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Insights on the contribution of doctoral research findings from a school in a South African University towards policy formulation

Translation of health research findings into policy contributes to improvement of health systems. Generally, in sub-Saharan Africa policymakers rarely use research evidence and hence policies are often not informed by research evidence. Unless published or in the case of commissioned research, doctoral health research is often not used for health policy formulation. This paper analysed the potential and utilization of doctoral research from the School of Nursing and Public Health by KwaZulu-Natal Health Department of Health. The study adopted a mixed methods approach that combined elements of qualitative and quantitative research aspects. Qualitative data was collected through content analysis of 29 theses produced in the School of Nursing and Public Health, University of KwaZulu-Natal between 2014 and 2021 and interviews held with four Department of Health personnel as policymakers. When researchers could not get information on how research questions were formulated from content analysis, they checked the student questionnaire for answers. Quantitative data was collected from 79 participants through structured questionnaires. Participants included 47 PhD graduates, 11 final year PhD students and 21 PhD supervisors. Data from content analysis and interviews was analyzed thematically while data from questionnaires was analyzed quantitatively. Eleven (52%) PhD supervisors reported that findings from 22 studies were being considered for policy development and adoption while some had resulted in policy guidelines and frameworks that can be used to formulate policies. Factors such as failure to involve the Department of Health during the formulation of research questions, inappropriate packaging of research findings, policymakers not aware of the availability of research findings, lack of commitment to the dissemination of research results by students and poor demand for research evidence by policymakers hindered the translation of PhD research findings into policy. From the 29 theses reviewed, sixteen (28%) of PhD respondents highlighted that they involved the Department of Health to formulate research questions while forty-two (72%) did not. The theses review also revealed limited identifiable information related to policy formulation. The study confirms the use of PhD research findings for policy formulation. Additionally, it highlights the factors that hinder utilization of PhD work by policymakers. Further research to understand the perspectives of policymakers on factors that contribute to utilization of PhD work as well as how the findings have contributed to policy formulation is recommended since there was not sufficient data collected from policymakers due to Covid-19 restrictions.

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Background

In 2013, World Health Organization (WHO) reported that for 20 years there had been an unprecedented effort to use evidence in policy and decision making for health systems. Globally, it has been acknowledged that translation of health research into policy and practice is vital for enhancing the performance of health systems, promoting service delivery, and improving health outcomes (Barratt et al. 2017; Langlois et al. 2016; El-Jardali et al. 2014). However, evidence indicates that whilst there are numerous promising research findings, they are underutilized and often take a long time to be translated into health policy (Walugembe et al. 2015; El-Jardali et al. 2014). Research generated by universities can be used to influence national health policies to improve service delivery and outcomes (Pariyo et al. 2011; Nankina et al. 2011). Studies that document the pathway of students' research generally show that a substantial proportion of this work ends up on the shelves and are often underutilized (Caan and Cole 2012, Bullen and Reeve 2011). Translation of research findings into policy can be facilitated through numerous ways. Researchers should strive to disseminate their research findings through appropriate methods for targeted policymakers. Examples of these include news media, social media, policy briefs, one-on-one meetings, policymakers' workshops, and seminars. Researchers should also involve policymakers and other stakeholders in the earlier stages of the research particularly during the identification of key research questions (Uzochukwu et al. 2016).

The KwaZulu-Natal Provincial Health Research and Ethics Committee (KZN-PHREC) in South Africa sets research priority questions for the province and communicates them to the leaders of all academic institutions and research organizations. The priority research questions are also posted on the KwaZulu-Natal Department of Health (KZN-DOH) website to encourage researchers to address the questions through research projects (KZN-DOH webpage). Despite the growing knowledge of the factors influencing utilization of health research into policy, we are not aware of research that has specifically examined how doctoral research generated from the University of KwaZulu-Natal (UKZN) School of Nursing and Public Health (SNPH) through doctoral studies has contributed to existing policies or influenced formulation of guidelines and policies in South Africa. Understanding what facilitates utilization of doctoral research findings for policy formulation is critical to ensure that research conducted by doctoral students does not go to waste. We therefore conducted this study to establish if the knowledge generated from doctoral studies at UKZN, SNPH has contributed to existing DOH policies or formulation of DOH guidelines and policies and analyze the factors that may hinder or promote knowledge uptake by policymakers.

Methods

Study area. The study was conducted in KwaZulu-Natal (KZN) province and data was collected at UKZN in the College of Health Sciences (CHS), School of Nursing and Public Health (SNPH). The school has an average enrollment of 44 PhD students per year with a throughput of 32 students per year. The school has an average total of 54 PhD supervisors distributed across nine disciplines namely, Behavioral Medicine, Biostatistics & Bioethics and Medical Law, Family Medicine, Nursing, Public Health Medicine, Rural Health, Telemedicine, Traditional Medicine and Occupational and Environmental Health. The SNPH works closely with the KZN-DOH to provide skilled staff and inform research.

