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INSTITUTIONEN FÖR VÅRDVETENSKAP OCH HÄLSA

MIDWIFERY EDUCATION IN SUB-SAHARAN AFRICA

- A systematic integrative literature review

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My Mowitz

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The master thesis' contribution to the main area Reproductive and Perinatal health

Sahlgrenska Academy, Gothenburg University provides a course package for midwives to reach a master level in the major subject Reproductive and Perinatal Health, which adds knowledge to fulfil competence as a midwife as presented in the midwifery policy document "Kompetensbeskrivningen för Barnmorskor" published by the Swedish Midwifery Association (1,2). The problem area for this Master Thesis, the quality of midwife education programmes and facilitators and barriers for such programmes, is important in the strive to increase competence in midwives by offering high quality education, which in turn will increase the educated midwives´ competence in supporting people´s Reproductive and Perinatal Health.

Global assessments estimate about 810 maternal deaths every day, with the highest maternal mortality rate in Sub-Saharan Africa. Furthermore, globally, almost one in five women give birth without assistance from a skilled healthcare provider (3). The main causes of maternal deaths are haemorrhage, hypertensive disorders, and sepsis. Midwives have been identified as the healthcare provider that have the best ability to reduce maternal deaths due to these common causes (4). To become a midwife, that adheres to the role and scope of practice described by the International Confederation of Midwives (ICM) it requires undertaking a midwifery education that is based on the ICM Essential Competencies for Basic Midwifery Practice (5) and the framework of the ICM Global Standards for Midwifery Education (6). In Sub-Saharan Africa, data reporting from 42 countries, showed that only 12 countries account for more than 80 per cent of the nursing and midwifery educational programmes with almost 40 per cent of the institutions in just two countries: Democratic Republic of Congo and Nigeria. Midwifery education is critical to attain the proficiency and adequate number within the midwifery workforce to meet sexual, reproductive, and perinatal needs in Sub-Saharan Africa. Current midwifery workforce doesn't even make up to half of what is required (4). Investment in work environment, education, regulation, and management of midwives would not only expand the midwifery workforce but improve maternal and newborn's quality of care. Strategies to scale-up midwifery education in especially low- and middle-income countries are of outmost importance (7). This review is, to our knowledge, the first systematic review to synthesise current publications within the field in Sub-Saharan Africa and map pre-

service midwifery education to the ICM Global Standards for Midwifery Education. The objective of this review was to describe facilitators of and barriers to providing quality midwifery education in Sub- Saharan Africa. The specific question asked was how midwifery education stands against the ICM's Global Midwifery Education Standards.

Reproductive and perinatal health is an area of expertise allocated midwives regarding human reproduction. Research within the field aims to describe or broaden the understanding of midwifery knowledge and skills. It is a part of the midwifery profession to continuously analyze strengths and weaknesses with midwifery competence to enhance understanding of the profession as to ensure accountability (1). Acquired evidence-based knowledge is to be shared with different authorities, pre-service midwifery education, and through channels providing continuing professional development for midwives (8). The role of the midwife is to promote, protect and support sexual, reproductive, and perinatal health. Furthermore, is based on ethical principles, holistic care and takes part in a partnership with the woman (8). The national midwifery association in Sweden, Svenska Barnmorskeförbundet, has released a report addressing the *midwife's role* in implementing the Sustainable Developmental Goals (9). It highlights, in alignment with ICM, the importance of ensuring that midwives are educated according to ICM Global standards for Midwifery Education in order to meet the sustainable development goal 3. They aspire to reform the education system both within Sweden as well as to support reform internationally in regards to the midwifery discipline (1). WHO launched together with United Nation Population Found (UNFPA) and International Confederation of Midwives the action plan "The Framework for action to strengthen midwifery education" to improve midwifery education in order to achieve further reductions in mortality and morbidity (10). They present three foundational pillars a) Every woman and newborn should be cared for by a midwife, educated and trained to international standards, b) Midwifery leadership at all levels to ensure universal health coverage, and c) Coordination and alignment between midwifery stakeholders at global, regional and country levels. Education to international standards is set as a prerequisite to produce competent midwives with ability to provide reproductive and perinatal health that reduce mortality and morbidity (10). The Swedish midwife-led interdisciplinary model of care could work as a source of inspiration figuring as an example for other countries implementing the action plan. Placing the midwife as primary healthcare provider for all sexual and reproductive health issues during the woman's whole reproductive life cycle. Low-income countries that invest in

mothers and children get a nine-fold return through social and economic development, increasing both productivity and gross domestic product (GDP) (9).

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RPH040

Title page

Midwifery education in Sub- Saharan Africa – A systematic integrative literature review

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Abstract

Background: Maternal mortality remains a major global health concern, with the highest rate found in Sub-Saharan Africa. There is documented lack of well-trained midwives, hence, a need for increased quality midwifery education to improve maternity care and secure women's reproductive health.

Objective: This review aims to describe facilitators of and barriers to providing quality midwifery education in Sub- Saharan Africa. The specific question asked was how midwifery education stands against the ICM's Global Midwifery Education Standards.

Method: An integrative review, as described by Whittemore and Knafl, was conducted following the five stages: Problem identification, Literature search, Data evaluation, Data analysis, and Presentation of the result. The literature search was conducted in three databases: PubMed, CINAHL and Scopus in January 2023. A deductive approach, using ICM´s six Standards for Midwifery Education guided the analysis.

Result: The searches identified 1664 publications, 82 were read in full, leaving 29 publications included, describing studies conducted in 18 countries within Sub-Saharan Africa. *Programme governance:* there was little support for the midwifery program such as its registration and knowledge of scope of practice. *Faculty:* The faculty was not competent enough for the tasks they were assigned. *Students*: The students showed a clear demand for more support. *Midwifery programme & curriculum:* The content and execution of the midwifery programme & curriculum was limited and did impact on the students' achievement. *Resources*: A conspicuous lack of resources. *Quality improvement:* Shortage of funding and knowledge about quality improvement processes limited the quality assurance within the program as well as external accreditation.

Conclusion: The included studies in this review reports challenges within each and one of the educational standards that could have serious implication for the quality of the midwifery education provided. Further research is therefore required.

Keywords: Midwifery, Education, ICM Standards for Midwifery Education (2021), Sub-Saharan Africa

Introduction

Maternal mortality remains a major global health concern, with the highest rate in Sub-Saharan Africa. In the South-East Region of Africa alone, nearly 77,000 women died in 2017 due to preventable causes related to childbirth, with a staggering 391 deaths per 100,000 live births. To meet the Sustainable Development Goal (SDG) 3 of reducing global maternal mortality to 70 deaths per 100,000 by 2030, immediate and comprehensive action must be taken to improve access to skilled care during pregnancy, childbirth, and postpartum (1).

With a skilled midwifery workforce, healthcare makes a system-level shift applying the field of midwifery, as primary response to address sexual, reproductive and neonatal healthcare. Preventing up to 80 per cent of maternal deaths (2). This has been proved both cost-efficient, and promotive of health equity, for women and children globally (3). In 2020 Sub-Saharan Africa had installed 39 per cent of its estimated nurse- and midwifery workforce, and with the current situation the trajectory for 2030 is that only 49 per cent of the demand for nurses and midwives will be met (4). Increased quality midwifery education is therefore critical in order to achieve targeted goals in SDG3 (4). The Essential competencies for midwives developed by the International Confederation of Midwives (ICM) (5) specifies what is required in order to be called a midwife, what a midwife should know, and able to do. Such midwife has been found best suited as primary care provider during a woman's whole reproductive life cycle (6, 7). Yet, in Sub-Saharan Africa more than twenty different cadres of skilled birth attendants' have been identified (8). At present, pre-service midwifery education in the Sub-Sahara region contains four different pathways, two through vocational training: certificate and direct entry diploma. Two with a university degree, post general nursing diploma and direct entry bachelor´s degree. They span between 2,5 to 5 years of studying where most of the education programmes are a direct entry to midwifery education and mostly at a diploma level. While some countries have made progress in upscaling their pre-service midwifery education and regulating the legislation of the profession several challenges remain (1, 4).

International Confederation of Midwives (ICM) provide a framework to educational institutions of how to ensure a quality pre-service midwifery education that generates a skilled professional midwifery workforce (9). It set itself apart by focusing on how to enable competency-based education to address a variety of educational pathways after which midwives are going to be prepared to practice in a variety of different contexts (6). The

extensive knowledge translation from the educational institution to the students is synthesized into six standards with subcategories: Programme Governance, Faculty, Student, Midwifery Program and Curriculum, Resources and Quality improvement (10). With a diversity in midwifery education across Sub-Saharan Africa this review aims to describe facilitators of and barriers to providing quality midwifery education in Sub- Saharan Africa. The specific question asked was how midwifery education stands against the ICM's Global Midwifery Education Standards.

Method

Study design

An Integrative Literature Review, described by Whittemore and Knafl (11) was conducted following the five stages: Problem identification, Literature search, Data evaluation, Data analysis, and Presentation of the result. The integrated review involving both qualitative and quantitative primary studies diversifying the scope, and by doing so allows for an in-depth understanding of the topic (12).

The included data was summarised and organised with a deductive approach, against ICM Standards for Midwifery Education (10) as described by Elo & Kyngäs (9) in order to identify facilitators and barriers to quality midwifery education.

Literature search stage

To organise the search-strategy a PIOS approach (13) (Population, Intervention, Outcome and Study design) was used to identify the major concepts involved; midwifery, education, and Sub-Sahara Africa. The search terms were used with the Boolean operators AND/OR/NOT and the truncation symbol* to expand the search terms (14). Librarians at Gothenburg's University Library was utilised throughout the literature search stage (13).

