Liberia; (2) a senior lecturer, nurse educator and head of an inter-professional simulation laboratory;(3) A nurse educator, former registrar of a nursing council, currently working as a for a ministry of health(employer); (4) a child health nurse, a lecturer and a consultant for a specialist children’s hospital; (5) a nursing educator, with experience in concept-based curriculum development, nursing regulation, leadership and healthcare quality improvement; (6) a paediatrician, fellow of the College of Paediatricians of South Africa; and (7) an Advanced Practice Nursing researcher, a nurse educator. The principal author facilitated the process. Twenty-two concepts were developed using instructions for selecting concepts for a concept-based CHNP curriculum framework developed by the researcher to guide the curriculum committee. This was a twelve-page document comprising the overview of the curriculum structure, knowledge domains from the scoping review, results of the Delphi, the stages of developing a concept-based curriculum and a graphical guide for selecting concepts and exemplars for a CHNP curriculum synthesised from Ignatavicius’[27] 12-steps of developing a concept-based curriculum. The concepts were analysed by the team using the components of concept analysis outlined by Johnston [28,29].

3.4 Framework Development, Confirmation and Evaluation

The principal researcher compiled the framework consisting of the eight common components of a curriculum framework listed in section 1.0. The draft curriculum framework was sent via email to the 27 international multidisciplinary health experts who participated in the last phase of the Delphi. Nineteen (19) of participants who responded stated that the framework accurately represented the data they provided. After the confirmation, 17 curriculum development experts from 15 universities in 10 sub-Saharan African countries were purposively selected to evaluate the curriculum framework. The participants were included if they were faculty of a Department or School of Nursing in sub-Saharan Africa and had extensive research or practice experience in nursing curriculum development. Comments from the curriculum development experts were used to finalise the curriculum framework.

3.5 Patient and Public Involvement

No patient involved

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3.6 Ethical Considerations

Ethical approval was acquired from the Human Research Ethics Committee, University of Witwatersrand (Number: M160632) and the Noguchi Memorial Institute of Medical Research Institutional Review Board, University of Ghana. All participants gave their informed consent before participating in this study.

4. RESULTS

4.1 Current Context

Current context refers to the socioeconomic setting within which an Advanced Practice Nursing (Child Health Nurse Practitioner) policy is made and the programme implemented. The population of sub-Saharan Africa is very poor, for instance, about 70% of the sub-Saharan African population is living on less than \$2.00 (R 26.40) per day, while about 48% live on \$1.25 (R16.27) per day [6,7]. About 34 million school-aged children (21.23%) are not in primary school.

The poor child health services provided in sub-Saharan Africa have led to the devastating rates of preventable child morbidity and mortality in the region. The impact of disease not only affects the child at a younger age but also exposes the children to many health challenges in adulthood. Advanced Practice Nursing programmes have been shown to improve access to cost-effective quality healthcare for the rural, hard to reach, populations [4,8].

Even though some institutions and countries within sub-Saharan Africa have shown interest in APN programmes, they lack contextual benchmarks and role models to guide the development and implementation of ANP programmes [4,8].

4.2 The Educational Policy Statement

This describes the goals of governments and institutions for the Advanced Practice Nursing (Child Health Nurse Practitioner) programme [13]. Educational policy is influenced by local health needs and international policy. Sustainable Development Goal 3 demands that preventable deaths of new-born babies and children under the age of 5 years should be ended [9]. Countries all over the world are expected to end preventable deaths with at most 12 neonatal deaths and 25 under-5 deaths per 1000 live births by 2030. Sustainable Development Goal 3 also requires that there must be universal coverage of quality healthcare, medicine and vaccines, and vital health services at an affordable cost [9]. The goal of the APN programme

is to train adequate numbers of Advanced Practice Nurses who are willing to provide patient-centred care for the rural populations of sub-Saharan Africa. The expert team unanimously asserted that there must be at least one Child Health Nurse Practitioner who is competent in the integrated management of childhood diseases (IMCI) and resuscitation of babies at every Primary Health Care clinic.

4.3 Broad Learning Objectives and Outcomes

The broad learning objectives and outcomes stipulate what the Advanced Practice Nurse (Child Health Nurse Practitioner) should know and be able to do when he or she completes the programme [13]. The outcomes are expressed in a range of domains, including knowledge, understanding, skills, competencies, values and attitudes. The Child Health Nurse practitioner should be knowledgeable, have competent skills and attitudes in the knowledge domains listed in Table 1.