Study design. A case study design applying the mixed methods approach was used in this study. The SNPH in the CHS was

treated as the case. The case study design was adopted because it allows the researcher to investigate a topic in its real-life context (Crowe et al. 2011). Mixed methods research was conducted to get an in-depth and comprehensive understanding of the research questions and complex phenomena that required the use of both qualitative and quantitative methods (Dawadi et al. 2021). The use of mixed methods research enabled researchers to answer the research questions with sufficient depth and breadth allowing them to develop more effective and refined conclusions based on complementarity of the different approaches (Dawadi et al. 2021). The mixed method approach also allowed triangulation to enrich and strengthen research results through use of different methods of data collection and analysis (Molina-Azorin 2016). A convergent mixed method approach was applied in the study (Tariq and Woodman 2013). Qualitative and quantitative data was collected concurrently, and the two data sets were analyzed separately and compared, contrasted, and combined at interpretation stage (Creswell and Clark 2017). Equal priority was given to both data sets considering the equal importance of both types of data in answering the posed research questions (Dawadi 2019). The three research questions that the study responded to were "How have PhD theses produced in the SNPH, UKZN between 2014 and 2021 contributed to existing policies or influenced policy formulation?", "What factors contribute to utilization of doctoral research findings in the SNPH, UKZN by policymakers?" and "What factors influence utilization of doctoral research findings by DOH?". The three research questions had the common goal of establishing if doctoral research findings from the SNPH contributed to existing policies or influenced policy formulation.

Study population and sampling. Non-probability purposive sampling was adopted to select the sample for both the qualitative and quantitative aspects of the study. We used our judgment in selecting individuals or items that possessed the required qualities and were able to provide the required data to respond to the questions of interest (Hibberts et al. 2012; Baker et al. 2013; Creswell 2014a). Sampled items for the qualitative aspect included PhD theses and key DOH personnel at provincial level who were members of the research committee involved in granting permission to researchers conducting research in the DOH facilities. Sampled individuals for the quantitative aspect of the study included PhD theses, PhD graduates, PhD final year students, and PhD supervisors. The sample size for the two data sets was calculated using the Cochran formula below:

$$no = Z^2 pqe^2 / (0.5^2)$$

$$no = (1.96^2)(0.5)(0.5) / (0.5^2)$$

The targeted population included 81 PhD theses, 81 PhD graduates, 48 PhD final year students and 48 PhD supervisors. Out of the 81 theses that were marked and passed only fifty-one were available according to library records. There were however only thirteen theses available in the library repository as the data base was still being developed. Fourteen graduates whose thesis could not be accessed from the library agreed to share their soft copies. An additional twenty-four hard copies of the theses were obtained from the Postgraduate office. Out of the fifty-one theses that were accessed only twenty-nine met the criteria. We considered the 7-year timeframe we used to be reasonable because quality data was available for that period than earlier times and the study period coincided with the time the College adopted the thesis by publications format for presenting thesis which seems favorable for policy processes. We characterized a

thesis as “policy related” if it highlighted the development of a framework, a model, guidelines, policy briefs, and if the study highlighted potential for the findings to be translated to policy. We excluded studies that were conducted outside South Africa. Of the eighty-one PhD graduates that were expected to participate only forty-seven (58%) participated. Eleven out of forty-eight (23%) PhD final year students participated. Due to Covid-19, it was not clear if they were still registered or not, so follow-up was difficult. Twenty-one (44%) out of forty-eight PhD supervisors participated making the overall response rate 45%.

Summary of sample selection. We selected all those who met the study’s criteria for eligibility as summarized. Theses produced between 2014 and 2021 based on studies conducted in South Africa, PhD graduates who graduated between 2014 and 2021, PhD final year students who were in the data collection and analysis, thesis write up, thesis submission and awaiting results, PhD supervisors who have supervised PhDs to graduation, and research committee members of the DOH were included in the study. Theses not based on studies conducted in South Africa, PhDs that graduated before 2014, PhD final year students in the proposal development stage, PhD supervisors who have not supervised PhDs to graduation, and those not in the DOH research committee were excluded.

Data collection methods and process. We adopted a mixed methods approach previously used and demonstrated to produce good results (Munce et al. 2021; Dawadi 2019; Mckim 2017). We used a combination of three data collection tools: content analysis, questionnaire, and interviews. The aim of combining the three tools was to manage two research questions and obtain stronger evidence for conclusions by merging research findings (Creswell 2014b; Greene et al. 1989). The data collection tools are described in detail below:

Thesis content analysis. We conducted content analysis of doctoral theses produced between 2014 and 2021 in the SNPH, UKZN. Content analysis allowed us to analyze the data qualitatively and at the same time quantify it by measuring the frequency of different categories and themes (Grbich 2012). Content analysis was also conducted to confirm responses to the questionnaires. Twenty-nine PhD theses were analyzed to determine their implications on policy. A thesis by publication is submitted in the form of a series of already published, accepted or under review journal articles. A traditional thesis is a comprehensive piece of research in a book form.