Table 1. Inclusion and exclusion criteria

Inclusion criteria	**Exclusion criteria**
Participants Primary stakeholders - identified as Administrators: the heads of schools, heads of the midwifery programme, institutional administrators, accountants, and human resource officers educators, clinical supervisors, and clinical instructors Students Sub-Saharan Africa, as defined by UNFPA	

Interventions Pre-service midwifery education	
Outcomes Facilitators of and barriers to providing quality midwifery education	Focus on covid
Study design Original research Publications in English Published between January 2013- January 2023 Ethical approval	Grey literature Books Not published research Secondary research, such as editorials and commentaries

The search was conducted in three databases: PubMed, CINAHL and Scopus in January 2023. For the full search strategy, see Appendix 1.

The geographical area of interest was Sub-Saharan Africa as defined by UNFPA (15) . It include the following 45 countries: Angola, Benin, Burkina-Faso, Botswana, Burundi, Cameroon, Central African Republic, Chad, Cabo Verde, Cote d'Ivoire, Comoros, Democratic Republic of Congo, Eritrea, Eswatini, Ethiopia, Equatorial Guinea, Gabon, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mozambique, Namibia, Nigeria, Niger, Rwanda, Republic of Congo, Sao Tome & Principe, Senegal, Sierra Leone, Seychelles, South Africa, South Sudan, Tanzania, Togo, The Gambia, Uganda, Zambia and Zimbabwe.

The number of studies found, included, and excluded is visualised through a PRISMA flow-chart, the Preferred Reporting Items for Systematic Reviews and meta-Analysis (16). See Figure 1 below.

Of the identified literature, after removing for duplicates, 1664 publications remained and was imported to the Rayyan web application (17) were title and abstract was read. Eighty-two publications corresponded to aim and were selected to be read in full, 29 publications were identified eligible for inclusion. For publications read in full but then excluded and for what reasons, see Appendix 2.

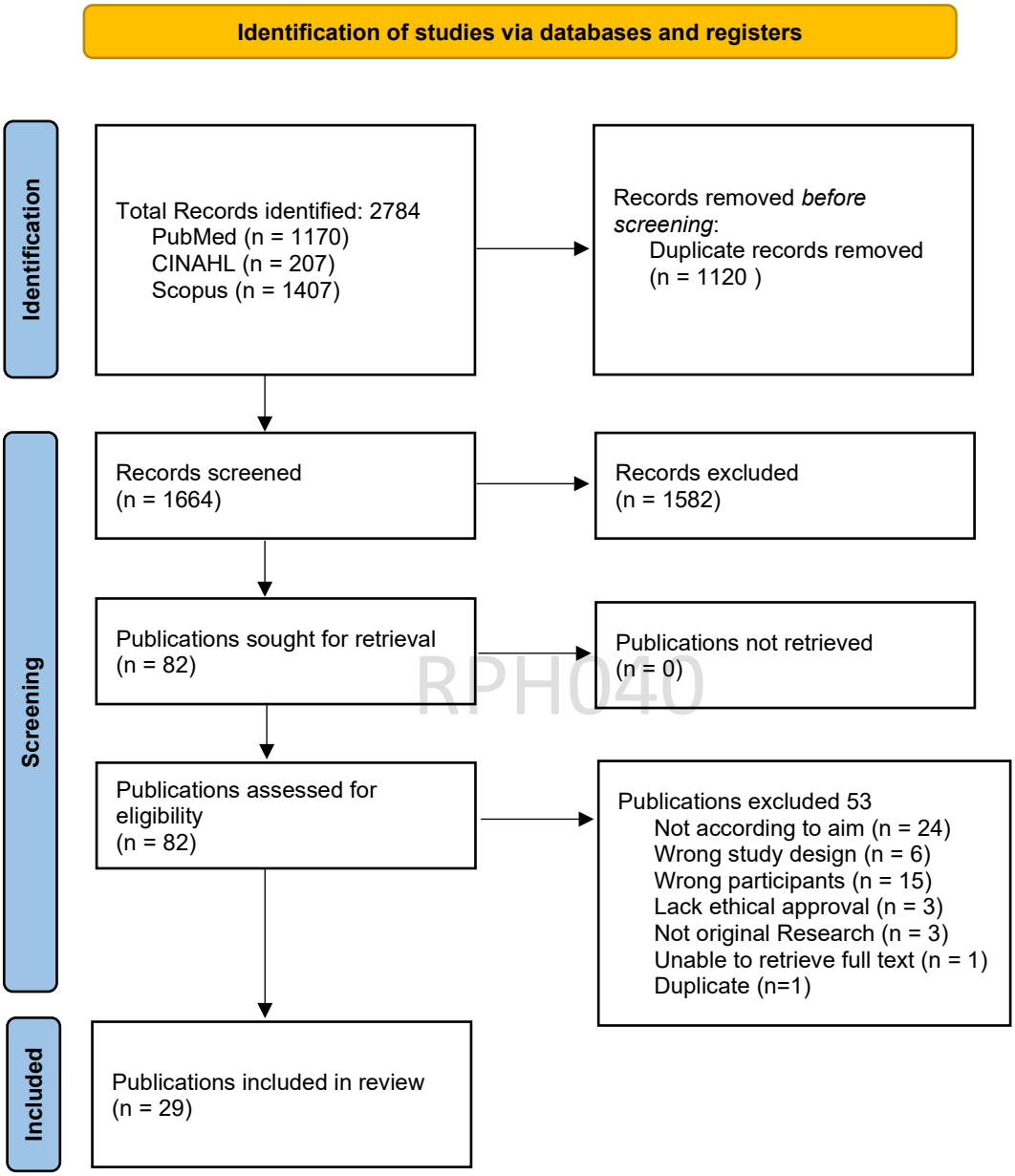

Figure. 1 The PRISMA 2020 statement (16)

Data evaluation stage

The quality assessment of the publications was carried out using Pluye's Mixed Methods Appraisal Tool (MMAT) (18). The MMAT is designed for evaluating both qualitative and quantitative studies which makes it a good instrument for integrative reviews. The tool contains different methodological quality criteria depending on what type of study design there is to evaluate. Two screening questions are the same for all types; *Are there clear research questions? Do the collected data allow to address the research questions?* The other 25 evaluation questions are divided into five groups depending on what kind of study to assess. For example, when appraising a qualitative study one of the questions is; *Is the*

interpretation of results sufficiently substantiated by data? In the MMAT the response to the questions is *Yes, No* or *Can´t tell.* Every question answered *yes* gives 20%, why the evaluation of every included study is scored between 0-100% (18). For quality appraisal on the included articles, see Table 2, Article Matrix & Quality Appraisal.

Data analysis stage

The included 29 publications was read through to get a familiarization of the whole (11). Findings corresponding to aim was identified and deductively sorted into the six categories described in ICM's Standards for Midwifery Education (10, 19). Word-documents were created for each and one of the six categories: Programme Governance, Faculty, Students, Midwifery Programme & Curriculum, Resources and Quality Improvement. The units of information that corresponded with one of these standards were carefully selected to ensure the quality of the data unit, and put in these documents respectively (12). This process was done individually initially and then merged onto one paper where inconsistencies of what data-units to include, could be discussed before continuing the analysis. Once all data had been identified and then categorised, each category were analysed in-depth to find intersections and diversities between the findings. Then each category was synthesised to a text body. Finally, facilitators and barriers to quality midwifery education was identified (12, 19).

Result

Characteristics of included publications

Although the ambition was to include all 45 countries in the Sub-Saharan region (20) the 29 publications identified corresponding to aim, represented 18 countries: Botswana (n=1) (21), The Democratic Republic of Congo (n=2) (22, 23), Eswatini (n=1) (21), Ethiopia (n=9) (21, 24-31), Ghana (n=4) (32-35), Kenya (n=2) (21, 36), Lesotho (n=4) (21, 37-39), Malawi (n=4) (21, 40-42), Mauritius (n=1) (21), Mozambique (n=1) (21), Namibia (n=1) (21), Rwanda (n=2) (21, 43), Seychelles (n=1) (21), Tanzania (n=1) (21), Uganda (n=4) (21, 44-46), South Africa (n=4) (21, 47-49), Zambia (n=1) (21), and Zimbabwe (n=1) (21). Twenty-eight country specific publications reporting from nine countries, and one cross-country publication (21) reporting findings from 16 countries. All but one (30) have been published within the last five years.

Of the 15 publications with a quantitative study design twelve reported using a cross-sectional survey. Sampling size ranged between 60-484 with a total of 2922 participants; 1281 midwifery students and 695 nursing students were asked about their satisfaction or competence during their clinical placement: 463 educators were assessed on their clinical teaching competencies; 413 newly graduated bachelor midwifery students were assessed on determinants of competency in delivery care; and 70 nursing and midwifery leaders were asked about quality improvement measures at pre-service midwifery programmes. Three publications with a non-randomized study-design analysed the effect pre and post an intervention; measuring the effect in student's competence after introducing clinical conferences (n=34) (31), students competence after obtaining the midwifery programme with a new curriculum (n=77) (29); continual professional development to enhance capacity in midwifery educators ability to teach emergency obstetric and newborn care (n=30) (36).

Nine publications, all with a descriptive qualitative study-design were identified for inclusion. Three reported findings from individual interviews with a total of 121 educators (28, 40, 43). Four reported findings from focus group discussions with 67 midwifery students, 24 Nursing students, and 123 educators and clinical supervisors (22, 39, 47, 49). Two reported findings from both individual interviews with 23 administrators and 17 educators and 4 clinical supervisors and focus group discussions with around 88 midwifery students. The field of interest investigated was teaching-methods, curriculum, preparedness for clinical placement, type of clinical placement, and barriers to deliver quality midwifery education,

Five publications reported using a mixed-method study-design, three of these originated from the same project exploring e-learning and its associated factors to facilitate its implementation in Uganda (44-46). The remaining two publications used a questionnaire to gather general information and focus group discussion to get an in-depth understanding of respective field: the current state of the midwifery profession, and clinical learning environment (23, 41). In total 217 midwifery students, 68 educators, 8 administrators and 17 key country representatives of midwifery took part.

Table. 2 Included publications with quality appraisal.