Table 1: Knowledge Domains of the Advanced Child Health Nurse Practitioner

Domain	Brief Description
Domain A: Nursing Leadership and Governance	The key responsibilities of APNs in their setting are healthcare governance, leadership, management, advocacy and resource management
Domain B: Quality Practice	This domain covers issues of quality in healthcare delivery and continuous professional development.
Domain C: Ethico-legal Practice and Professionalism	This domain covers the ethos of professional practice. It also refers to all the legal aspects of the Advanced Practice Nurse’s practice
Domain D: Education and Research	This domain covers clinical teaching, community education and research
Domain E: Advanced Child Health Nursing Practice	Advanced Child Health Nurse Practitioners (CHNPs) are expected to conduct an assessment (history taking, physical examination, request and interpret laboratory and imaging studies), diagnose children, prescribe treatment (pharmacological and non-pharmacological), admit, discharge, refer and comprehensively manage patients in their practice settings.
Domain F: Attitudes and Values	This domain deals with patient and family centred care and cultural sensitivity.

4.4 Structure of the Educational System

The structure of the educational system stipulates the general educational system within which the Advanced Practice Nursing programme will be implemented as outlined in Table 2. This section of the curriculum framework specifies the duration of the programme, number of school weeks in an academic year, notional hours and associated credits for the Advanced Practice Nursing (Child Health Nurse Practitioner) programme.

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Table 2: Structure of the Educational System

Variable	Description
Level	Master's level (SAQA NQF level 9)
Ontological orientation	Andragogy and experiential learning approaches
Epistemological orientation	Concept-based curriculum/learning
Total credit	360 credits (180 credits per year)
Number of years	2-years full-time
Number of weeks	40 weeks a year
Number of hours per week	40 hours a week
Total clinical hours	800 -1000 hours
Internship	One-year internship

Note: SAQA NQF=South African Qualification Authority National Qualification Framework [30]

4.5 Structure of the Curriculum Content

The structure of curriculum content defines the concepts for the Child Health Nurse Practitioner programme. The concepts are presented with definition, scope, characteristic features, attributes, exemplars and interrelated concepts presented in Table 3 adapted from Christmals, Crous and Armstrong [8]. The modules developed in this study are presented in Figure 2.

Table 3: Module Credits for Child Health Nurse Practitioner Curriculum

Module (% Of Total Credits)	Concepts	Characteristic Features	Definition	Exemplars	Interrelated Concepts
HEALTH SYSTEM (10%)	Transformational leadership	Execution, partnership, others, communication, self (to set a personal example), ideal impact, strong motivation, intellectual stimulation, and personal consideration	Transformational leadership is the process in which a leader inspires the followers in developing higher-order goals and motivating them to reach such goals through the refinement of the followers' worldview and attitudes.	Scarce resource management; inter-level patient referral; changing curriculum	Nursing case management; systems thinking; governance
	Governance	Accountable, transparent, responsive, rule of law, stable, equity, empowerment, inclusive, consensus orientation, effectiveness and efficiency	Governance refers to the legally recognised structures and processes that are created to guarantee "accountability, transparency, responsiveness, rule of law, stability, equity and inclusivity, empowerment, and broad-based participation" in an organisation, institution or society.	Financial audit; clinical audit; universal coverage	Systems thinking; transformational leadership
	Systems thinking	Leadership and governance, service delivery, health system financing, health workforce, medical products, vaccines and technologies, health information systems, systems organisation, systems network, systems dynamics, systems knowledge	Systems thinking is a quality improvement process in which the understanding of the relationships and interaction between the components of a system is engineered to generate synergy in the system.	Quality improvement project; memorandum of understanding; development of community outreach	Influencing curriculum; clinical assessment; quality of care
GENERIC ADVANCED PRACTICE NURSING CONCEPTS (20%)	Quality of care	Effective, efficient, accessible, acceptable and equitable	Quality is defined as conforming to specified standards of a particular service, i.e. meeting or exceeding the expectations of the population served.	Clinical audit; NIMART; universal coverage	Research dissemination; teaching; influencing curriculum
	Clinical assessment	History taking, physical assessment (biopsychosocial, spiritual, emergency) laboratory examination, imaging studies	Clinical assessment is the process of gathering patient information through patient history taking, physical assessment, laboratory examination and imaging studies to guide the clinician's and clinician's decision making processes especially in the selection of treatment or referral for appropriate treatment.	Assessment critically ill children; assessing for diarrhoeal diseases; assessing for child abuse	Teaching; quality of care; clinical decision making
	Clinical decision making	Pathophysiology, clinical judgement, diagnosis, current-evidence, clinical expertise and patient preferences and characteristics (uniqueness, criticalness, urgency, stability, risks), variables (certainty, similarity, congruence/conflict)	Clinical decision making, synonymous with clinical diagnosis, is the process of deciding on the health status of the client in order to select the best treatment that responds to the client's condition with the primary purpose of improving the health of the client and community.	Critically ill child; use of clinical guidelines; clinical audit	Quality of care; teaching
	Treatment selection	Pharmacological, non-pharmacological (complementary and alternative medicine), pharmacovigilance, cost-effectiveness	Treatment selection is the selection of appropriate and cost-effective treatment that responds to patients' needs for a requisite period.	Critically ill child; clinical pathways; diarrhoeal diseases	Quality of care; clinical assessment; clinical decision making; nursing case management
	Nursing case management	Assessment, clinical decision making, treatment selection, referral services, follow-up care and costing of services, primary healthcare, family centred care, referral system, clinical progress, safe, timely, effective, efficient, cost-effective, equitable and patient-centred, payer, level of care, benefits	Case management refers to the actions taken by the Advanced Practice Nurse in coordinating ongoing comprehensive medical services (assessment, clinical decision-making, treatment selection, referral services, follow-up care and costing of healthcare) that respond to the needs of the patient, family or community.	Inter-level patient referral; use of clinical guidelines; clinical audit	Quality of care; clinical assessment; clinical decision making; treatment selection
CHILD HEALTH NURSE PRACTITIONER SPECIALITY	Child mortality	Pneumonia, diarrhoeal disease, malaria, HIV, severe malnutrition and contributing factors (country of birth, preterm birth, poverty, gender, neonate, rural settlement, urban slum settlement, small for age, child abuse)	Child morbidity is the percentage of children who contracted a disease, fell ill or were injured within a specific period in a defined population. Child mortality is the number of child deaths per 1000 live births in a specified geographical or political location.	Managing adverse events; managing critically ill children; managing pneumonia	Quality of care; clinical assessment; clinical decision making