We used a data extraction form to collect information from hard and soft copies of theses. The extraction form captured information on the discipline, research questions identification process, research findings dissemination methods and framework/model/guidelines/policy brief development and contribution of study to policy. The researchers checked the methods section of the theses under review for clues on how the research question formulation process was conducted and from the way theses are written, the 29 studies had no indication of how the process was carried out. Since we had used mixed methods, we were able to get the information on how the process was conducted from the student questionnaire. Under each of the categories, we extracted information and presented it in a form of questions as indicated in the supplementary file attached:

Interviews. Qualitative data was also collected through in-depth interviews conducted with four key DOH personnel at provincial level using a structured interview guide which included open-

ended questions that were informed by literature review and the objectives of the study (Vaismoradi et al. 2013). The DOH personnel were members of the research committee who were responsible for granting permission to the researchers to conduct research. The researcher who conducted the interviews acquired interviewing skills through workshops and consultations with experienced qualitative researchers. The researcher was trained on interview and transcribing skills. Interviews provided detailed and rich data regarding phenomenon under study (Barrett and Twycross 2018) which was confirmed by questionnaire data (Harris and Brown 2010). Quotations that best illustrated the factors affecting translation of doctoral research into policy were used.

An interview guide with questions focusing on DOH’s expectations from doctoral students and the barriers, and facilitators of utilization of doctoral research findings by DOH was used to solicit for responses from participants. An interview guide allowed the researcher to control the line of questioning (Creswell 2014b). Participants were contacted through email and telephone. The interviews lasted 40 minutes. Three of the interviews were done through zoom and one was conducted face to face. All four interviews were recorded with permission from the interviewees. Notes were taken to back up the audio recordings in case there were interruptions and, in the event, that the researcher forgot to switch on the recorder.

Questionnaire. Quantitative data was collected through a questionnaire using KoboCollect software. Participants were contacted through email. Two questionnaires were used for data collection. One questionnaire was administered to 47 PhD graduates and 11 PhD final year students. The other one was administered to 21 PhD supervisors. Completing questionnaires took about 40 min to an hour. PhD and PhD final year students’ questionnaire consisted of 50 questions. The supervisors’ questionnaire comprised of 30 questions. Data was fed on Microsoft Excel and cleaned before analysis.

Analysis of qualitative and quantitative data. We used qualitative content analysis to analyze data obtained through review of theses. Qualitative content analysis enables a purposeful interpretation of the data as well as the context in determining meaning which provides a good description of the material (Schreier 2014). Content analysis facilitated the categorization of data into themes, thus allowing the information to be analyzed appropriately. We categorized the content of the theses from raw data without a theory-based categorization matrix (Elo et al. 2014).

Recorded interviews were transcribed verbatim in a Microsoft word document by the researcher and a research assistant and imported into NVivo 12 to manage coding of the data. The files from which the data came from were given a unique identifier. Transcripts were read over and over as recommended by Erlingsson and Brysiewicz in order to familiarize with the data and get the sense of the text as a whole (Erlingsson and Brysiewicz 2017). The scripts were closely examined to identify common themes such as topics and ideas that came up repeatedly. The text was divided into meaning units keeping the research aim and question clearly in focus. The meaning units were then condensed further while keeping the meaning intact. Codes were developed using open coding. The exercise was repeated until the researchers were satisfied with the outcome. Codes that appeared to deal with the same issue were assigned to categories and themes. Quantitative data were analyzed using IBM- SPSS version 27 and summarized as percentages. Data from interviews was analyzed thematically using NVivo 12 software.

Rigour/quality/validity and reliability

Triangulation of qualitative and quantitative methods was used to enhance validity through the convergence of information from different sources (Molina-Azorin 2016; Nancy Carter et al. 2014; Zohrabi 2013; Creswell and Clark 2017; Rolfe 2006). In-depth interview was pilot tested on DOH personnel who did not take part in the study to check the validity of the tool. Prior to administering the questionnaires, a pilot study was conducted among PhD graduates, PhD final year students and PhD supervisors before being used as final documents, after which they were refined and some questions were rephrased before distribution to participants to ensure validity of the tool (Creswell and Hirose 2019; Thomas 2010; Ehrenberg and Sniezek 1989). The pilot test was used to improve precision, reliability, validity of data, identify problems/omissions, and assess time spent to complete the survey. The interview guide was also pilot tested to ascertain if participants interpreted the meaning of the questions as intended. The research instruments were reviewed by experts in the field of research and unclear questions were revised based on the reviewers' comments (Zohrabi 2013).

Integration of qualitative and quantitative findings

The two data types were handled and analyzed separately and compared and contrasted for corroboration purposes (Tariq and Woodman 2013; O'cathain et al. 2010). Integration of the two data sets was done during interpretation of the findings (Chaumba 2013). The intention of integration was to develop results and interpretations that expand understanding, are comprehensive and validated and confirmed (Creswell and Clark 2017). The researchers listed the findings from each component of the study and considered where the findings agreed (convergence), offered complementary information on the same issue (complementarity), or appeared to contradict each other (discrepancy or dissonance) (Farmer et al. 2006).

Ethical considerations

The study was approved by the Biomedical Research Ethics Committee (BREC/00001384/2020) and the Kwa-Zulu-Natal Provincial Department of Health (KZ-202008-030). All research was performed in accordance with the ethical standards of institutional research committee applicable when human participants are involved. Written informed consent was obtained from all participants in the study.