Author, Year, Title	**Country, Method**	**Aim**	**Quality appraisal**
Abuosi AA, Kwadan AN, Anaba EA, Daniels AA, Dzansi G. (2022) Number of students in clinical placement and the quality of the	Ghana Quantitative Cross-sectional Survey	To assess students' perceptions of the number of students on the ward and the quality of the clinical learning environment.	100%

clinical learning environment: A cross-sectional study of nursing and midwifery students.			
Adam AB, Druye AA, Kumi-Kyereme A, Osman W, Alhassan A. (2021) Nursing and Midwifery Students' Satisfaction with Their Clinical Rotation Experience: The Role of the Clinical Learning Environment.	Ghana Quantitative Cross-sectional Survey	To provide answers to the degree to which nursing and midwifery students at the university for Development Students, Tamale, Ghana, are satisfied with their clinical rotation experience, as well as the clinical learning environment's role in their satisfaction with their clinical rotation experience	100%
Ama Amoo, S, Innocentia, N, Enyan, E (2022) Clinical learning experiences of nursing and midwifery students; a descriptive cross-sectional study, ,	Ghana Quantitative descriptive cross-sectional design	To assess the clinical learning experiences and its effectiveness among students of a Nursing and Midwifery Training College in Cape Coast of the Central Region of Ghana.	100%
Amare TG, Tesfaye TT, Girmay B, Gebreagziabher TT. (2021) Exposure to Occupational Health Hazards Among Nursing and Midwifery Students During Clinical Practice.	Ethiopia Quantitative Institutional-based cross-sectional survey	To assess exposure to occupational health hazards among nursing and midwifery students during clinical practice at Mekelle University	100%
Amod HB, Brysiewicz P. (2019) Promoting experiential learning through the use of high-fidelity human patient simulators in midwifery: A qualitative study.	South Africa A descriptive qualitative research approach	The aim of this study was to describe how HFHPS can promote experiential learning following the management of postpartum haemorrhage as a midwifery clinical emergency	100%
Amod HB, Mkhize SW. (2022) Clinical support and perceived competency levels of midwifery students: A descriptive analysis.	South-Africa Quantitative research method Descriptive design	To describe the clinical support and the perceived competency levels of midwifery students, following clinical placement at five public hospitals.	100%
Angasu Kitaba K, Weldemariam S, Belachew AB, Bekela T. (2021) Effective Clinical Teaching Practice and Associated Factors Among Midwifery Educators in Public Universities of Ethiopia: Institution-Based Cross-Sectional Study.	Ethiopia Quantitative Institution-based cross-sectional survey	This study aimed to assess effective clinical teaching practice and associated factors among midwifery educators in public universities of Ethiopia	100%
Bigirwa,J.P Ndawula, S. and Naluwemba, E. F (2020) E-learning adoption: Does the instructional design model matter? An explanatory sequential study on midwifery schools in Uganda,	Uganda An explanatory sequential mixed methods design	This research intended to ascertain whether instructional design was an influencer of e-learning adoption and profile the salient instructional design traits relevant to e-learning adoption in midwifery schools in Uganda.	100%
Bigirwa, J. P, Ndawula, S and Naluwemba,E. F (2020) Does the school financing role matter in E-learning adoption? An explanatory sequential study in midwifery schools in Uganda	Uganda An explanatory sequential mixed methods design	To establish whether school financing role was essential to e-learning adoption, and the salient traits of school financing role which ought to be focused on by midwifery schools in order to improve the adoption of e-learning in their respective schools.	100%
Bigirwa JP, Ndawula S, Naluwemba EF. (2022) Technology Leadership Practices of End Users and the Adoption of	Uganda Explanatory sequential mixed methods design	To evaluate whether technology leadership practices of end users had an influence on e-learning adoption, and ascertain the main practices of technology leadership to be prioritised by	100%

E-Learning in Midwifery Institutions in Uganda.		midwifery institutions in order to improve e-learning adoption	
Bogren M, Kaboru BB, Berg M. (2021) Barriers to delivering quality midwifery education programmes in the Democratic Republic of Congo - An interview study with educators and clinical preceptors.	the Democratic Republic of Congo Qualitative description	To explore the barriers to delivering quality midwifery education programmes in the DRC and reflect on potential areas for improvement	100%
Bogren M, Kaboru BB, Berg M. (2020) Midwifery education, regulation and association in the Democratic Republic of Congo (DRC) - current state and challenges.	the Democratic Republic of Congo an integration of qualitative (description) and quantitative (survey) data was analysed	To explore the current state of the midwifery profession in the DRC and to suggest suitable strategies for increasing the quality and quantity of a highly competent midwifery health workforce in the DRC.	100%
Gessesse, D.N, Yirdaw, B.W, Mekonen, G.D (2021) Predictors of competency on delivery care service among final year undergraduate midwifery students in higher education institutions of Ethiopia, 2019: A cross sectional study,	Ethiopia A quantitative, Institution-based cross-sectional survey	To assess determinants of delivery care competency among newly graduated BSc midwives in Amhara regional state Higher Education Institutions, Ethiopia, 2019.	100%
Hailu M, Welday M, Haftu A, Tadesse D, Weldeamanel T, Amsalu B, Guta A, Kassie N, Sema A, Mohammed A, Abdurashid N, Solomon Y, Bati F, Girma M, Sintayehu Y, Belay Y, Amsalu S. (2021) Clinical Practice Competence and its Associated Factors Among Midwifery and Nursing Students at Dire Dawa Health Sciences Colleges, East Ethiopia, 2020.	Ethiopia A quantitative, Institutional cross-sectional survey	To determine the clinical practice competence and associated factors among midwifery and nursing students at Dire Dawa.	100%
Kibwana S, Haws R, Kols A, Ayalew F, Kim YM, van Roosmalen J, Stekelenburg J. (2017) Trainers' perception of the learning environment and student competency: A qualitative investigation of midwifery and anaesthesia training programs in Ethiopia.	Ethiopia Qualitative description study	This qualitative study examines the perceptions of classroom instructors and skills lab assistants who work at training institutions and preceptors who supervise students at clinical practice sites.	100%
Kitaba A.K. (2022) Effectiveness of Pre- and Post-Clinical Conferences in Improving Clinical Learning Among Midwifery Students of Jimma University: Pre-Experimental Study	Ethiopia A quantitative institution-based pre-experimental study	This study aimed to assess the effectiveness of pre- and post- clinical conferences in improving clinical learning among third-year undergraduate midwifery students of Jimma University.	100%
Matewere I., Msosa A., Mfuni J. (2022) Exploring perceived barriers to effective utilization of learner-centered teaching methods	Malawi Qualitative study	The aim of this study was to explore perceptions of tutors of Holy Family College of Nursing and Midwifery on barriers to effective utilization of learner-	100%

by tutors at Holy Family College of Nursing and Midwifery, Phalombe, Malawi		centered teaching methods since teachers' perceptions are the driving force towards successful implementation of learner centered teaching methods.	
Mbakaya C.B., Kalembo W.F., Zgambo M., Konyani A., Lungu F., Tvei B., Kaasen A., Simango M., Bvumbwe T. (2020) Nursing and midwifery students' experiences and perception of their clinical learning environment in Malawi: a mixed-method study.	Malawi Mixed-method	This study aimed to assess the student nurses and midwives' experiences and perception of the clinical learning environment in Malawi.	100%
McCarthy F.C., Gross M.J., Verani R.A., Nkowane M.A., Wheeler L.E., Lipato T.J., Kelley A.M (2017) Cross-sectional description of nursing and midwifery pre-service education accreditation in east, central, and southern Africa in 2013	Namibia, Botswana, South Africa, Lesotho, Swaziland, Zimbabwe, Zambia, Malawi, Mozambique, Tanzania, Rwanda, Uganda, Kenya, Ethiopia, Seychelles, Mauritius A cross-sectional survey	This study sought to gain an understanding of current pre-service accreditation policies, approaches, and practices in 16 ECSA countries relative to the 2013 WHO guidelines, Transforming and Scaling Up Health Professional Education and Training.	60%
Mhango L., Jere D., Msiska G., Chorwe-Sungani G., Chirwa E. (2021) The roles and experiences of preceptors in clinical teaching of undergraduate nursing and midwifery students in Malawi	Malawi A cross-sectional study	This study explored the roles and experiences of preceptors during clinical teaching of the students.	100%
Misganaw E., Yigzaw T., Tezera R., Gelitew A., Gedamu S. (2022) The promise of the new Educational Strategy for Curriculum Development (SPICES) Model on the Development of Students' Clinical Reasoning Ability. A Comparative Cross-Sectional Study	Ethiopia A comparative cross-sectional study	The purpose of this study is to determine whether the new educational strategy for curriculum development improves the clinical reasoning ability of midwifery students when compared to a peer institution that follows a traditional curriculum.	100%
Ndayisenga J.P., Evans K.M., Babenko-Mould Y., Mukeshimana M. (2020) Nurse and midwife educators' experiences of translating teaching methodology knowledge into practice in Rwanda	Rwanda A qualitative descriptive design	The purpose of this qualitative descriptive study was to explore nurse and midwife educators' experiences of translating the knowledge and skills acquired from participating in continuous professional development (CPD) workshops about teaching methodologies into their teaching practice with nursing and midwifery students in Rwanda.	100%
Nyoni N.C., Botma Y. (2018) Sustaining a newly implemented competence-based midwifery program in Lesotho: Emerging issues	Lesotho A qualitative descriptive study and document analysis	This article reports on issues that challenge the sustainability of a newly implemented CBC in Lesotho.	100%
Nyoni N.C., Botma Y. (2019) Implementing a competency-based midwifery program in Lesotho: A gap analysis.	Lesotho Qualitative Gap-analysis	This article reports an examination of the implementation of the CBC within midwifery program in NEIs in Lesotho through a gap analysis	100%