Module (% Of Total Credits)	Concepts	Characteristic Features	Definition	Exemplars	Interrelated Concepts
CONCEPTS (30%)	Medical record management	Principles (evidence, legal, confidential, safety, critical information, retention period); Uses (continuity of care, quality improvement, research, medicolegal); Types (paper-based, electronic); Content (demographic, consent, admission, management, discharge, financial)	Medical record management refers to the organisational policies, regulations and procedures governing the collating, handling, storage and use of patient medical records.	Patient kardex; inter-level patient referral; clinical audit	Nursing research; quality of care
NURSING EDUCATION (10%)	Teaching	Health promotion, health education, clinical teaching, patient education, curriculum, andragogy, learning, assessment, knowledge brokering	Teaching is the process by which the teacher (lecturer, facilitator etc.) guides the student to acquire certain knowledge, skills and attitudes that are intentionally planned through an institutional curriculum.	Patient education; clinical nursing education; health promotion	Influencing curriculum; quality of care; transformational leadership
	Influencing curriculum	Advocacy, professional organisation, needs analysis, programme development, programme evaluation, feedback	Influencing curriculum refers to advocating and positively determining the course of teaching and learning in nursing.	Clinical nursing education; curriculum change; child health advocacy.	Nursing research; teaching; transformational leadership
NURSING RESEARCH (30%)	Nursing Research	Research proposal, data collection, data analysis, interpretation, dissemination, principles (privacy, anonymity and confidentiality, ethical approval, institutional approval)	Nursing research is defined as a "diligent and systematic endeavour to validate and refine existing knowledge and generate new knowledge."	Research proposal development; literature review; writing a research report	Teaching; influencing curriculum; research dissemination
	Research dissemination	Institutional factors (dissemination strategy, organisational culture, incentives); values and skills (academic integrity, plagiarism, academic writing); types (research report, journal papers, conferences presentation, research brief)	Dissemination is a well-planned process in which research findings are exposed to a wider audience through written and verbal means for appropriate evaluation and inclusion into policy and healthcare practice to facilitate evidence-based practice.	Evidence-based poster development; writing journal article; writing research report;	Nursing research; transformational leadership; influencing curriculum

[Adapted from Christmals, C. D., Crous, L., & Armstrong, S. J. (2019). The Development of Concepts for a Concept-Based Advanced Practice Nursing (Child Health Nurse Practitioner) Curriculum for Sub-Saharan Africa. *International Journal of Caring Sciences*, 12(3), 1410–1422] [8] .

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4.6 Standards of Resources Required for Implementation

Standards of resources describe the level of lecturer qualifications, workload per lecturer, student qualifications and number per class, materials (textbooks, computers and other equipment) and facilities (classrooms, furniture, fittings).