Results

Demographics of participants. Table 1 shows the demographics of the sources of data.

Eleven (52%) PhD supervisors reported that findings from 22 studies were being considered for policy development and adoption while some had resulted in policy guidelines and frameworks that can be used to formulate policies. Table 2 below indicates the studies produced between 2014 and 2021 that are being considered for policy development and adoption.

Table 1 Demographics of sources of data.	
Sources of data	Total
No. of PhD theses by publications/manuscripts	23
No. of traditional PhD thesis	6
No. of PhD graduates	47
No. of PhD final year students	11
No. of PhD supervisors	21
No. of policymakers	4
TOTAL	112

Emerging themes

Two major themes emerged during interviews with DOH personnel and content analysis of PhD theses:

1. Involvement of DOH in the formulation of research questions
 - a. DOH priority research questions
 - b. Meetings with DOH
2. Dissemination methods used to communicate research findings to DOH including policy briefs, journal articles, National Health Research Database (NHRD), conference presentations, research reports, media, copies of theses, presentation at DOH annual health research days and stakeholder meetings.

Findings from the two data sets (qualitative and quantitative) were integrated and are discussed below:

Theme 1: Involvement of DOH in the formulation of research questions. The findings revealed that DOH is somewhat involved in the formulation of research questions. Sixteen (28%) of the PhD respondents highlighted that they involved DOH while forty-two (72%) did not involve DOH. Interview data indicated that DOH publishes a list of priority research questions on its website and sends it to senior management of research and academic organizations in KwaZulu-Natal including the SNPH with the hope that researchers will engage with it, for example, some of the participants stated that:

"We have a list of priority research questions that we have published on our website, and we have also sent to the senior management of research and academic organisations in KwaZulu-Natal. We developed these priority research questions with our district managers, program managers and facility managers. We hope that researchers who are looking for topics will engage with them, and we hope that we have advertised them well enough for them to know about them". Respondent 1, DOH

"The department of Health has a research agenda that is published on its communication platforms". Respondent 4, DOH

According to data sources, in most cases students do not respond to priority research questions. In some instances, they conduct studies that are part of their supervisors' bigger projects. For example, 2 (10%) supervisors mentioned that their commissioned projects involve PhD students. PhD research work is not commissioned by DOH as confirmed by one of the participants from DOH,

"We do not really commission research because we cannot pay for it. When we need research to be done, we usually do it in partnership with institutions or if possible, we just do it ourselves". Respondent 2, DOH.

Theme 2: Research findings dissemination. Only twenty-two (38%) students confirmed that they sent their findings to DOH while thirty-six (62%) did not share their research findings with DOH despite the condition in the DOH gatekeeper permission that the report should be submitted to the DOH. This was also supported by the qualitative data indicating that although part of DOH approval letter instructs students to share their research findings with them, only a small fraction of the students send their research results on completion of their studies.

Table 2 PhD studies that are being considered for policy development and adoption.

Citation	Title/topic	Stakeholders involved	Contribution to policy
1.	The delivery of cultural care by health professionals among the hospitalized AmaXhosa male initiates of traditional circumcision in the Eastern Cape	Stakeholders from the DOH in Eastern Cape, Traditional leaders, Public Health specialists, nurses and midwives, community health workers and community members	Traditional circumcision guidelines
2.	The use of love medicine among black Africans in KwaZulu-Natal and risks of HIV transmission to both men and women in South Africa.	Traditional leaders, community members, traditional healers, nurses and midwives and community members	HIV prevention and management guidelines for traditional healers
3.	Developing a middle-range theory for implementing workload indicators of staffing needs (WISN) tool in primary healthcare settings in South Africa	Representatives from the National DOH, Provincial DOH, WISN managers from 9 provinces, district managers, nurses, health facility managers, administration staff	Framework for implementing WISN tool to determine staffing needs in primary healthcare settings.
4.	Development of a framework for documentation of patient health information in KZN	Traditional Health Practitioners, Traditional Health Practitioners Council, DOH	The framework developed is currently being considered by Traditional Health Practitioners' Council and DOH for possible further development and adoption.
5.	Evaluation of praziquantel dose for treatment of schistosomiasis	Department of Health- South Africa	We recommended continuation with 40 mg/kg body weight instead of a 60 mg/kg body weight dose.
6.	The Development of Policy Guidelines for the Integration of Student Nurses with Disabilities into nurse training programs in KwaZulu-Natal Nursing Education Institution: South Africa	Department of Health, South African Nursing Council	Guidelines to inform policy on student nurse recruitment.
7.	Nutrition	DOH National, Provincial, District	Data provided information used in developing guidelines for DOH nutrition policies.
8.	Parasite control	DOH	Studies contributed to School Health Services' Policy
9.	Air pollution and respiratory health among schoolchildren in south Durban	Local government; Local industry; Local communities, Provincial and national government	Air quality standards
10.	Air pollution in Vaal and Highveld	National government	Air quality standards
11.	Post-training and mentorship experiences of KidzAlive-trained healthcare workers at primary healthcare facilities in KwaZulu-Natal, South Africa	Health Departments in various Districts	Child-friendly spaces for HIV care in children
12.	Exploring the mechanism through which a child-friendly storybook addresses barriers to child-participation during HIV care in primary healthcare settings in KwaZulu-Natal, South Africa	Health Departments in various Districts	Child-friendly spaces for HIV care in children
13.	Towards the implementation of malaria elimination policy in South Africa: the stakeholders' perspectives	National Malaria Control Program, Provincial Malaria Control Program, MRC	Malaria Elimination Strategy
14.	Southern African Mental Health Integration (SMhINT) project (http://www.smhint.co.za/)	National Department of Health KZN Department of Health	Adoption of the Community Mental Health Education and Detection (CMED) for use by ward based PHC outreach teams (WBPHCOTs) (National & KZN-DOH) Adoption of psychoeducational materials for use at PHC facilities (KZN-DOH) Adoption of Brief Mental Health (BMH) screening tool into policy for widespread use (KZN-DOH) Adoption of a Wellness Resource for PHC providers for widespread use (KZN-DOH)
15.	Development of an Appropriate Framework for Accredited Training of 2 Traditional Health Practitioners in KwaZulu-Natal, South Africa	Department of Health Traditional Health Practitioners	Institutionalization of traditional health practices
16.	Development of a Generic Framework for Patient Record Keeping by Traditional Health Practitioners in eThekweni Municipality, KwaZulu-Natal Province	Department of Health Traditional Health Practitioners	Developing patient record tools for traditional health practitioners
17.	Outreach of specialist consultant	DOH	Provided documentation of value of outreach programs