Phafoli S.H., Christensen-Majid A., Skolnik L., Reinhardt S., Nyangu I., Whalen M., Stender S.C (2018) Student and preceptor perceptions of primary health care clinical placements during pre-service education: Qualitative results from a quasi-experimental study	Lesotho Qualitative cross-sectional study design	To describe the effect of Primary Health Care (PHC) placements on students and preceptors.	100%
Shikuku DN, Jebet J, Nandikove P, Tallam E, Ogoti E, Nyaga L, et al. (2022) Improving midwifery educators' capacity to teach emergency obstetrics and newborn care in Kenya universities: a pre-post study.	Kenya Quasi-experimental design (pre-post)	The objective of the research paper was to assess the change in knowledge, skills and confidence of pre-service university midwifery educators to effectively deliver the updated midwifery curricula after the capacity strengthening workshop in Kenya.	100%
Vuso Z. , James S. (2017) Effects of limited midwifery clinical education and practice standardization of student preparedness	South Africa Qualitative, explorative, descriptive and contextual design	To explore the perceptions of midwifery educators regarding effects of limited standardization of midwifery clinical education and practice on clinical preparedness of midwifery students.	100%
Yigzaw T., Ayalew F., Kim Y-M., Gelagay M., Dejene D., Gibson H., Teshome A., Broerse J., Stekelenburg J. (2015) How well does pre-service education prepare midwives for practice: competence assessment of midwifery students at the point of graduation in Ethiopia	Ethiopia Cross-sectional	To evaluate the quality of midwifery education by assessing the competence of graduating midwifery students.	100%
Ziba F.A., Yakong N.V., Ali Z.(2021) Clinical learning environment of nursing and midwifery students in Ghana	Ghana Cross-sectional survey	Aimed to assess students' evaluation of the clinical learning environment and the factors that influence their learning experience.	80%

Facilitators and barriers to a quality midwifery education

The research question for this review was to identify facilitators of and barriers to a quality midwifery education as reported by the included publications. The main barriers and facilitators identified, and implications that was seen in practice to enhance midwifery education have been summarised and presented in Table 3.

Table 3 Facilitators and barriers to a quality midwifery education

Barriers	**Facilitators**	**Implications for practice**
Programme Governance Lack of a regulatory process Lack of financial independence Lack of competence to perform the duties ascribed head of the midwifery program	Strong leadership, Diversified sources of funds Good structure for school fees Well-developed faculty structures	Difficulties to implement and adapt to new educational systems Bureaucratic processes delaying funding Difficulties to work with long-term implementations

		Inability to uphold academic oversight
Faculty Lack of formal education and preparation for teaching Lack of collaboration and a shared objective between educational and clinical sites Unclear understanding of the core of midwifery	Student-centred pedagogy Continuing professional development acquiring -knowledge -pedagogic skills -a variety of teaching methods for both teachers and preceptors Coordination and communication between educational institution and clinical practice sites Standardization of quality midwifery practice Standardized routines for clinical supervision	Difficulties following curriculum and, evolving course content and assessment tools Difficulties for students in integrating theoretical knowledge with clinical practice Dependency only on clinical supervisors for teaching the student the practical skills
Student Negative experiences in clinical learning environments	Adequate clinical practice Friendly, pedagogical environment Good relationship with the staff and the clinical supervisors Received peer education Given clinical objectives	High workload at the ward and insufficient clinical supervisors Difficulties in performing the care they have been taught at school clinical supervisors taking shortcuts during procedures Exposure to various hazards Expectation to perform ward duties
Midwifery Programme and Curriculum Using a traditional teacher-oriented instructional design Lack of standardised learning objectives and assessments methods Lack of student preparedness Lack of access to information and communication technology Uncertainty of students' competencies	Aligning instructional design with competency-based curriculum Using participatory teaching methods Using simulation-based learning Standardized clinical objectives and assessment tools, Ensure student-teacher reflection and feedback opportunities Providing e-learning options Maximise 'Hands on' experience both as preparation in the classroom and/or skills labs, and at the clinical learning environment Offer a variety of clinical learning environment placements.	length of programme and academic level not meeting ICM standard Using informative learning the students missed out on support to develop their critical thinking and problem-solving skills Insufficient simulations-based learning Lack of clinical exposure Students felt unsupported in their learning Not attending stipulated number of births in accordance with ICM's standards Too many students on the ward at the same time
Resources Human Resource restraints Restricted access to evidence-based knowledge Lack of infrastructure, facilities, and guidelines Lack of resources in the classroom, at skills lab and the	Skills lab supplied with equipment's and materials, Online platforms to enhance communication E-learning options Variety of clinical learning sites	Heavy workloads, time constraints and lack of administrative support curriculum documents not being up to date Insufficient number of classrooms, libraries and study rooms

clinical learning environment for skill practice		Lack of - Internet - Computers - Textbooks - Course literature - Evidence based research papers The number of students exceeded what was manageable
Quality assurance Low levels of accreditation Under developed Quality assurance	Midwifery-policy documents	Lack of standardized quality assessment standards Financial restraints to initiate and a lack of knowledge of how to execute an assessment process

Category 1: Programme Governance

A barrier to the midwifery education was the absence of an approved regulatory process despite the official definition of the profession in the national health sector plan (23). There was a need of program governance where the midwifery profession and the relationship between education and the profession is identified on a higher level (22, 23).

Another barrier was the lack of independence to decide on budgets and funds, making it hard to implement and adapt to new educational systems. Strong leadership, faculty development, and diversified sources of funds, along with school structure payment, can facilitate the implementation process (38, 45, 46). However, bureaucratic processes delay funding from the government, which affects planning (37, 38).

A barrier was the lack of necessary competence and preparation for requirements such as administration, budget, and student activities within the head of the midwifery program (37, 38). Due to the regular exchange of the head of the midwifery program, it is difficult to work with long-term implementations (38). Academic oversight is sometimes done by the professional midwifery association (23) due to a lack of competence at the educational institution (37).

Category 2: Faculty

A barrier was, among midwifery teachers, a lack of formal education and preparation for teaching. When this was promoted their confidence and competence became a facilitator. This improvement is observed in both lectures and teaching clinical skills (22, 36, 38, 43). Broadening their teaching methods with peer-teaching, small group discussions and

simulation demonstrations was showed to help to enhance the student's experience of learning (36).

However, there are variations in the educational and practical midwifery qualification among the faculty, with some expressing a deficiency in understanding the core competence of midwifery (22, 23, 25, 30, 37, 48, 49). For students to develop their competence in midwifery skills, it is essential for the faculty, including both teachers, preceptors and clinical supervisors, to continually develop and maintain their knowledge and pedagogical skills. This is crucial to enable them to follow the curriculum (22, 23, 37-39, 49) and evolve course content and assessment tools (22, 43). Supervision of students in both educational and clinical areas is crucial, (22, 25, 30, 35, 41) with the environment in the ward playing a significant role in the provision of quality pedagogical and clinical education (23, 25, 28, 41, 43).

A barrier was poor collaboration and a shared objective between educational and clinical sites, which are essential prerequisite for qualified midwifery education. Failure to achieve this coordination and communication between these sites can result in difficulties for students in integrating theoretical knowledge with clinical practice (23, 25, 27, 28, 37, 41, 43, 49).

A facilitator was the available education programs for preceptors and clinical supervisors even though the faculty sometimes depend fully on the clinical midwives for teaching the student the practical skills (37). A facilitator was experienced clinical supervisors (41) but a barrier was the lack of knowledge how to use the assessment when students are in the clinical sites (22, 25, 28, 41, 49). Standardization of quality midwifery practice and routines about the clinical supervision and student assessment are requested by the faculty (22, 49).

Category 3: Students

A facilitator was students receiving adequate clinical practice during their midwifery education, which increased their confidence and competencies for providing care (30, 33, 34, 39, 48). Clinical practice provided students with a more profound understanding of the social impact of care and promoted critical thinking skills (34, 39).

Another facilitator found was the enhanced learning when there was a friendly, pedagogical environment, where the students have good relationship with the staff and the clinical supervisors shows the procedures and allow the students to perform the tasks. Learning was positive when the students received peer education and information was given what was expected from them (24, 26, 27, 33, 48).. Some students found their learning objectives

fulfilled and explained they were confident to perform procedures (27). A barrier was the difficulties in performing the care they have been taught in school, considering the huge workload in the ward, making the clinicians taking shortcuts in their procedures (41).

A facilitator was that students found it easier to seek guidance from their teachers and appreciated their presence in the clinics, where they assisted with providing comprehensive care (26, 27, 41). However, some students reported negative experiences in clinical learning environments (30, 35) and a barrier was unfriendly staff who shouted and corrected them in front of peers and patients (41). Additional negative factors included a lack of midwifery preceptors (23), exposure to various hazards (24), and the expectation to perform ward duties (41).

Category 4: Midwifery Programme and Curriculum

In most countries the midwifery curriculum has transitioned from a traditional teaching-cantered approach to a competency-based model that focuses on the essential competencies outlined by the ICM. The development of standardized instructional design and assessment strategies is ongoing. In addition, e-learning has been identified as an important method for delivering the midwifery program (22-25, 27-31, 34, 35, 37-41, 43-49).

The length of the midwifery programme did not always meet the educational standards and the academic, a higher academic level compared to the nursing programme. Whilst the competency levels among midwifery students ranged from 8.8 per cent to 88.6 per cent. Several reported that some students may not have attended the required number of childbirths, and one study stated that only 32 per cent had attended 20 or more births (the national standard) and only 6 per cent had attended 40 or more (ICM's standard). Nonetheless, were there a positive correlation between attending more births and increased competence levels among students (23, 26-28, 30, 44, 48). In Ethiopia it was reported that 10,2 per cent never provided delivery care for a woman who is giving birth during their clinical placement (26).

The overall learning capacity was proven to increase when student-centred instructional design aligned with the competency-based curriculum. Students improved their ability to retain knowledge as well as increase their skill competency (31, 37, 38, 40, 43).