4.6.1 Lecturer qualifications

Nursing lecturers are expected to have a PhD in nursing. Consideration is given to a Master of Nursing (coursework and research components). Non-nurse lecturers are also expected to have obtained PhD in a specialist field. Consideration is given to a Master of Medicine and equivalent qualification if there are no PhD holders. All lecturers in the CHNP programme should have at least a Diploma in Health Science Education.

4.6.2 Student qualifications and resources

A 4-year degree in nursing with a minimum of 60% cumulative average mark is required for admission into the CHNP programme. Two years' minimum clinical practice after Community/National/Youth Service or internship is the prerequisite clinical practice for gaining admission into the CHNP programme. Mathematics, computing skills, and English/French language skills are required for admission into the CHNP programme. Paediatric Nursing, Anatomy, Physiology, Psychology, Sociology, Pharmacology, Microbiology, Community Health Nursing, Family Health Nursing, Communicative Skills, Research Methods and Fundamentals of Nursing are courses the candidate should have taken in an undergraduate programme to qualify for the CHNP programme. Students are expected to have personal materials such as a laptop computer, prescribed textbooks, and a diagnostic set to promote effective learning.

4.6.3 Library resources

The students should have access to textbooks, computers, internet services, online learning platform (e.g. Sakai, Moodle), subscription to research database and online books.

4.6.4 Classroom resources

Classroom resources to support the implementation of the programme include Liquid-crystal Display (LCD) projector, comfortable tables and chairs for students, good ventilation and temperature regulation system, chalkboard and chalk, white/marker board and markers, good lighting, and good ventilation.

4.6.5 Teacher-student ratio

A lecturer student ratio between the ranges of 1: 7 to 1:14 is desirable.

4.7 Teaching methods

Teaching methods describe the range of teaching approaches that might be employed in the implementation of the framework. Experiential learning and problem-based learning, which are adult education-oriented, are to be implemented to inculcate the level of critical thinking, problem-solving and ability to apply concepts to general to situations. The expert team also proposed small group sessions, self-study and blended learning methods.

4.8 Assessment and reporting methods

Assessment and reporting methods describe the modes of assessment, pass marks and how the student achievements are awarded or certified. Assessment should seek to determine the Child Health Nurse Practitioner's critical thinking, problem-solving and ability to apply concepts to general situations in the healthcare setting and community that are served. Objective Structured Clinical Examination (OSCE), written tests and examinations, viva-voce and take-home assessments were proposed by the expert team.

4.9 Other elements

Other elements of this curriculum framework in addition to the eight (8) elements of a curriculum framework outlined by Stabback (2007) include clinical practice, internship, licensure and continuous professional development (CPD), and adoption and adaptation instructions.

4.9.1 Clinical Training

Clinical training describes the mode of clinical training (clinical practice for learning and role-taking) by the student enrolled in the Child Health Nurse Practitioner Programme. Simulation laboratory, clinical placement facilities, anatomical models, clinical mentors, simulators, clinical supervisors, resuscitation equipment, diagnostic sets, personal protective equipment, and a qualified skills laboratory technician are materials and resources needed for successful clinical training. Between 800-1000 hours of clinical placement for learning and role-taking is prescribed for the 2-year training programme.

4.9.2 Internship

A one-year internship under the supervision of a paediatrician, if available, is recommended.

4.9.3 Licensure and CPD

Licensing of the Advanced Practice Nurse should be done at the discretion of the nursing council under which he or she is registered.

4.9.4 Adoption and Adaptation of the Child Health Nurse Practitioner Curriculum Framework

The framework should be adopted and adapted to suit each country in sub-Saharan Africa. Changes to this curriculum framework could affect the context, aim, knowledge domains, resources and concepts. Due to the expectations of the Advanced Practice Nurses and the aim of having the Advanced Practice Nursing programme locally relevant and internationally competitive, changes to the level of training and number of years of training are not advised. Resistance from the medical profession, limited human and fiscal resources and lack of political will are some of the challenges that need to be surmounted in the implementation of this programme.

4.10 Confirmation and Evaluation of the Curriculum Framework

4.10.1 Confirmation

The 27 international multidisciplinary health experts who took part in the last phase of the Delphi study were given the draft curriculum framework to review and state any deviations they identified in the framework from the data they provided. Nineteen (19) of the 27 participants responded to the confirmation questionnaire. They all stated that the curriculum framework accurately represented the data they provided for the study.