Table 2 (continued)

Citation	Title/topic	Stakeholders involved	Contribution to policy
18.	Regulation of traditional medicines	WHO African Regional Office; African Regulatory Standards Authority; South African Bureau of Standards	Regulation of African Traditional medicines
19.	Safety of paraffin	SABS, Paraffin Safety Association, Department of Trade, and Industry	Paraffin safety
20.	South Africa's National Policy on African traditional medicine	Department of Health, Interim Traditional health Practitioners Council	National policy on the Discipline of African traditional medicine
21.	National AIDS Policy	South Africa National AIDS Council (SANAC)	Integration of traditional medicine in the AIDS response
22.	Indigenous Knowledge Systems (IKS) Policy	Department of Science & Technology (DST) now Department of Science and Innovation (DS)	Traditional medicine aspects of national indigenous knowledge policy

"The expectation is that as part of dissemination of research findings, the researcher should then come back and share their findings with the Department of Health and table their recommendations because when we do research we want to come up with recommendations at the end. Unfortunately, this is not really monitored or done". Respondent 2, DOH.

However, it was reported that it is difficult for DOH to monitor the feedback of research findings since there are many projects approved every year in KZN. For example, one of the participants said,

"Part of our letter of approval states that students are required to send their research findings to DOH on completion of their studies. Beyond that we don't really do anything and it's quite difficult to monitor because there are hundreds of projects approved every year in KZN so to follow up will take a lot of time. There is need to systematize it so that when the researcher is done, we ask them to send us their findings. We cannot really do it on an individual basis, and we haven't got a system in place yet to automate it. We have been discussing various options, but we have not really hit on one that we think is going to improve everything". Respondent 1, DOH.

Analysis of theses showed that research findings were disseminated to DOH and stakeholders through various methods; peer-reviewed journal articles, copies of theses, conference presentations, community/stakeholder meetings and policy briefs. This corroborates with what was highlighted by PhD graduates and final years in their responses for the questionnaire study. Table 3 below shows responses from the questionnaire on the methods that were used by students to disseminate research findings to DOH.

Five (24%) supervisors stated that their students used policy briefs to disseminate their findings to DOH while seventeen (81%) supervisors said that students used peer-reviewed publications. Sixteen (76%) supervisors reported that students used stakeholder feedback meetings, two (10%) supervisors said they used the media and one (5%) supervisor stated that the students used X. According to PhD graduates and final years questionnaire data, conference presentations were used more than the other methods to disseminate research findings to DOH. Dissemination to NHRD and use of media were the least used methods of dissemination with 1 (2%) participant each.

Thirty-one (53%) PhD students stated that they had attended the KZN-DOH annual research day and twenty-three (40%) had presented on such research days. Twenty-seven (47%) attended the research days to listen to other researchers' presentations. The dissemination of research findings through the KZN-DOH annual research day was corroborated by a DOH respondent:

Table 3 Dissemination methods used by students to communicate research findings to DOH.

Dissemination method	No. of participants	Percentage
Policy briefs	2	4%
Journal articles	6	13%
National Health Research Database (NHRD)	1	2%
Conference presentations	13	27%
Research reports	9	19%
Use of media	1	2%
Copies of theses	10	21%
Presentation at DOH annual health research days	4	8%
Dissemination to stakeholders	2	4%
TOTAL	48	100%

"The department holds a research day annually and only a few researchers get the opportunity to present their research findings. There is poor attendance of policymakers who have the decision-making powers at the event hence the research findings and recommendations will not be translated into policy. Respondent 3, DOH.

