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# Collaborative design of a health research training programme for nurses and midwives in Tshwane district, South Africa: a study protocol

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## ABSTRACT

**Introduction** Nurses are essential for implementing evidence-based practices to improve patient outcomes. Unfortunately, nurses lack knowledge about research and do not always understand research terminology. This study aims to develop an in-service training programme for health research for nurses and midwives in the Tshwane district of South Africa.

**Methods and analysis** This protocol outlines a codesign study guided by the five stages of design thinking proposed by the Hasso-Plattner Institute of Design at Stanford University. The participants will include nurses and midwives at two hospitals in the Tshwane district, Gauteng Province. The five stages will be implemented in three phases: Phase 1: Stage 1—empathise and Stage 2—define. Exploratory sequential mixed methods including focus group discussions with nurses and midwives (n=40), face-to-face interviews (n=6), and surveys (n=330), will be used in this phase. Phase 2: Stage 3—ideate and Stage 4—prototype. A team of research experts (n=5), nurses and midwives (n=20) will develop the training programme based on the identified learning needs. Phase 3: Stage 5—test. The programme will be delivered to clinical nurses and midwives (n=41). The training programme will be evaluated through pretraining and post-training surveys and face-to-face interviews (n=4) following training. SPSS V.29 will be used for quantitative analysis, and content analysis will be used to analyse qualitative data.

**Ethics and dissemination** The protocol was approved by the Faculty of Health Sciences Research Ethics Committee of the University of Pretoria (reference number 123/2023). The protocol is also registered with the National Health Research Database in South Africa (reference number GP_202305_032). The study findings will be disseminated through conference presentations and publications in peer-reviewed journals.

## STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This study will be strengthened through the use of quantitative and qualitative methods to understand the research problem.
⇒ The inclusion of two hospitals and the participation of different nurses and midwives will ensure the credibility of the findings.
⇒ Local research experts, nurses and midwives will collaborate to develop a training programme appropriate to the context of the setting.
⇒ The findings will be limited to two hospitals; therefore, the findings may not be generalisable to other hospitals.

## INTRODUCTION

Evidence-based practice (EBP) has gained prominence in health services internationally over the past three decades.[1] EBP integrates individual clinical expertise with clinical evidence generated from systematic research.[2] EBP aims to deliver appropriate, efficient patient care.[3] Consequently, generating evidence that informs care delivery has become increasingly important for improving patient-centred care, patient safety, patient outcomes and the healthcare system.[1 3] In healthcare, nurses are well positioned to implement EBP because they constitute the largest proportion of the health workforce.[1 4] Nurses thus have to be proactive in acquiring, synthesising and using research knowledge and the best evidence to inform their practice and decision-making.[3 4]

Recognising the need for EBP, many nursing organisations worldwide have developed best practice guidelines for patient-care decision-making.[4] In South Africa, the roadmap for strengthening nursing and midwifery acknowledges that nurses are vital for providing safe and effective patient care. Strategically, investing in nurse-led research will help develop nurse-led models of care.[5] Similarly, the South African Nursing Council expects nurses to actively participate in research activities, including academic writing, reading and reviewing, as part of continuing professional development.[6] Training nurses and midwives can enhance their research capacity and enable them to use available resources for research, ultimately leading to changes in EBP in clinical settings.

Nurses need to gain research knowledge and become comfortable with research terminology.[7 8] Although undergraduate nursing training includes a research component, this training does not always translate into a strong understanding of research.[7] As such, there needs to be more nurse-led patient-centred research. A recent review of nursing research from 2000 to 2019 showed that most nursing research is conducted by nurses working at higher education institutions. Research output and collaboration are also disproportionately more prominent in high-income countries across North America, Europe, and Oceania than in low-income and middle-income countries.[9] The other challenges that affect health research include limited time, lack of research facilities, research culture, mentors, access to mentors, and workforce capacity.[10]

Little is known about the research literacy of nurses and midwives and research training programmes for practicing nurses and midwives in South Africa. Therefore, we developed a protocol to develop a research training programme for nurses and midwives in the Tshwane district of South Africa. This protocol is guided by the following research questions: (a) what are the levels of nurses' and midwives' knowledge, attitudes and involvement in research?; (b) what are the learning needs of nurses and midwives regarding research design and implementation?; (c) what content should be included in a research training programme for nurses and midwives?; (d) how does the developed training programme impact nurses' knowledge about research?