4.10.2 Evaluation

Fifty (50) faculty from 38 institutions in 15 sub-Saharan African countries (Botswana, Ethiopia, Ghana, Kenya, Liberia, Malawi, Nigeria, Lesotho, South Africa, Rwanda, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe) were invited to participate. Seventeen faculty from fifteen nursing education institutions in ten sub-Saharan African countries (Ghana 2, Botswana 1, Swaziland 2, South Africa 1, Nigeria 2, Rwanda 2, Uganda 1, Kenya 2, Malawi 1 and Zambia 1) responded to the evaluation questionnaire before the close of the study. One response was incomplete and was excluded from the study, leaving 16. The 16 curriculum development experts stated the framework was applicable in sub-Saharan Africa. Some participants said:

“It is applicable because the framework responds to the needs of the country. However, it will require a change in policy especially in regard to the scope of nurses.”- Rwanda 1

“There is an adequate, easy-to-understand description of the current context, educational policy statement, statement of broad learning objectives, the structure of the Child Health Nurse Practitioner programme.”- Nigeria 1

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"It is evidence-based and issues discussed affect us as a country. The issues of high neonatal, infant and child mortality-SDG 3. There is a need for our country to train nurses who will provide quality care to the children as paediatricians do not spend a long time with the children. Our country has 79% of the population residing in rural areas."- Swaziland 1

The participants also believed that the ACHNP curriculum framework could be adapted for other ANP specialities. A faculty stated that the guidelines provided for the adoption and adaptation of the curriculum framework will be very helpful for her institution and country. Three faculty indicated that the curriculum framework will be easily adopted if it is adapted using country-specific burden of diseases. Other recommendations include disseminating the framework on compact disks and other electronic formats to make it accessible to the stakeholders of nursing in sub-Saharan Africa. These institutions are major gatekeepers for nursing education programmes in every country. The ability of this programme to make any impact in sub-Saharan Africa will depend, largely, on their approval.

5. DISCUSSION

This is the first postgraduate level concept-based curriculum framework to be developed; it was laborious trying to determine how many concepts were sufficient and which ones to include. The difficulty in determining how many concepts to be included in the curriculum was also reported by Giddens, Wright and Gray[31] in their state-wide undergraduate concept-based curriculum development.

The APNs are expected to practice extended roles that involve comprehensive assessment and diagnosing and management of illness and diseases. This requires extensive knowledge of the disease process and the essential skills to function effectively. The concepts for Advanced Nursing Practice were carefully selected to equip the APN with the needed skills in clinical practice. Fifty per cent of the concepts presented the Advanced Nursing Practice speciality area. The remaining concepts that were included were specific to the content in research, education and health systems, which implies the need for vital knowledge, skills and attitudes by the Advanced Practice Nurse to function effectively.

For the APNs to be competent in evidence-based practice, they need to be able to generate evidence and be competent in utilising such evidence. The APN will be expected to do clinical teaching for nursing programmes and to educate the patient in the clinical setting. To do that, the concepts of nursing education are necessary. The APN will acquire knowledge, skills and

attitudes to teach students and clients effectively in hospital settings. The health system is the larger context within which the APN will practice. To be able to function within the confines of the law and to produce positive effects in practice, the APN must understand the health system, the players in it and their demands. Three concepts were included under health systems to guide the APN understanding of the health systems. He or she is envisaged as the leader at the community healthcare level, therefore, leadership and governance skills are important for the APN's practice.

The knowledge domains defined in this study are not significantly different from the competencies of advanced practice nursing prescribed by the Nursing and Midwifery Board of Ireland [32]. They are also in alignment with the course structure of the Nurse Practitioner programme implemented by the University of British Columbia[33], with the exception that the University of British Columbia's programme emphasizes pathophysiology and pharmacology. The Royal College of Nursing [34] also emphasised pathophysiology and pharmacology. All other components are the same, with the exception that this curriculum is concept-based and does not encourage the emphasis on content, rather concepts such as decision making and treatment selection, which includes pathophysiology and pharmacology. In a study to explore the fundamental aspects of Advanced Practice Nursing in aesthetic medicine, Greveson [35] reported "developing a nurse-led service; patient assessment and decision making; consultation skills; treatment selection; non-medical prescribing; insurance and record-keeping; audit and research and continuous professional development" as the components of aesthetic medicine for Advanced Practice Nursing. These components are consistent with the concepts reported in this study, with a few nomenclature differences.

The concepts developed in this study are of higher thinking and problem solving than those developed for undergraduate nursing by Giddens, as the Advanced Practice Nurses are expected to practice at a higher level than the graduate nurses – advanced assessment, diagnosing, prescribing and management of care [36].