Apart from KZN-DOH annual research day, the students also presented at other national and international conferences. 76% of participants presented their work at least at four local scientific conferences while 72% presented their work at least at five international conferences. Policymakers suggested dissemination strategies that are potentially useful to translate research into policy such as setting aside a specific day for DOH employees to meet and read an article by a student from SNPH, UKZN that has policy implications or for students from SNPH, UKZN to present their research findings to relevant employees in the department who may consider them for policy formulation. One of the participants stated that,

"It can be sessions at work where you can come up with one article a Friday once a month and engage in research that has been done and choose whatever works for you to improve practice or even in policy development. DOH needs to allow students who have done research an opportunity to present their studies to relevant employees in the department who might take the recommendations seriously and use them to improve and inform our own practice and develop informed policies from them". Respondent 4, DOH

Table 4 Frequency of feedback of research results to DOH by PhD supervisors.

Response	No. of participants	Percentage
Never	3	14.3%
Rarely	2	9.5%
Sometimes	8	38.1%
Often	4	19%
Always	4	19%
TOTAL	21	100%

Policy briefs produced or policy contributions by students.

Only two students produced policy briefs with one student producing two policy briefs and the other one producing one. This was confirmed by data obtained from the PhD graduates and final year students' questionnaire. Only two (3%) students responded that they produced policy briefs. Only one (5%) supervisor indicated that their students have produced policy briefs. Respondents from DOH were not aware of any research conducted by students in the SNPH during the period 2014 to 2021 that has been used in programs, either for guidelines or policy formulation.

"I cannot name any recent or specific research that was done in the SNPH between 2014 and 2021 that was used in programs either for guidelines or policy formulation. Research that I remember that was conducted at UKZN and translated into policy very quickly was research conducted during the early years of HIV which was used in creating policy around HIV and infant nutrition". Respondent 1, DOH

"I do not want to lie to you... none, whatsoever. I have not heard of any research study conducted by a student actively being converted into influencing our policies or guidelines". Respondent 4, DOH

"I don't know of any specific research from the school that was used for policy formulation". Respondent 3, DOH

Regarding feedback on research results to DOH, supervisors expressed varied degrees of compliance. They were asked to state their responses on a 5- point Likert scale: Never, Rarely, Sometimes, Often and Always. Table 4 shows frequency of feedback of research results to DOH by PhD supervisors.

Discussion

The gap between research and policy and practice is still very wide in low and middle- income countries such as South Africa (Uzochukwu et al. 2016). The failure to take-up high- quality research evidence by policymakers is a persistent problem. Academics and policymakers have different incentives (Nutley et al. 2007), rules, obligations, values and interests (Newman et al. 2016). We analysed the contribution of doctoral theses to the formulation of health policies in KwaZulu-Natal, South Africa. Fifty-two percent (52%) of PhD supervisors who participated in the study reported that 22 studies conducted between 2014 and 2021 in the SNPH, UKZN were being considered for policy development and adoption. Some of the studies resulted in the development of policy guidelines and frameworks that can guide the formulation of policies. According to the information obtained from PhD supervisors' questionnaire, the studies were successful in reaching policymakers because where supervisors thought there was policy relevancy arising from PhD work, they ensured that they engaged with policymaking entities such as the Department of Health and the Department of Environment, Forestry and Fisheries at provincial and local government level as well as at national level for research findings to be translated into policy. Some

studies were also successful in reaching policymakers because supervisors had meetings with policymakers to highlight problem areas and possible solutions. Some supervisors revealed that studies were successful in reaching policymakers because the students embedded their work within their larger projects through a learning collaborative that was established within KZN-DOH which facilitates evidence-based learning. However, none of the 22 studies were included in the 29 theses analyzed by the researchers.

Although we found some evidence of utilization of doctoral research findings for policy formulation, the research was not utilized to its fullest potential by policymakers (Nutley et al. 2007). Two major themes of the factors that contribute to utilization of PhD work emerged from the study; involvement of DOH in the formulation of research questions and dissemination methods used to communicate research findings to DOH. The factors were the same across the two data sets (qualitative and quantitative) hence they were merged.

In contrast, DOH personnel reported that they were not aware of any PhD research from the SNPH that has influenced policy formulation. Perhaps, the challenge leading to this disparity is that the provincial officials interviewed may not have been fully aware of research conducted in all the districts and municipalities. Students and supervisors may be disseminating findings to the district and municipalities. It could also be a problem of deficiencies of the reporting systems in cascading information upwards. It is sensible that students report their findings to officials who are closer to their research sites. Furthermore, these findings would be relevant to that municipality or district where research is being conducted. Hence, they disseminate their findings to the closest office. On the other hand, provincial officials are swamped with work and may not be fully aware of research conducted in all the eleven districts.