### Theoretical framework

The principles of constructivism learning theory will guide this study. This theory is rooted in the work of Piaget and Vygotsky.[11] This paradigm explains how people might acquire and retain knowledge.[12] Through the lens of constructivism learning theory, adult educators acknowledge learners' previous experiences, appreciate multiple perspectives and embed learning in social contexts. The instructor is a mentor who helps learners understand new information. Constructivism learning theory has three dimensions, namely, individual constructivism, social constructivism and contextualism. In individual constructivism, learners are self-directed and construct knowledge via personal experience. Social constructivism assumes that learning is socially mediated, and that knowledge is constructed through social interaction. In contextualism, learning should be tied to real-life contexts.[13] Some benefits of constructivism theory are that learners enjoy learning because they are actively engaged and have ownership over what they learn.[12] The theory was considered appropriate because the study will be conducted at two research-intensive hospitals. Therefore, nurses and midwives are familiar with the research process.

## METHODS AND ANALYSIS

### Research design

We will use a codesign approach guided by the stages of design thinking proposed by the Hasso-Plattner Institute of Design at Stanford University.[14 15] The design originated from participatory research and involves active engagement of the participants to identify needs and collaboratively propose solutions.[14 16] The approach is considered appropriate because it ensures meaningful involvement of end-users, thereby creating meaningful benefits.[17] A codesign approach ensures fewer challenges when implementing the initiative because stakeholders are fully engaged throughout the process.[14] Underpinned by the African philosophy of Ubuntu, the process will promote the culture of working together and collective solidarity.[18]

The study will be guided by the five stages of design thinking: empathise, define, ideate, prototype and test. Empathise aims to understand the deeper issues, needs and challenges needed to solve the problem. Define involves data analysis and prioritising the needs of the end users of the training programme. Ideate includes brainstorming for innovative solutions to address the identified needs. In the prototype stage, the idea or innovation is shown to the end users and other stakeholders. Finally, testing involves checking what works in a real-world setting.[14 15]

### Study setting

The study will be conducted at two public hospitals in the Tshwane district of Gauteng Province in South Africa. The province has the highest population density, the most hospitals and the greatest number of nurses and midwives.[19] According to a 2016 community survey, Gauteng has a population of 13.4million people.[20] Tshwane is one of the five districts in the province and the third most populous district, accounting for 24% of the population in the province.[21] There are three district hospitals, namely, Tshwane, Pretoria West, Jubilee and ODI; one regional hospital, Mamelodi; and three tertiary hospitals, namely, Steve Biko Academic Hospital, Dr George Mukhari Hospital and Khalafong Hospital. The two hospitals were selected due to their proximity to the University of Pretoria. One of the hospitals is a tertiary hospital with 800 beds. The second hospital is a 240-bed district hospital linked to the University of Pretoria's Faculty of Health Sciences.[22]

### Target population

The population will comprise nurses and midwives working at the two hospitals. In South Africa, there are six categories of nurses and midwives based on qualifications as follows: registered auxiliary nurse (higher certificate), registered general nurse (diploma in nursing), registered midwife (advanced diploma), registered professional nurse and midwife (bachelor's degree), nurse specialist or midwife specialist (postgraduate diploma), advanced specialist nurse (master's degree) and those with doctorate degrees.[5] Nurses working at academic

Table 1 Illustration of the research process guided by the stages of design thinking

| Phase 1 | | Phase 2 | | Phase 3 |
|---|---|---|---|---|
| **Objectives 1 and 2** | | **Objective 3** | | **Objective 4** |
| Stage 1<br>*Empathise* | Stage 2<br>*Define* | Stage 3<br>*Ideate* | Stage 4<br>*Prototype* | Stage 5<br>*Test* |
| Four FGDs (n=40)<br>Individual interviews (n=6)<br>Data analysis—content analysis<br>Survey—EROS (n=330) | Data analysis: SPSS V.28<br>Content analysis | Development of the draft training programme<br>Brainstorming by the research team<br>Design studio technique (n=5) | Consultative meeting with nurses and midwives (n=20) | Implementation of the training programme<br>Participants—practising nurses and midwives, n=41<br>Evaluation of the training |

EROS, Edmonton Research Orientation Survey; FGDs, focus group discussions.

hospitals are expected to engage in research activities, including academic writing, reading and reviewing, as part of continuing professional development.[6] A preliminary audit revealed 1900 nurses and midwives working at the two hospitals.