The structure of the education system reported in this study is supported by the Advanced Practice Nursing programmes implemented in the United States of America, United Kingdom, Canada and other parts of the world. The differences are the number of credits for the programme, type of curriculum and context in which the programme is being implemented.

Differences in credits are a result of the different credit systems used in different jurisdictions [1,33]. The structure of the curriculum content has been organised into modules which are made up of concepts. This is a unique way of curriculum content organisation, as the concept-based curricula reported by other authors [27,37,38] were organised into courses. The modular structure of curriculum best suits postgraduate education and reformed higher education from its traditional subject, course, semester nature [39]. The concept-based epistemological perspective of this curriculum is essential in reducing the content of the Advanced Practice Nursing curriculum while allowing the Child Health Nurse Practitioner to acquire the knowledge, skills and attitudes needed to function at a competent level in critical thinking and problem-solving. Less content will also give the CHNPs enough time for clinical practice. Though the authors put in measures to ensure the rigour in this study, the study is not without limitations. Though the use of a nominal group technique in addition to the Delphi method would have been more appropriate for the evaluation of scoping review results and providing the content of the curricula, it was not possible due to the vastness of the context and funding limitations. Also, only 17 faculty from 10 sub-Saharan African countries responded to the evaluation questionnaire. The authors cannot tell if the results would have been different if all the nursing institutions in sub-Saharan Africa evaluated the framework for applicability. Also, the authors cannot guarantee that there will not be challenges in the implementation of the curriculum framework.

6. CONCLUSION

The Child Health Nursing Practitioner curriculum framework is comprehensive, context-specific, has the potential to respond to the special child healthcare needs of sub-Saharan Africa and is adaptable for other Advanced Practice Nursing speciality programmes in sub-Saharan Africa. The nursing leadership should lobby and professionally advocate for funding and introduction of the CHNP programme as a collaborative process between government, clinical services, public and educational institutions; and propose how this can be done. Child mortality is a global phenomenon. The CHNP could be adapted for other contexts in which human resources for primary health care for children is lacking.

7. AUTHOR CONTRIBUTIONS

Both authors, Dr Christmal D. **Christmals** and Dr Susan J. **Armstrong** were involved in study conceptualisation, literature review, data collection, data analysis, interpretation of results and manuscript writing.

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9. CONFLICT OF INTEREST

There were no conflicts of or competing interests as far as this manuscript is concerned.

10. FUNDING

This study was self-funded.

11. DATA SHARING

Data collected for this study has been deposited in the Mendeley database: Christmals, Christmal (2019), “Dataset_Concepts for Advanced Practice Nursing Curriculum in Sub-Saharan Africa”, Mendeley Data, v1 <http://dx.doi.org/10.17632/2kmpt2wg9s.1> .

[Word Count: 3997]

Figure legend:

Figure 1: Summary of Methods

Figure 1 presents the flow of the methods used in this study. The scoping review, followed by the Delphi, then concept development, curriculum framework development, confirmation and evaluation.

Figure 2: Structure of the curriculum content

The content of the framework is presented in five modules as presented in table 2. The modules consist of Health systems generic APN concepts, CHNP speciality concepts, nursing education and nursing research.