Results of our study showed that policymakers were not aware of the availability of doctoral research findings due to lack of meaningful discussion of available research findings between researchers and policymakers, their suitability to policy- related problems and identification of other policy related areas requiring research attention (Uzochukwu et al. 2016). DOH was also not aware of the availability of research findings because they were not involved in the formulation of research questions for the projects. The results revealed that forty-two (72%) students did not engage with DOH/ policymakers during the formulation of research questions for their projects. It is acknowledged that engagement of stakeholders during formulation of research questions for projects ensures that appropriate research questions are pursued as well as informing policymakers of the availability of research findings (Edwards et al. 2019, Oliver and Cairney 2019). This finding is in line with studies conducted in Ghana and Tanzania (Kok et al. 2017, Wolffers and Adjei 1999). WHO stresses the value of closer collaboration between research organizations and the policymakers they seek to influence, so that evidence creation is better aligned with policy priorities (Organization 2016). DOH was also not aware of the evidence from research they did not commission. We established that DOH does not commission research due to lack of funding. Policymakers are likely to translate research that they have commissioned because they would have defined what gap needs to be informed by pending evidence (Mapulanga et al. 2020).

The poor demand for research evidence on research projects approved by DOH was also reported as a barrier. This may reflect DOH's perception of the value of doctoral research evidence or their prioritization of research for decision-making (Ezenwaka et al. 2020). Part of DOH approval letter states that students are required to send their research findings to DOH on completion of their studies. However, according to the data obtained from the students' questionnaire only twenty-two (38%) students sent feedback to DOH when they completed their studies. This was

supported by supervisors who reported that students hardly give feedback to institutions that give them permission to carry out their studies. Although DOH do not have an automated system to monitor projects that have been completed out of the hundreds of projects they approve in the province per year, they do not have to rely on students who have completed their studies for feedback. They can use other strategies such as journal clubs to access research results. A participant from DOH suggested that as DOH they can form journal clubs where they can meet once a month and read an article by a student from the SNPH. Another participant suggested that students from SNPH can be asked to come and share their research findings with relevant people in the department. The study also revealed that 76.1% supervisors sent feedback of students' research findings to DOH.

The methods through which research findings were communicated by the students could have also influenced demand and research uptake by DOH (Uzochukwu et al. 2016). It was interesting to note that PhD research findings were disseminated at scientific conferences and in scientific journals more than at policy forums or workshops (Edwards et al. 2019; Mcvay et al. 2016). 76% of the students reported that they presented their work at least at four local scientific conferences whilst 72% presented their research findings at least at five international conferences. Often, policymakers are not present at these conferences. This finding shows that PhD students prefer to communicate their research results through scientific conferences and peer-reviewed journals more than active engagement with policymakers. These results are consistent with the findings of (Ndlovu et al. 2016) that academics prioritize scholarly communication and prefer academic journals and conferences as communication platforms. In the SNPH, this could be attributed to a culture where publishing in peer-reviewed journals is rewarded and carries considerable prestige and power. Institutional priorities such as number of journal articles published, number of conferences attended and number of grants attracted limit researchers commitment to responding to policy issues facing policymakers (Ha et al. 2022; Gordon and Bartley 2015).

Scientific journals, with their assortment of articles may contain nothing of interest to a policymaker whose needs are very specific (Glied et al. 2018). It has also been argued that some policymakers might not have the skills and resources to access research evidence or time to source for evidence from scientific journals (Hyder et al. 2011). Most policymakers have responsibilities and priorities that may prevent them from spending a lot of time reading or reviewing the materials provided to them in detail (Brownson et al. 2018). Presenting research findings in less complex formats such as policy briefs that use simple language, has been shown to improve health research transfer in policymaking (Newman 2014). It was not the case with this study where only three policy briefs were produced. The study revealed that only 3.4% of the students who participated in the survey produced policy briefs. This supports findings of a survey of researchers in the Eastern Mediterranean Region that showed that only 15% produced policy briefs (El-Jardali et al. 2012). The low production of policy briefs may be attributed to researchers' lack of policy briefs writing skills.

DOH acknowledges the strategic role of knowledge translation in attaining national health goals, as evidenced by the creation of KZN-DOH annual research day which is a one-day evidence-to-policy workshop aimed at getting feedback on research that they have approved. The main perceived benefit of the platform is to provide a non-academic space (Fernández-Peña et al. 2008) recommended for researchers to disseminate research findings to policymakers who can translate research into policies and adoption of interventions to public health settings (Proctor and Chambers 2017; Tinkle et al. 2013). The other benefit of the forum is that it is a platform where researchers and policymakers discuss health policy implications of research findings pertaining to policy and practice (Parkhurst 2017).

This finding is also supported by a study conducted in Nigeria which found that the Nigerian research days that were organized by the Department of Family Health, Federal Ministry of Health of Nigeria had fostered a platform to discuss policies on maternal and child health by allowing dialog among various stakeholders, including researchers and policymakers (Johnson et al. 2020). The combined use of policy briefs, policy dialogs and meetings with policymakers have been proposed to enhance knowledge translation as the strategies are deemed to be likely familiar to both researchers and policymakers (Edwards et al. 2019).