The quality of the relationship between teacher and student was enhanced when using participatory teaching methods, creating trust, and by giving the student encouragement. This was seen enhancing the students clinical reasoning, self-confidence, and psychomotor skills (27, 29, 31, 43).

A lack of standardized methods to provide learning objectives and assessment in class as well as at the clinical practice created an uncertainty of students' actual competence (25, 27, 34, 37, 40, 41, 47, 49). Promoting student reflection and eliciting feedback both to and from teachers are vital in knowledge translation from theory to practice (25, 27, 41, 47). Using Simulation-based learning in skills lab increased the student preparedness for encounters in the clinical learning environment (22, 28, 29, 31, 37, 38, 40, 43, 44). Finishing with an Objective structured clinical examination was then one standardize assessment tool used to measure students' preparedness before sending the students to clinical practice (28). Performance based assessment tool was suggested for evaluation of student competence developed at the clinical learning sites (25).

Difficulties arose when a competency-based curriculum was implemented in a school where teacher-centred pedagogy was still prevalent (37, 44). Teachers struggled with understanding and implementing student-centred pedagogy, leading to a combination of the two approaches that left students feeling unsupported (28, 37, 38, 40). In some cases, important content was not taught due to resistance to new teaching methods (22). This discord had a negative impact on student preparedness and performance in clinical learning environments (29, 37, 38, 43).

Category 5: Resources

Regrettably, lack of recourses was found to be substantial (22-24, 28, 30, 37, 40, 41, 43, 46, 47). Provision of knowledge in theory and skill acquisition in practice, using student-centred methods were restricted (22). Human resource restraints at the educational institution with heavy workloads, time constraints and lack of administrative support was reported. Lack of guidelines, such as updated curriculum documents and lack of facilities such as classrooms, libraries, and study rooms hampered the educators teaching abilities (22, 23, 28, 30, 37). Another barrier was restricted access to information, due to a lack in: infrastructure, internet, of computers, and materials such as textbooks, course literature and evidence-based research papers (22, 23, 40). The theoretical learning was facilitated when students and teachers used

different types of information and communication technology. Such as online platforms where the students could communicate. Implementing and maintain e-learning options beneficially increased the general usage of technology at the institutions (43, 46, 47).

Preparation for clinical practice through simulation-based learning at well supplied skill labs also facilitated the development of competence. It especially added to their decision-making and problem-solving skills. These experiences then allowed for the students to feel encouraged to participate in any similar real-life opportunities (22, 23, 28, 39, 47). Lack of material, equipment, and facilities utilized in simulation-based learning was a barrier to the knowledge translation from theory to practice (22, 28, 41). Noteworthy, one study from Lesotho reported that even though their midwifery programs were provided with fully equipped skill labs they were not utilized by the faculty (37).

A variety of clinical learning sites with opportunity for primary healthcare experience as well as hospital rotation was reported to give the student a wider scope for midwifery practice (39). In the clinical learning environment, the number of students exceeded what was manageable for clinical supervisors to ensure that the student was subjected to enough cases and diverse learning opportunities (27, 28, 32, 41, 43). The lack of supplies could be so vast that not only did it reduce skill acquisition but the overall ability for students to provide essential care during childbirth (22, 24, 27, 30, 41).

Category 6: Quality improvement

It was reported that although some countries have a legal mandate for accreditation, the majority of education programs that produce most of the midwives have low levels of accreditation (21). A successful external accreditation facilitated autonomy to the midwifery program in their decision-making process and allow them to follow through with a competency-based education (21, 37).

Accreditation was required as a mean to uphold quality assurance within the educational institution, a process that was encouraged to be transparent and evaluated periodically. When conducting an accreditation 86 per cent reported adhering to specific national or regional standards in their quality improvement processes, one country used an international standard.

Challenges was seen regarding finance of the accreditation service and knowledge about how to conduct such an inquiry (21, 38).

There was a limited influence from the professional council on monitoring and accrediting midwifery programs. Quality assurance through midwifery-policy documents sustaining the administration, implementation and monitoring of the competency-based curriculum were underdeveloped (38). In contrast, when the midwifery program belongs to the hospital, the perception is that they are not being heard by the hospital board (37, 38).

Discussion

Several barriers were found within each standard to maintain and advance a quality midwifery education in Sub-Saharan Africa aligning with ICM's educational standard for midwifery education. Financial restraints and inadequate leadership had vast implication for the organization and quality of the program delivered. It hindered management of quality improvement processes that elsewise could be used to create a foundation of trust for the midwifery programme. Both in relation to external regulatory processes as well was within the educational structure, to unite students, educators, preceptors, administrators, and key stakeholders. A comprehensive global inquiry into the awareness of ICM's educational standards among midwifery leaders reported that less than 10 per cent could recall their knowledge of it. They stressed that longer duration programs, lack of sufficient academic and clinical resources to effectively educate midwifery students, role conflicts with nursing and absence of a midwifery model of care as barriers to adhere to quality midwifery education (9).

The *Programme governance* standard describes the overall management of the midwifery program (10). This review shows a lack of clear regulation of midwifery programs, which hinder the development of a quality midwifery education according to ICM Standard for Midwifery Education. To support implementation process of quality midwifery education, Maweu et al. suggest that the ministry of health cooperate with private stakeholders (50). However, where established institutions, were the regulation registration system and scope of practice is statutory, midwifery education and profession ensures that the public receives quality care (4, 51). This review indicates that the head of the midwifery program isn't always

prepared for the task given. It creates poor qualification for a quality midwifery education as the head of the program has the main responsibility for the training and the organization of the same (10). There are examples of countries in the region where the midwifery education programs includes more knowledge about management and research (4, 52). It can therefore be assumed that in the long run this can lead to higher competence among midwives with leading positions.

The *Faculty* standard contain specifics of needed qualifications for teachers and preceptors (10). One of the most striking findings was that one publication indicated that teachers did not feel confident about the core of the midwifery profession, which poses a major obstacle to the development of quality midwifery education. Further studies are needed to ascertain whether this reflects the majority of the included countries. In this study the publications shows that the qualification among the teachers and clinical supervisors is poor. The result indicates that competence and confidence increase when education of the faculty is given. In the Sub-Saharan region there has been development of education program for faculty including advanced-teaching methodologies, curriculum development, formative and summative evaluation. This led to increased knowledge and awareness about the importance of adaptation to the cultural context (53). An important finding in the review is that the collaboration between the school and the clinical area is of the utmost importance for a quality midwifery education. In accordance with the present results, Uwizeye et al have demonstrated that consistency of expectations between classroom and clinical settings is crucial (53). This is also described by Maweu et al. highlighting the importance and quality of the clinical supervisors, by suggesting financial compensation and continuously training to ensure that clinical practice for students is maintained at a high level (50). However, in low-income countries like Sub-Saharan Africa a solution like that can be a challenge due to financial issues.

The *Student* standard contains benchmarks regarding admission, requirements and the learning process (10). Interestingly these issues are not represented in the result of this review. According to WHO an experienced shortage of midwives can be explained not by inadequate numbers, but the competencies the students have when graduated (54). This corroborate with Uwizeye et al. (53) saying that although the density of midwives is associated with better sexual and reproductive healthcare, they are unprepared both in terms

of education and skills. Therefore, further studies with more focus on how admission requirements, recruitment process and number of admitted students affect the development of a quality midwifery education, are suggested. This study revealed that an adequate clinical placement, where the students can practice their skills together with a midwife creates most competence and safety. This also accords with earlier studies, which showed that if the students feel safe during their clinical placement, they will work deliberately to reach their goals. A good learning environment includes committed teachers and supervisors. It influences how students learn and the satisfaction they feel with the future profession (55).

The *Midwifery Programme and Curriculum* standard give guidance of how to achieve competence, and a context, to the learning process (10). The findings in this review indicate that midwifery students' competence varies greatly within Sub-Saharan Africa. Not adhering to stipulated requirements by ICM Essential Competencies (5) such as number of attended births seen in this review, had implications for students' ability to achieve a quality education. In a review analysing the curriculum reform in Africa (56) implementation of a competency-based curriculum is prerequisite in order to achieve competent midwifery graduates. This was also reported in another review from Uganda (57), further stating that the course was too short to allow for enough exposure and to provide needed social and cultural context in order to prepare midwifery graduates for their professional role. Supporting the findings in this review that there is a lack of student preparedness from the educational institutions, simulation-based training in skills labs, as well as lack of cases in the clinical learning environment. A barrier for implementation of competency-based curriculum seen in this review was the lack of alignment with the instructional design. Which requires participatory teaching-methods and mentored training in clinical skills, together supporting the development of student's introspection (57). To develop students critical thinking and ability to reflection a review from Nigeria (58) stress that students need time and opportunity for thoughtful conversations and feedback from educators and clinical supervisors in order to retain competency. In the recently published report, The Nursing and Midwifery Workforce in the African Region competency-based curriculum is seen slowly being implemented in, so far 34 countries in Sub-Saharan Africa (59). It is suggested from our review to use clearly defined learning objectives and methods for assessing the achievements of expected competencies, which will create greater understanding for both students, educators and clinical supervisors. Using those standardized tools to, on a grass root level, build trust

between students, the educational institution, and the clinical placement. Potentially an adequate amount to strengthen the belief in, and implementation off, a competency-based curriculum.

Resources, include insufficient teaching and learning resources to ensure adequate preparation for and exposure to practical learning (10). The stated substantial lack of resources found in this review is also reported by The state of the World's Midwifery report 2021 severely challenge the ability to uphold a quality midwifery education in Sub-Saharan Africa (60). It was a reoccurring problem with restricted access to internet reported in this review not only hampering implementation of quality midwifery education but constraining availability of essential evidence-based publications and literature. This was reported as a significant barrier seen as crucial to combat in order to fully implement the ICM Standards for Midwifery education. The report The Nursing and Midwifery Workforce in the African Region (59) describe similar findings with a low utilization of information and communication technology and slow implementation of e-learning options. E-learning has been identified as a vital component in Rwanda (53) to strengthening the pre-service midwifery education as well as providing option for the existing workforce to level up their academic competence. Both essential in order to reach targeted SDG3 (59).