### Inclusion and exclusion criteria

Participation will be limited to registered auxiliary nurses, registered general nurses, registered midwives, registered professional nurses and midwives older than 18 years, those registered with the South African Nursing Council, and those with more than 3 months of experience. All people older than 18 years are mandated to give legal consent in South Africa. Nurses with less than 3 months of experience or undergoing orientation will be excluded from the study.

As illustrated in table 1, the study will be implemented in three phases and five stages to address the four objectives. Stage 1 is currently underway. The collection of the qualitative data started in December 2023 at one of the two hospitals. This will proceed at the second hospital until April 2024. The whole study is expected to be completed by September 2024.

## PHASE 1

In this phase, we aim to understand the nurses' and midwives' perceived knowledge, attitudes and involvement in research and their learning needs. We will base our investigation on empathising and defining. An exploratory sequential mixed methods design will be used. This design begins with collecting and analysing qualitative data. The qualitative findings are used to develop quantitative measures or instruments to test the identified variables.[23] In this study, the qualitative findings will be used to revise a questionnaire for the subsequent quantitative strand.

### Strand 1—qualitative study

Qualitative methods are appropriate for investigating the who, what and where of events or experiences of informants of a poorly understood phenomenon.[24 25]

### Sample size and sampling

Forty-six participants (n=46) will be selected from nurses and midwives working at the two hospitals. The sample size was pragmatically determined according to the mode of data collection and the volume of data to be collected. However, the final sample size will be determined by data saturation.

We will purposively sample nurses and midwives from the following cadres: registered auxiliary nurses, registered general nurses, registered midwives, and registered professional nurses and midwives. As presented in table 2, two focus group discussions (FGDs) will be held at each hospital and will involve 10 participants each. Due to power differences that can cause a halo effect among the participants,[26] one FGD will include senior professional nurses and midwives. In contrast, the other FDG will include junior nurses and midwives with either diplomas or certificates. For the individual interviews, three participants (one registered auxiliary nurse, one registered general nurse with a diploma and one professional nurse (with either a bachelor's or postgraduate qualification)) will be invited to participate. The participants will be expected to share their knowledge of the competencies needed for conducting health research.

### Data collection

The study information will be communicated through nursing and midwifery managers. Participation will be voluntary. Nurses and midwives willing to participate will be invited for either FGDs or individual interviews. The participants will be given the details of the study and a consent form. The interviews will be conducted in English in hospitals in private settings at times and places that are most convenient for participants. The participants will be requested to use pseudonyms during interviews. A semi-structured interview guide will be used for the interviews (refer to online supplemental file 1). The interviews will be audiotaped and later transcribed verbatim in English.

### Data analysis

The data will be analysed manually using conventional content analysis as described by Hsieh and Shannon.[27]

Table 2 Sampling plan for the qualitative strand

| Hospital | Cadre | Data collection method | |
|---|---|---|---|
| | | Individual interview participants | FGD participants |
| A | Registered professional nurse and midwife | 1 | 10 |
| | Registered general nurse/midwife | 1 | 5 |
| | Registered auxiliary nurse | 1 | 5 |
| B | Registered professional nurse and midwife | 1 | 10 |
| | Registered general nurse/midwife | 1 | 5 |
| | Registered auxiliary nurse | 1 | 5 |
| **Total** | | **6** | **40** |

FGD, focus group discussion.

The steps of the analysis will be as follows: (a) repeatedly reading the data to achieve immersion and a sense of the whole; (b) deriving and labelling codes by highlighting the words that capture critical thoughts and concepts; (c) sorting the related codes into categories; (d) organising numerous subcategories into fewer categories; (e) defining each category; and (f) identifying the relationship of the categories in terms of their concurrence, antecedents or consequences. To ensure the reliability of the qualitative coding, tHead2he two researchers will code the first transcript independently. The online Coding Analysis Toolkits[28] will be used to calculate intercoder reliability. The two researchers will discuss differences and agree on the coding before proceeding to the next transcript.