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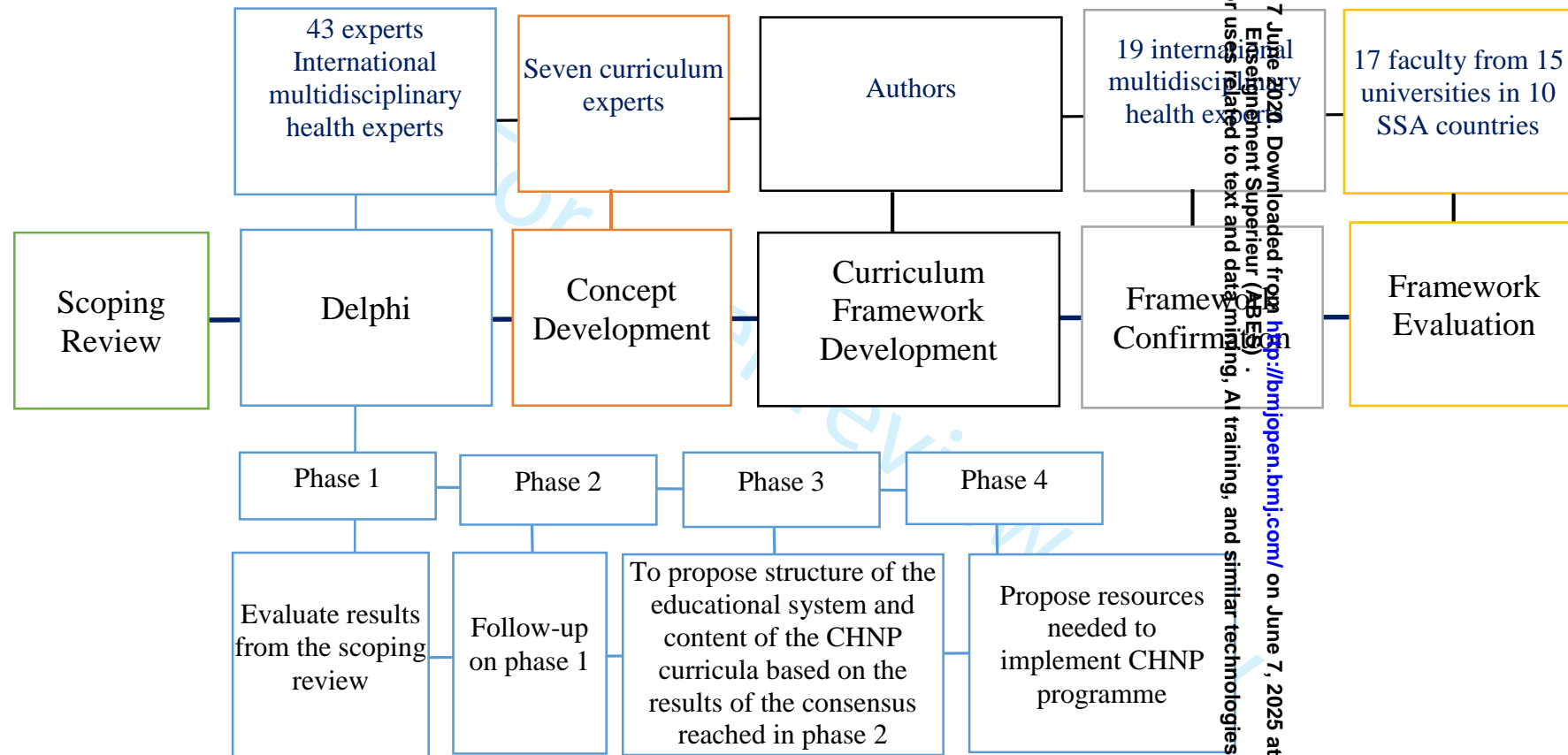


Figure 1: Summary of methods

PROGRAMME OUTCOME: To produce competent Advanced Practice Nurses who will produce evidence-based, culturally sensitive and cost-effective quality child health care to the underserved populations in sub-Saharan Africa.

MODULES	HEALTH SYSTEM	GENERIC APN CONCEPTS	CHNP SPECIALTY CONCEPTS	NURSING EDUCATION	NURSING RESEARCH
CONCEPTS	Transformational leadership, governance, systems thinking	Quality of care, clinical assessment, clinical decision making, treatment selection, medical record management	Nursing case management, child mortality	Teaching, influencing curriculum	Nursing research, research dissemination
MODULE OUTCOMES	The APN will be able to comprehend national and international health systems and their influence on child health nursing and be able to lead and transform the health system at the local level in order to facilitate the provision of evidence-based, culturally sensitive and cost-effective quality child health care to the underserved populations in sub-Saharan Africa	The CHNP will be able to acquire knowledge, competent skills and attitudes need to provide evidence-based, culturally sensitive and cost-effective quality child health care provided for the underserved populations in sub-Saharan Africa (assess, diagnose, manage and record)	The CHNP will be able to plan, execute and evaluate evidence-based, culturally sensitive and cost-effective quality child health care to the underserved populations in sub-Saharan Africa with the aim of reducing child mortality and improving other healthcare indices	The CHNP will be able to impart evidence-based, culturally sensitive health information to the child, family and community in order to promote, restore or maintain their health status and to inculcate the knowledge, attitudes and behaviours necessary to provide evidence-based, culturally sensitive cost-effective quality child health care to the underserved populations in sub-Saharan Africa into nursing students through clinical teaching.	The CHNP will be able to propose, conduct research and synthesize research findings in order to provide evidence-based, culturally sensitive and cost-effective quality child health care to the underserved populations in sub-Saharan Africa

Figure 2: Structure of the curriculum content

Reporting checklist for quality improvement study.