The Quality Assurance standard evaluate measures taken for internal and external quality assessment (10). A publication conducting an evaluation of pre-service education for midwives in Ethiopia, Ghana, and Malawi states that these assessment strategies are in place to ensure accountability, in that midwifery programme delivers an education to the extent and quality they proclaim (61). This review showed that at a majority of the educational institutions there was a low level of accreditation, hence, a low accountability between decision-makers and those affected by those decisions. Contrary to when decision-makers at the midwifery programs implement midwifery policy documents it enabled quality assurance processes to be instigated which increase accountability. The same applied in a review-article reporting accountability mechanism in maternal and neonatal healthcare in Sub-Saharan Africa (62). They state that progress is seen when recourses or disciplinary actions support implementation of rules, regulations, norms or practice and additionally was made public though social and political advocacy (62). Furthermore, it presents multiple challenges in creating a standardized accreditation services when the pathway to become a midwife is not

standardized and some midwifery programmes graduate on a vocational level and others with an academic degree (61). A facilitating strategy for Midwifery programs in Sub-Saharan Africa could be to utilize ICM MEAP, which is an accreditation service the intention to provide clarity to the programme governance of the educational programme's strengths and weaknesses. By so, identifying what is needed to achieve pre-service midwifery education aligning with ICM Standards for Midwifery Education (63).

Strengths and Limitations

Due to the inclusion criteria, this review has been able to find facilitators for and barriers to a quality midwifery education from a wide range. Still, there might be a limitation that publications that didn't distinguish between midwifery and nurse students was excluded even though the publications corresponding to the aim. To look at this topic through an integrative review, is considered a strength, giving a more comprehensive result, since both quantitative and qualitative publications contributes to varied perspective on the phenomenon (11).

However, a limitation could be that, due to time limit, no grey literature or published reports were included. Nor publication describing development work within the field. Both authors using three different databases making the search strategy broad and reliable. During the literature search, publications corresponding to the aim of this review, still might have been missed. However, the results of this review are reinforced by the WHO and the United Nations (UN) (1, 4, 64) making it reliable. Using ICM´s definition of a midwife, as a person who works in partnership with women, giving support and care, includes the education based on the Essential Competencies for Midwifery Practice (65). Therefore, the deductive approach analysing against ICM Standards for Midwifery Education is seen as a strength as it clarifies what facilitators of and barriers to quality midwifery education found in Sub-Saharan Africa.

From the 45 countries in the inclusion criteria eighteen countries are represented in the result. This finding itself confirm the result of this review and may be taken to indicate that many countries in the Sub-Saharan African Region, do not have the capacity to conduct midwifery research and are therefore in great need of developing this (4).

Conclusion

Our review concludes that there is an overall lack in Sub-Saharan Africa of descriptive studies describing the structure of the midwifery programmes and explicitly a lack of evidence-based research from the west-central region. Only one publication (37), reporting on implementation of competency-based curriculum within midwifery education, was analysed against ICM's Global standard for Midwifery Education. More evidence-based research addressing current educational structures in Sub-Saharan Africa and its alignment with the ICM educational standards for midwifery education is warranted. The included publications in this review reports challenges within each and one of the educational standards that has serious implication for the quality of the midwifery education provided. To fully implement educational standards and adhere to the ICM's Essential Competencies the evidence shows a need for increased use of clear objective and assessment-strategies. As well as utilizing quality improvement measures within the governance programme. It was seen that such instruments were improving the trust between programme governance, faculty and students facilitating joint efforts in developing a quality midwifery education.

Ethical Considerations

Ethical approval was not required for this review since it is a secondary analysis of original and published research. Potential risks for the participants involved in conducted research presented in the included publications of this review is considered low and outweighed by the benefit of strengthening individual publication's finding's synthesised with similar discoveries.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix 1.

Search strategy in PubMed, CINAL and Scopus summarized in three tables. Conducted on the 27th of January 2023

Search number	Search term	Limitations	Hits
#13	#12	2013-2023	1170
#12	#3 AND #8 AND # 11		1933
#11	#9 OR #10		2865844
#10	"educat*"[Ti/Ab] OR "teach*"[Ti/Ab] OR "training"[Ti/Ab] OR "Clinical practice site"[Ti/Ab] OR "school"[[Ti/Ab] OR "college"[Ti/Ab] OR "institut"[Ti/Ab] OR "facult*" [Ti/Ab] OR "universit*"[Ti/Ab] OR "student" [Ti/Ab] OR "curricul*" [Ti/Ab] OR "syllab*" [Ti/Ab] OR "Programme" [Ti/Ab] OR "competence" [Ti/Ab] OR "mentor*"[Ti/Ab] OR "supervisor*" [Ti/Ab] OR "preceptor*" [Ti/Ab] OR "learn*" [Ti/Ab]		2492884
#9	Education [MeSH Terms]		935921
#8	#6 OR #7		647560
#7	"angola"[MeSH Terms] OR "angola"[All Fields] OR "angola s"[All Fields] OR ("benin"[MeSH Terms] OR "benin"[All Fields] OR "benin s"[All Fields]) OR ("burkina faso"[MeSH Terms] OR ("burkina"[All Fields] AND "faso"[All Fields]) OR "burkina faso"[All Fields]) OR ("botswana"[MeSH Terms] OR "botswana"[All Fields] OR "botswana s"[All Fields]) OR ("burundi"[MeSH Terms] OR "burundi"[All Fields]) OR ("cameroon"[MeSH Terms] OR "cameroon"[All Fields] OR "cameroons"[All Fields] OR "cameroon s"[All Fields]) OR "Central African Republic"[All Fields] OR ("chad"[MeSH Terms] OR "chad"[All Fields]) OR "Cape Verde"[All Fields] OR "Cote d'Ivoire"[All Fields] OR ("comoros"[MeSH Terms] OR "comoros"[All Fields] OR "comoro"[All Fields]) OR "Democratic Republic of Congo"[All Fields] OR ("eritrea"[MeSH Terms] OR "eritrea"[All Fields]) OR ("eswatini"[MeSH Terms] OR "eswatini"[All Fields]) OR ("ethiopia"[MeSH Terms] OR "ethiopia"[All Fields] OR "ethiopia s"[All Fields]) OR "Equatorial Guinea"[All Fields] OR ("gabon"[MeSH Terms] OR "gabon"[All Fields]) OR ("ghana"[MeSH Terms] OR "ghana"[All Fields] OR "ghana s"[All Fields]) OR ("guinea"[MeSH Terms] OR "guinea"[All Fields] OR "guinea s"[All Fields] OR "guineas"[All Fields]) OR ("guinea bissau"[MeSH Terms] OR "guinea bissau"[All Fields] OR ("guinea"[All Fields] AND "bissau"[All Fields]) OR "guinea bissau"[All Fields]) OR ("kenya"[MeSH Terms] OR "kenya"[All Fields] OR "kenya s"[All Fields]) OR ("liberia"[MeSH Terms] OR "liberia"[All Fields] OR "liberia s"[All Fields]) OR ("lesotho"[MeSH Terms] OR "lesotho"[All Fields]) OR ("madagascar"[MeSH Terms] OR "madagascar"[All Fields] OR "madagascar s"[All Fields]) OR ("malawi"[MeSH Terms] OR "malawi"[All Fields] OR "malawi s"[All Fields]) OR ("mali"[MeSH Terms] OR "mali"[All Fields]) OR ("mauritania"[MeSH Terms] OR "mauritania"[All Fields]) OR ("mozambique"[MeSH Terms] OR "mozambique"[All Fields] OR "mozambique s"[All Fields]) OR ("namibia"[MeSH Terms] OR "namibia"[All Fields] OR "namibia s"[All Fields]) OR ("nigeria"[MeSH Terms] OR "nigeria"[All Fields] OR "nigeria s"[All Fields]) OR ("niger"[MeSH Terms] OR "niger"[All Fields]) OR ("rwanda"[MeSH Terms] OR "rwanda"[All Fields] OR "rwanda s"[All Fields]) OR "Republic of Congo"[All Fields] OR "sao tome principe"[All Fields] OR ("senegal"[MeSH Terms] OR "senegal"[All Fields] OR "senegal s"[All Fields]) OR "Sierra Leone"[All Fields] OR ("seychelles"[MeSH Terms] OR "seychelles"[All Fields]) OR "South Africa"[All Fields] OR "South		631878

	Sudan"[All Fields] OR ("tanzania"[MeSH Terms] OR "tanzania"[All Fields] OR "tanzania s"[All Fields]) OR ("togo"[MeSH Terms] OR "togo"[All Fields]) OR "The Gambia"[All Fields] OR ("uganda"[MeSH Terms] OR "uganda"[All Fields] OR "uganda s"[All Fields]) OR ("zambia"[MeSH Terms] OR "zambia"[All Fields] OR "zambia s"[All Fields]) OR ("zimbabwe"[MeSH Terms] OR "zimbabwe"[All Fields] OR "zimbabwe s"[All Fields]) OR ("congo"[MeSH Terms] OR "congo"[All Fields]) OR ("eswatini"[MeSH Terms] OR "eswatini"[All Fields] OR "swaziland"[All Fields])		
#6	#4 NOT #5		246283
#5	"djibouti"[MeSH Terms] OR "sudan"[MeSH Terms] OR "somalia"[MeSH Terms]		7109
#4	"africa south of the sahara"[MeSH Terms] OR "burundi"[MeSH Terms] OR "comoros"[MeSH Terms] OR "seychelles"[MeSH Terms] OR "madagascar"[MeSH Terms]		253392
#3	#1 OR #2		40473
#2	"midwi*"[Title/Abstract] OR "nurse midwi*"[Title/Abstract]		29408
#1	"midwifery"[MeSH Terms] OR "nurse midwives"[MeSH Terms]		26851