### Methodological rigour

Trustworthiness will be achieved through credibility, transferability, dependability and confirmability.[24 29] Credibility will be achieved through spatial and personal triangulation. Spatial triangulation refers to collecting data on the same phenomenon from multiple sites, while personal triangulation refers to collecting data from different types and levels of people.[29] This study will collect data from different cadres of nurses and midwives at two hospitals. Transferability will be enhanced by providing sufficient study details. Dependability and confirmability will be achieved by establishing an audit trail describing the procedures and processes. Additionally, reflexivity will be used to ensure the transparency and quality of the study.[29 30] Reflexivity is where researchers critique, appraise and evaluate the influence of subjectivity and context on the research process.[30] In some branches of qualitative inquiries, researchers use reflexive bracketing to prevent subjective influences. However, Olmos-Vega *et al*[30] observed that this approach is no longer favoured in modern qualitative research because setting aside certain aspects of subjectivity is problematic. In this study, reflexivity will be ensured by keeping memos and field notes to document interpersonal dynamics and critical decisions made throughout the study.

### Strand 2—quantitative study

A cross-sectional survey will be used to assess nurses' and midwives' perceived knowledge, attitudes and involvement in research.

### Sample size and sampling

The sample size was calculated using Yamane's formula[31] as follows: n=N/(1+N(e2), where n is the sample, N is the population size, and e is the level of precision. Assuming a 95% CI and the estimated proportion of an attribute p=0.5, the calculated sample size for a population N=1900 with ±5% precision is 330. In this study, a convenience sampling technique will be used to select participants.

### Data collection

The researchers will brief nurse managers about the study. Furthermore, posters inviting nurses and midwives to participate in the study will be placed in each department. The poster will include details of the study and relevant contact details. The nurses and midwives willing to participate will be given an information sheet, consent form and questionnaire. They will be requested to leave the completed questionnaire in a designated box in the unit manager's office.

### Data collection instrument

The data will be collected using the Edmonton Research Orientation Survey (EROS). The EROS was developed in Canada and is a valid and reliable self-reported instrument for measuring perceived knowledge, attitudes and involvement in research. The tool has four subscales with 43 items. The four subscales are the value of research, value of innovation, research involvement and research utilisation (EBP). Valuing research is a positive attitude towards research; the value of innovation refers to being on the leading edge or keeping up to date with information; research involvement relates to active participation in research; and research utilisation (EBP) pertains to whether respondents use research to guide their day-to-day practice. Additionally, there is a category for the barriers and support for research.[32–34]

The EROS items are measured using a 5-point Likert scale ranging from 1—strongly disagree to 5—strongly agree. The maximum score is 215. Higher overall scores indicate a stronger research orientation. The scores will be categorised into high (between 143 and 215 points), medium (73–142 points) or low (0–72 points).[32 33] The tool has been extensively used to assess the research orientation of health professionals, including physiotherapists,[35] midwives,[36] occupational therapists,[33] academics[32] and undergraduate students.[34] Previous studies reported high internal reliability with Cronbach's alpha coefficients of 0.95[37] and 0.92.[34]

Although the tool has been previously used among South African occupational therapists,[33] the copyright author observed that the tool had been developed at a time when there was no access to information via the internet, hence the need to find ways of incorporating such issues. This study will use qualitative findings to identify items not included in the tool but relevant to the South African context.

### Data analysis

The quantitative data will be entered into Microsoft Excel and imported to IBM SPSS statistics V.29. Descriptive statistics will be used to summarise demographic characteristics and questionnaire scores. Mean scores and SD will be calculated for individual items, subgroup scores and overall scores. Independent sample t-tests, Mann-Whitney U tests, and multiple regression will be used to compare the scores of different groups of nurses and midwives. The assumptions for each test will be assessed before analysis. The level of significance will be set at 0.05.