Based on the SQUIRE guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the SQUIRE reporting guidelines, and cite them as:

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	Reporting Item	Page Number
Title		
	#1 Indicate that the manuscript concerns an initiative to improve healthcare (broadly defined to include the quality, safety, effectiveness, patientcenteredness, timeliness, cost, efficiency, and equity of healthcare)	1
Abstract		
	#02a Provide adequate information to aid in searching and indexing	1
	#02b Summarize all key information from various sections of the text using the abstract format of the intended publication or a structured summary such as: background, local problem, methods, interventions, results, conclusions	1
Introduction		
Problem description	#3 Nature and significance of the local problem	2

1	Available	#4	Summary of what is currently known about the problem, including	2
2	knowledge		relevant previous studies	
3				
4				
5	Rationale	#5	Informal or formal frameworks, models, concepts, and / or theories used	3
6			to explain the problem, any reasons or assumptions that were used to	
7			develop the intervention(s), and reasons why the intervention(s) was	
8			expected to work	
9				
10				
11	Specific aims	#6	Purpose of the project and of this report	3
12				
13				
14	Methods			
15				
16	Context	#7	Contextual elements considered important at the outset of introducing	3
17			the intervention(s)	
18				
19				
20	Intervention(s)	#08a	Description of the intervention(s) in sufficient detail that others could	N/A
21			reproduce it	
22				
23				
24	Intervention(s)	#08b	Specifics of the team involved in the work	N/A
25				
26	Study of the	#09a	Approach chosen for assessing the impact of the intervention(s)	N/A
27	Intervention(s)			
28				
29				
30	Study of the	#09b	Approach used to establish whether the observed outcomes were due to	N/A
31	Intervention(s)		the intervention(s)	
32				
33				
34	Measures	#10a	Measures chosen for studying processes and outcomes of the	4
35			intervention(s), including rationale for choosing them, their operational	
36			definitions, and their validity and reliability	
37				
38				
39	Measures	#10b	Description of the approach to the ongoing assessment of contextual	3-5
40			elements that contributed to the success, failure, efficiency, and cost	
41				
42				
43	Measures	#10c	Methods employed for assessing completeness and accuracy of data	3-5
44				
45	Analysis	#11a	Qualitative and quantitative methods used to draw inferences from the	3-5
46			data	
47				
48				
49	Analysis	#11b	Methods for understanding variation within the data, including the	N/A
50			effects of time as a variable	
51				
52				
53	Ethical	#12	Ethical aspects of implementing and studying the intervention(s) and	5
54	considerations		how they were addressed, including, but not limited to, formal ethics	
55			review and potential conflict(s) of interest	
56				
57				
58	Results			
59				
60				

	#13a	Initial steps of the intervention(s) and their evolution over time (e.g., time-line diagram, flow chart, or table), including modifications made to the intervention during the project	6-11
	#13b	Details of the process measures and outcome	6-11
	#13c	Contextual elements that interacted with the intervention(s)	6
	#13d	Observed associations between outcomes, interventions, and relevant contextual elements	N/A
	#13e	Unintended consequences such as unexpected benefits, problems, failures, or costs associated with the intervention(s).	N/A
	#13f	Details about missing data	6-10
Discussion			
Summary	#14a	Key findings, including relevance to the rationale and specific aims	11
Summary	#14b	Particular strengths of the project	11-13
Interpretation	#15a	Nature of the association between the intervention(s) and the outcomes	N/A
Interpretation	#15b	Comparison of results with findings from other publications	11-13
Interpretation	#15c	Impact of the project on people and systems	12-13
Interpretation	#15d	Reasons for any differences between observed and anticipated outcomes, including the influence of context	11-13
Interpretation	#15e	Costs and strategic trade-offs, including opportunity costs	11-13
Limitations	#16a	Limits to the generalizability of the work	N/A
Limitations	#16b	Factors that might have limited internal validity such as confounding, bias, or imprecision in the design, methods, measurement, or analysis	1
Limitations	#16c	Efforts made to minimize and adjust for limitations	1
Conclusion	#17a	Usefulness of the work	13
Conclusion	#17b	Sustainability	13
Conclusion	#17c	Potential for spread to other contexts	N/A
Conclusion	#17d	Implications for practice and for further study in the field	13

1	Conclusion	#17e	Suggested next steps	13
2				
3	Other			
4	information			
5				
6				
7	Funding	#18	Sources of funding that supported this work. Role, if any, of the funding	13
8			organization in the design, implementation, interpretation, and reporting	
9				

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12 NC 4.0. This checklist was completed on 06. November 2019 using <https://www.goodreports.org/>, a tool made
13 by the [EQUATOR Network](#) in collaboration with [Penelope.ai](#)
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