Search strategy in CHINAL the 24th of January 2023

Search number	Search term	Limitations	Hits
S12		Peer review 2013-2023	207
S11	S3 AND S7 AND S10		424
S10	S8 OR S9		470,790
S9	TI (educat* OR teach* OR training OR "Clinical practice site" OR school OR college OR institut OR Facult* OR universit* OR student OR Curricul* OR Syllab* OR Programme OR competence OR mentor* OR supervisor* OR preceptor* OR learn*) OR AB (educat* OR teach* OR training OR "Clinical practice site" OR school OR college OR institut OR Facult* OR universit* OR student OR Curricul* OR Syllab* OR Programme OR competence OR mentor* OR supervisor* OR preceptor* OR learn*)		354,406
S8	MH Education+		257,502
S7	S5 OR S6		26,200
S6	TI (Cameroon OR "Central African Republic" OR Chad OR Congo OR "Democratic Republic of the Congo" OR "Equatorial Guinea" OR Gabon OR Burundi OR Eritrea OR Ethiopia OR Kenya OR Rwanda OR Tanzania OR Uganda OR Angola OR Botswana OR Lesotho OR Malawi OR Mozambique OR Namibia OR "South Africa" OR Swaziland OR Eswatini OR Zambia OR Zimbabwe OR Benin OR "Burkina Faso" OR "Cape Verde" OR "Cote d'Ivoire" OR Gambia OR Ghana OR Guinea OR Guinea-Bissau OR Liberia OR Mali OR Mauritania OR Niger OR Nigeria OR Senegal OR "Sierra Leone" OR Togo OR Comoros OR Madagascar OR Seychelles OR "South Sudan" OR "Sao Tomé & Principe") OR AB (Cameroon OR "Central African Republic" OR Chad OR Congo OR "Democratic Republic of the Congo" OR "Equatorial Guinea" OR Gabon OR Burundi OR Eritrea OR Ethiopia OR Kenya OR Rwanda OR Tanzania OR Uganda OR Angola OR Botswana OR Lesotho OR Malawi OR Mozambique OR Namibia OR "South Africa" OR Swaziland OR Eswatini OR Zambia OR Zimbabwe OR Benin OR "Burkina Faso" OR "Cape Verde" OR "Cote d'Ivoire" OR Gambia OR Ghana OR Guinea OR Guinea-Bissau OR Liberia OR Mali OR Mauritania OR Niger OR Nigeria OR Senegal OR		18,034

	"Sierra Leone" OR Togo OR Comoros OR Madagascar OR Seychelles OR "South Sudan" OR "Sao Tomé & Principe")		
S5	MH (MH Africa South of the Sahara+ NOT MH sudan NOT MH somalia NOT MH djibouti) OR MH madagascar		21,768
S4	MH Africa South of the Sahara+ NOT MH sudan NOT MH somalia NOT MH djibouti		21,691
S3	S1 OR S2		19,443
S2	TI midwi* OR AB midwi* OR TI nurse-midwi* OR AB nurse-midwi*		13,294
S1	MH Midwifery+ OR MH Midwives+		12,920

Search strategy in Scopus the 26th of January 2023

Search number	Search term	Limitations	Hits
#5	#4	2013-2023	1407
#4	#1 AND #2 AND #3		2335
#3	TITLE-ABS-KEY (educat* OR teach* OR training OR "Clinical practice site" OR school OR college OR institut OR facult* OR universit* OR student OR curricul* OR syllab* OR programme OR competence OR mentor* OR supervisor* OR preceptor* OR learn*)		10786804
#2	TITLE-ABS-KEY (angola OR benin OR burkina-faso OR botswana OR burundi OR cameroon OR "central african republic" OR chad OR "cabo verd" OR "cote d'ivoire" OR comoros OR "democratic republic of congo" OR eritrea OR eswatini OR swaziland OR ethiopia OR "equatorial guinea" OR gabon OR ghana OR guinea OR guinea-bissau OR kenya OR liberia OR lesotho OR madagascar OR malawi OR mali OR mauritania OR mozambique OR namibia OR nigeria OR niger OR rwanda OR congo OR "sao tome & principe" OR senegal OR "sierra leone" OR seychelles OR "south africa" OR "south sudan" OR tanzania OR togo OR "the gambia" OR uganda OR zambia OR zimbabwe)		979395
#1	TITLE-ABS-KEY (midwifery OR midwife* OR midwive* OR nurse-midwi*)		51063

Appendix 2

Excluded articles with reason

	Article	Reason for exclusion
1	Achampong EK. Assessing the Current Curriculum of the Nursing and Midwifery Informatics Course at All Nursing and Midwifery Institutions in Ghana. J Med Educ Curric Dev. 2017 May 1;4:2382120517706890.	Not according to aim
2	Addae HY, Alhassan A, Issah S, Azupogo F. Online learning experiences among nursing and midwifery students during the Covid-19 outbreak in Ghana: A cross-sectional study. Heliyon. 2022 Dec;8(12):e12155.	Not according to aim

3	Adegoke, A. A.; Mani, S.; Abubakar, A.; van den Broek, N.; Capacity building of skilled birth attendants: a review of pre-service education curricula. Midwifery 2013 Jul;29(7)64-72	Not original research
4	Adjei CA, Adjorlolo S, Kyei J, Ohene LA, Dzansi G, Acheampong AK, Asante INA, Woolley P, Nyante F, Aziato L. Ghanaian nurses' and midwives' perspectives on technology adoption in nursing and midwifery education. Nurs Open. 2023 Feb;10(2):754-764.	Wrong paricipant
5	Ajuebor O, McCarthy C, Li Y, Al-Blooshi SM, Makhanya N, Cometto G. Are the Global Strategic Directions for Strengthening Nursing and Midwifery 2016-2020 being implemented in countries? Findings from a cross-sectional analysis. Hum Resour Health. 2019 Jul 12;17(1):54.	Not according to aim
6	Alhassan RK. Assessing the preparedness and feasibility of an e-learning pilot project for university level health trainees in Ghana: a cross-sectional descriptive survey. BMC Med Educ. 2020 Nov 25;20(1):465.	Not according to aim
7	Angasu K, Bekela T. Achievement of Clinical Learning Outcomes and Associated Factors Among Midwifery and Nursing Undergraduate Students of Jimma University, Ethiopia. Adv Med Educ Pract. 2021 Aug 29;12:987-994.	Not according to aim
8	Angasu K, Bekela T, Gelan M, Wakjira D, Melkamu E, Belachew B, Diribsa T, Ahmed AA, Eba A, Tadesse K, Boche B. COVID-19's Negative Impacts on Clinical Learning and Proposed Compensation Mechanisms Among Undergraduate Midwifery and Nursing Students of Jimma University. Adv Med Educ Pract. 2021 Dec 4;12:1411-1417.	Not according to aim
9	Appiagyei M, Trump A, Danso E, Yeboah A, Searle S, Carr C. Case Study: The Role of eLearning in Midwifery Pre-Service Education in Ghana. World Health Popul. 2015;16(2):54-61. doi: 10.12927/whp.2016.24492. PMID: 26860764.	Lack ethical approval
10	Barker K, Omoni G, Wakasiaka S, Watiti J, Mathai M, Lavender T. 'Moving with the times' taking a glocal approach: a qualitative study of African student nurse views of e learning. Nurse Educ Today. 2013 Apr;33(4):407-12. doi: 10.1016/j.nedt.2013.01.001. Epub 2013 Feb 4. PMID: 23380536.	Not according to aim
11	Bourret K, Mattison C, Hebert E, Kabeya A, Simba S, Crangle M, Darling E, Robinson J. Evidence-informed framework for gender transformative continuing education interventions for midwives and midwifery associations. BMJ Glob Health. 2023 Jan;8(1):e011242.	Not according to aim
12	Budu HI, Abalo EM, Bam V, Budu FA, Peprah P. A survey of the genesis of stress and its effect on the academic performance of midwifery students in a college in Ghana. Midwifery. 2019 Jun;73:69-77.	Not according to aim
13	Chipeta, M. Gombachika, B. Bvumbwe, T. Nursing and Midwifery Students' Perspectives of Faculty Caring Behaviours: A Phenomenological Study Open Nursing Journal - Volume 16, Issue 1, pp. - published 2022-01-01	Not according to aim
14	Christensen A, Phafoli S, Butler J, Nyangu I, Skolnik L, Stender SC. Case Study: Primary Healthcare Clinical Placements during Nursing and Midwifery Education in Lesotho. World Health Popul. 2015;16(2):46-53.	Not according to aim
15	Christmals CD, Aziato L, Rispel LC. Perceptions of the functioning and effectiveness of nursing regulators in Ghana and South Africa: a cross-sectional study. BMJ Open. 2021 Dec 3;11(12):e050580. doi: 10.1136/bmjopen-2021-050580. PMID: 34862283; PMCID: PMC8647556.	Wrong paricipant
16	Dejene D, Stekelenburg J, Versluis M, Ayalew F, Molla Y. Assessment of core teaching competency of health professional educators in Ethiopia: an	Not according to aim