Whilst the KZN-DOH annual research day is ideal for dissemination of research findings; our study reveals that DOH is not utilizing the platform to its fullest potential. Only 40% of the students presented their research findings at the KZN-DOH annual research day. Only a few students got the opportunity to present their research findings since it is a one-day event. The event may be extended to two or three days or may be conducted on a quarterly basis to allow for more research results to be disseminated to DOH. It was also reported that attendance by policymakers who have the decision-making powers at the event was poor hence the likelihood of the research findings and recommendations being translated is low. Our study also found that although researchers are encouraged to address priority research questions posted on DOH website, projects did not respond to these questions. A previous study highlighted that sharing research priority lists is important in research question identification and rewarding such engagement would incentivize postgraduate students to demonstrate how they engaged policymakers at various levels (Obuku et al. 2021). When research does not respond to priority research questions raised, it minimizes the likelihood of research findings being used in policy and practice.

Only thirteen PhD theses produced in the SNPH between 2014 and 2021 were accessed from the institutional repository. The SNPH has an average enrollment of 44 students per year and a throughput of 32 students per year. Given the number of PhD students expected to have graduated during the period under study, the theses in the institutional repository reflected very low levels of content deposit. The finding confirms Harnad's position that most universities' institutional repositories are 85% empty with deposit levels sitting at 15% or below (Harnad 2011). Some supervisors highlighted that they held meetings with policymakers to highlight problem areas and possible solutions.

Implications for future research and policy

This paper has identified the gaps that exist in the process of translating doctoral research findings into policy. This has opened an opportunity to explore possible solutions to address the gaps. Our findings are unique to the field in that they are postulated by authorities and participants who have an active role in both the development and use of research findings with the department of Health in KwaZulu-Natal. The department on its own is a typical case study that can be portrayed as an example of how such challenges in translating research manifest and how they can be solved. Results of this study contributed to the development of a framework that guides both students and policymakers on the processes necessary for consideration of doctoral research findings in policy formulation.

Strengths and limitations

This is the first study that has attempted to highlight the extent to which doctoral research from the SNPH at UKZN has contributed to existing policies or influenced formulation of guidelines and policies of DOH, South Africa. Data were collected using three different sources (document review, questionnaires, and interviews) which allowed cross-checking of findings. Nonetheless, we encountered some shortcomings, particularly with regards to access

to PhD theses produced between 2014 and 2021. The library repository was not up to date and had a limited number of theses produced during the period under study; therefore, the document review did not include all the theses that were produced between 2014 and 2021. The only way to obtain all the theses produced during the period under study was to get them from the graduates themselves. However, some of them were reluctant to share their theses for personal reasons. We could have missed some important information pertaining to our study. Another limitation is that the study was carried out in a single school in one college of UKZN, yet the university has four colleges with 19 different schools. For this reason, our findings may not be generalized for UKZN. Some of the reviewed theses were too recent not allowing enough time for research findings to be utilized for policy. The other limitation was that several PhD supervisors who were approached to participate in the study could not participate due to various reasons such as busy schedules and not having had supervised PhD students to completion. It was a requirement for PhD supervisors to have had supervised students to completion. Due to lockdown restrictions the email was the only means of recruiting participants for the study. However, people have a tendency of not responding to emails even after reminded on several occasions. Since the online questionnaire was the only option for collecting data, the response rate was very low.

Conclusion

This study has identified the gaps that exist in the process of translating doctoral research findings into policy. The findings from this study indicated that some studies were being considered for policy development and adoption while some had resulted in policy guidelines and frameworks that can guide the uptake of PhD work. The study revealed that DOH was not aware of the availability of doctoral research findings which could be attributed to the format in which the research results were disseminated and the fact that students did not involve policymakers in the formulation of research questions for their projects. Research results were communicated through scientific conferences and peer-reviewed journals more than active engagement with policymakers. Findings from this study contributed to the development of a framework that guides both students and policymakers on the processes necessary for consideration of doctoral research findings in policy formulation.

Data availability

The data involved in this study are from in-depth interviews and questionnaire surveys, and because the original data involves personal information, it cannot be fully disclosed due to identifiability issues. De-identifiable datasets generated and analyzed during the study will be made available from the corresponding author on reasonable request.

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Author contributions

FUD, NGM and MJC conceptualized, designed, and drafted the manuscript. FUD collected data and prepared data for qualitative and quantitative analyses. FUD, NGM and MJC conducted the analysis. NGM and MJC guided the design, reviewed all the draft manuscripts, and provided comments and critical revisions to the manuscript. All authors read and approved the final manuscript.

Competing interests

The authors declare no competing interests.

Ethical Approval

The study was approved by the Biomedical Research Ethics Committee (BREC/00001384/2020) and the Kwa-Zulu-Natal Provincial Department of Health (KZ-202008-030). All research was performed in accordance with the ethical standards of institutional research committee applicable when human participants are involved.

Informed consent

The ethical principle of protection of the participants from harm were observed through obtaining written informed and signed consent from all participants before they proceeded to participate.

Additional information

Supplementary information The online version contains supplementary material available at <https://doi.org/10.1057/s41599-024-03439-x>.

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