## PHASE 2

During this phase, we will develop the training programme based on the learning needs identified in Phase 1. Research experts (n=5) will participate in a one-design studio workshop to brainstorm the content to be included in the training programme. Although there is limited literature on the definition and characteristics of an expert, Bruce *et al*[38] defined an expert as a person who is knowledgeable or informed in a particular discipline. Bruce *et al*[38] further observed that maximum variation or heterogeneity in sampling experts yields rich information. This study will select experts based on the criteria proposed by Davis[39] and Rubio *et al*.[40] The characteristics include clinical experience in the setting, professional certification in a related area, research experience, work experience, conference presentation and publication in the topic area.

A design studio workshop is a process in which participants create, and critique proposed interventions.[16] The researcher will share the findings of Phase 1 and explain the workshop's goal to the participants. Participants will be provided with pens, sticky notes and flip-chart paper. The researcher will facilitate discussion and capture feedback. At the end of the workshop, the researcher will consolidate the ideas, create a more detailed programme design and communicate with the participants.

Next, we will develop a prototype to be discussed in a consultative meeting and validation meeting. An iterative process will be used to validate the developed training programme. The consultative meeting will be held with research experts (n=5). A validation exercise will also be conducted with nurses and midwives (n=20), the programme's end-users. The nurses and midwives will be identified in consultation with nurse managers at the two hospitals to avoid disruption of services. During the validation exercise, the participants will be grouped into smaller idea groups to review and discuss the developed programme. Each group will be requested to identify a representative to report on behalf of the group. The feedback from the consultative and validation meeting will help to improve the developed programme.

## PHASE 3

The purpose of this phase is to assess the impact of the developed training programme. The developed training will be delivered to 41 nurses and midwives in the Tshwane district. The sample is based on similar studies that have implemented interventions for health professionals. For example, a study by Gundo *et al*[41] used G-Power software[42] to calculate the sample size based on a conservative effect size of d=0.5, a power of 80% and an alpha=0.05. The calculated sample size was 34, but 41 participants were invited to participate in training to allow for a dropout rate of at most 20%. The identification and invitation of the participants will be negotiated with nurse managers at the two hospitals to avoid service disruptions. The selection process will ensure the representation of the different cadres of nurses and midwives. We will invite a team of research experts to facilitate the training. The impact of the training will be assessed by comparing pre-survey and post-survey EROS scores, FGDs with participants, and evaluations at the end of the training. A paired-sample t-test will be used to compare the pretest and post-test scores.

## DISCUSSION

This protocol aims to develop a research training programme for nurses and midwives in the Tshwane district of South Africa. Initially, we will investigate the learning needs of nurses and midwives. The learning needs will inform a training programme to improve research capacity. As observed by Hines *et al*,[7] implementing a training programme will improve nurses' research knowledge, critical appraisal ability and research efficacy. Building capacity for health research in Africa will enhance the ownership of research activities that target relevant topics.

Furthermore, findings relevant to local populations will be communicated in a culturally acceptable manner. Research recommendations may also

resonate better and have a better uptake among African policymakers than research produced by internationally led teams.[43–45] This research training programme could be used in other hospitals with similar contexts and other categories of healthcare professionals. However, this will require a larger, multicentre validation study. Our findings will be limited to the two hospitals; therefore, the findings may not be generalisable to other hospitals.

## Ethics and dissemination

The protocol was approved by the Research Ethics Committee, Faculty of Health Sciences at the University of Pretoria (reference number: 123/2023). The protocol is registered with the National Health Research Database in South Africa (reference number GP_202305_032). The two hospitals also provided permission for the study. Permission to use the EROS was obtained from the copyright authors, Dr Kerrie Pain and Dr Paul Hagler.

The participants will receive an information leaflet and be required to provide written informed consent. The researcher will ensure that the participants' personal information is anonymised. Participants can give the researcher written permission to share their personal information. During the FGDs and individual interviews in Phase 1, the participants will be asked to use pseudonyms of their choice. In Phases 2 and 3, anonymity will not be possible because the meetings will be in person. However, the participants will be requested to maintain confidentiality. The data will be stored in compliance with the research ethics committee's guidelines. The findings of the study will be disseminated through conference presentations and publications in peer-reviewed journals. The preparation of this manuscript followed the standards for reporting qualitative research[46] and the guidelines for reporting observational studies.[47]

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