	institution-based cross-sectional study. BMJ Open. 2022 Sep 28;12(9):e059502.	
17	Ebu Enyan NI, Amoo SA, Boso CM, Doe PF, Slager D. A Multisite Study on Knowledge, Perceived Motivators, and Perceived Inhibitors to Precepting Nursing Students within the Clinical Environment in Ghana. Nurs Res Pract. 2021 Jan 18;2021:6686898.	Not according to aim
18	Ebu Enyan NI, Boso CM, Amoo SA. Preceptorship of Student Nurses in Ghana: A Descriptive Phenomenology Study. Nurs Res Pract. 2021 Jan 8;2021:8844431.	Not according to aim
19	Edwards G, Hellen K, Brownie S. Developing a work/study programme for midwifery education in East Africa. Midwifery. 2018 Apr;59:74-77. doi: 10.1016/j.midw.2018.01.007. Epub 2018 Jan 11. PMID: 29396383.	Not original research
20	Goodman JH, Beyan E, Johnson E. Improving Nursing and Midwifery Education in a Resource-Limited Context: An Initial Evaluation. J Nurs Educ. 2018 Dec 1;57(12):712-719. doi: 10.3928/01484834-20181119-03.	Wrong paricipant
21	Harerimana, A & de Beer, J. (2013). Nurse educators' utilisation of different teaching strategies in a competency-based approach in Rwanda. Africa Journal of Nursing and Midwifery. 15. 29-41.	Wrong paricipant
22	Hugo L, Botma Y, Raubenheimer JE. Monitoring preceptors' supportive role: A measuring instrument for increased accountability. Nurse Educ Today. 2018 Aug;67:83-89. doi: 10.1016/j.nedt.2018.05.006. Epub 2018 May 19.	Not according to aim
23	Ishaku, Salisu & Ahonsi, Babatunde & Oginni, Ayo & Tukur, Jamilu & Adoyi, Gloria. (2015). Obstetric knowledge of nurse-educators in Nigeria: Levels, regional differentials and their implications for maternal health delivery. Health Education Journal. 75. 10.1177/0017896915571763.	Lack ethical approval
24	Jamie AH, Mohammed AA. Satisfaction with simulation-based education among Bachelor of Midwifery students in public universities and colleges in Harar and Dire Dawa cities, Ethiopia. Eur J Midwifery. 2019 Oct 31;3:19.	Wrong paricipant
25	Jones S, Ameh CA, Gopalakrishnan S, Sam B, Bull F, Labicane RR, Dabo F, van den Broek N. Building capacity for skilled birth attendance: An evaluation of the Maternal and Child Health Aides training programme in Sierra Leone. Midwifery. 2015 Dec;31(12):1186-92. doi: 10.1016/j.midw.2015.09.011. Epub 2015 Sep 30.	Wrong paricipant
26	Jones SA, Sam B, Bull F, James M, Ameh CA, van den Broek NR. Strengthening pre-service training for skilled birth attendance - An evaluation of the maternal and child health aide training programme in Sierra Leone. Nurse Educ Today. 2016 Jun;41:24-9. doi: 10.1016/j.nedt.2016.03.018. Epub 2016 Mar 29.	Wrong paricipant
27	Kpangaala-Flomo CC, Tiah MW, Zeantoe GC, Loweal HG, Matte RF, Lake SC, Altman SD, Mendoza M, Tringali T, Stalonas K, Goldsamt L, Kurz R, Zogbaum L, Klar RT. Structure, Process, and Outcomes of Liberian National Nursing and Midwifery Curricular Revisions. Ann Glob Health. 2021 Oct 8;87(1):97.	Not according to aim
28	Kyakuwaire, H., Kirikumwino, A., Nabossa, J., & Edwards, G. A. (2020). Evaluating a work/study programme for Nurses and Midwives at Aga Khan University, Uganda. *Scholarship of Teaching and Learning in the South*, *4*(2), 63–79. https://doi.org/10.36615/sotls.v4i2.129	Not according to aim
29	Lordfred A, Tran NT, Nzee A, Kabeya A, Mukumpuri G, Eke H, et al. Midwifery curricula inclusion of sexual and reproductive health in crisis	Wrong studydesign

	settings in the Democratic Republic of Congo. Nurse Educ Pract. 2021;55:103173.	
30	Lori JR, Moyer CA, Dzomeku V, Nakua EK, Agyei-Baffour P, Rominski S. Achieving universal coverage: Understanding barriers to rural placement for final year midwifery students. Midwifery. 2018 Mar;58:44-49.	Not according to aim
31	Makule, Yuster C. Kibusi, Stephen M. Nursing Student's Perceptions on Formative Assessment Procedures and its Effects on Midwifery Module Performance: A Cross-Sectional Study among Diploma Nursing Students in Tanzania. International Journal of Nursing Education - Volume 12, Issue 1, pp. 136-141 - published 2020-01-01	Not according to aim
32	Maree C, Yazbek M, Leech R. Process of development of a contemporary curriculum in advanced midwifery. Health SA. 2018;23:1037.	Wrong studydesign
33	Maweu DM, Davies P, Dahn LC, Karanja VM, Nyishime M, Rogers RD, Bindai MG, Viah R, Nuahn HL, Connor IT, Verdier JA, Johnson LW, Cook R. Strategies for Success: Simple Education Interventions to Equip Nursing Students in Rural Liberia. Ann Glob Health. 2021 Oct 8;87(1):98.	Wrong studydesign
34	Molise, N, Botma, Y, Van Jaarsveldt, D (2022) Exploring the influence of culture in curriculum transformation using the Mmogo Method™ International Journal of Africa Nursing Sciences, Volume 17, 100448, ISSN 2214-1391,	Not according to aim
35	Motsaanaka MN, Makhene A, Ally H. Student nurses' experiences regarding their clinical learning opportunities in a public academic hospital in Gauteng province, South Africa. Health SA. 2020 Feb 17;25:1217.	Wrong paricipant
36	Mpeli MR. Analysis of self-evaluated ethical competence of midwifery students at a selected nursing college in the Free State. Curationis. 2018 Aug 29;41(1):e1-e9.	Not according to aim
37	Msibi G, Nkwanyana N, Kuebel H. Eswatini Nursing Council Regulatory Reforms: Process towards Entry to Practice Examination. Ann Glob Health. 2020 Apr 28;86(1):45.	Wrong paricipant
38	Mtshali, N G, Nyangu, I, Molise, N, Tsekoa L, Mamotsamai Ranneileng, Malihaelo C. Qhobela, Ntsoaki Ralejoana, (2019) Establishing the context for a Master degree programme in Nursing at the National University of Lesotho, International Journal of Africa Nursing Sciences, Volume 10, Pages 102-109, ISSN 2214-1391,	Wrong paricipant
39	Murараneza C, Mtshali GN. Conceptualization of competency based curricula in pre-service nursing and midwifery education: A grounded theory approach. Nurse Educ Pract. 2018 Jan;28:175-181.	Wrong paricipant
40	Murараneza C, Mtshali GN. Planning reform to competency based curricula in undergraduate nursing and midwifery education: A qualitative study. Nurse Educ Today. 2021 Nov;106:105066.	Wrong paricipant
41	Mwale OG, Kalawa R. Factors affecting acquisition of psychomotor clinical skills by student nurses and midwives in CHAM Nursing Colleges in Malawi: A qualitative exploratory study. BMC Nurs. 2016 May 4;15:30.	Wrong paricipant
42	Neal S, Bokosi M, Lazaro D, Vong S, Nove A, Bar-Zeev S, et al. Diverse pre-service midwifery education pathways in Cambodia and Malawi: A qualitative study utilising a midwifery education pathway conceptual framework. Midwifery. 2023;116:103547.	Not according to aim

43	Nove, A, Pairman, S, Bohle, L, Garg, S Moyo, N, Michel-Schuldt, M, Hoffmann, A & Castro, G (2018) The development of a global Midwifery Education Accreditation Programme, Global Health Action, 11:1,	Not original research
44	Ojemeni MT, Niles P, Mfaume S, Kapologwe NA, Deng L, Stafford R, Voeten MJ, Theonestina K, Budin W, Chhun N, Squires A. A case study on building capacity to improve clinical mentoring and maternal child health in rural Tanzania: the path to implementation. BMC Nurs. 2017 Sep 26;16:57.	Wrong paricipant
45	Ojemeni MT, Niles P, Mfaume S, Kapologwe NA, Deng L, Stafford R, Voeten MJ, Theonestina K, Budin W, Chhun N, Squires A. A case study on building capacity to improve clinical mentoring and maternal child health in rural Tanzania: the path to implementation. BMC Nurs. 2017 Sep 26;16:57.	Duplicate
46	Rinne J., Nabacwa N.O., Nabirye C.R., Shorten A. Impact of High Patient Volume on Midwifery Education in Kampala, Uganda…American college of Nurse-Midwives´62nd Annual Meeting in May 2017. Journal of Midwifery & Womens Health. 2017(62)633-633	No fulltext
47	Roets L, Maritz J. Facilitating the development of higher-order thinking skills (HOTS) of novice nursing postgraduates in Africa. Nurse Educ Today. 2017 Feb;49:51-56	Not according to aim
48	Salisu WJ, Sadooghiasl A, Yakubu I, Abdul-Rashid H, Mohammed S. The experiences of nurses and midwives regarding nursing education in Ghana: A qualitative content analysis. Nurse Educ Today. 2020 Sep;92:104507.	Wrong participant
49	Spies LA, Garner SL, Faucher MA, Hastings-Tolsma M, Riley C, Millenbruch J, Prater L, Conroy SF. A model for upscaling global partnerships and building nurse and midwifery capacity. Int Nurs Rev. 2017 Sep;64(3):331-344.	Not according to aim
50	Tankpara PA, Adom D, Adu-Agyem J. Quality assurance policies and implementation in nursing and midwifery training colleges in Ghana. International Journal of Evaluation and Research in Education. 2021;10(2):455-64.	Lack ethical approval
51	Telfer M, Zaslow R, Chalo Nabirye R, Nalugo Mbalinda S. Review of midwifery education in Uganda: Toward a framework for integrated learning and midwifery model of care. Midwifery. 2021;103:103145.	Wrong studydesign
52	Touré CO, Bijou S, Joiner M, Brown A, Tessougué J, Maiga H, et al. Accreditation of private midwifery and nursing schools in Mali: a local sustainable solution to increasing the supply of qualified health workers. Hum Resour Health. 2021;19(1):119.	Wrong studydesign
53	Uwizeye G, Mukamana D, Relf M, Rosa W, Kim MJ, Uwimana P, et al. Building Nursing and Midwifery Capacity Through Rwanda's Human Resources for Health Program. J Transcult Nurs. 2018;29(2):192-201	Wrong studydesign

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