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Research Uptake in a Low Resource Setting: How can a Low Resource Country Improve?

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Abstract

Introduction: Low-resource countries, including South Africa, face similar challenges in implementing research findings, where there is an enormous time-lags between discovery and integration of research evidence in practice and policy development due to shortage of resources, skills and competing priorities.

Objective: This paper attempts to resolve this, by focusing on the emergence and persistence of low research uptake to develop a tailored model to enable an optimal uptake of public health research findings.

Methods: Although the study initially employs a two-phase exploratory sequential approach, this paper focuses on the results generated from quantitative approach.

Results: By use of Exploratory Factor Analysis, the survey results established a total of 13 factors affecting research uptake: four individual factors (support, experience, motivation and time factor); four organizational factors (research agenda, funding, resources and partnerships), and five research characteristics factors (gatekeeping, local research committees, accessibility of evidence, quality of evidence and critical appraisal skills). However, the Spearman's correlation coefficient revealed that only six factors had a significant positive correlation with research uptake, namely: support, experience, motivation, time factor, resources, and critical appraisal skills.

Conclusion: In the context of research uptake in low-resource settings, understanding of these critical factors is important to developing targeted interventions for improving research uptake.

Keywords: Healthcare policy; Healthcare practice; Low-resource countries; Research uptake; Model

Abbreviation: CAHS: Canadian Academy of Health Sciences; DRUSSA: Development Research Uptake in Sub-Saharan Africa; EFA: Exploratory Factor Analysis; KTA: Knowledge to Action; LRC: Local Research Committee; OMRU: Ottawa Model of Research Use; PARIHS: Promoting Action on Research Implementation in Health Services

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Introduction

Slow uptake of new research and improved knowledge into healthcare practice and policy development is detrimental to the achievement and substance of improved and quality healthcare outcomes. Hence, the gap between research produced and research uptake is increasingly being recognized as a challenge by scholars in the conversation around health policy formation [1]. The situation is worse in low-resource countries where enormous time-lags between discovery and integration in practice and policy development are affected by a shortage of resources and competing priorities [2]. Scholars have indicated that the trend is likely to continue for some time in low-resource countries unless initiatives to promote research uptake strategies consider challenges faced by these countries [3]. The implications of low public health research uptake in low-resourced countries is that return on research investment remains lower than it could potentially be, which poses a significant challenge to improving patients' healthcare outcomes.

Relationships between health researchers and end-users have varied. In some instances, limited engagements have negatively affected health research uptake for practice and

policy development [4]. Generally, researchers produce research evidence that requires end-users such as policymakers and health practitioners to have analytical skills and clinical knowledge necessary to adopt and implement the research evidence. In this instance, end-users become involved in the research project's tail-end when findings are ready for dissemination through presentations or publication in academic journals. Ultimately, it renders the process of knowledge translation into practice and policy development as an uncoordinated activity between knowledge producers and knowledge users rather than a holistic process [5].

The concept of 'research 'uptake' is intended to close the gap by affording end-users and relevant stakeholders an opportunity to be immersed in shaping the research project in one way or another, so they know about the existing research project [6]. Grobbelaar defines 'research uptake' as a process by which knowledge generated through research enters the domain of audiences such as practitioners, scholars, end-users, policymakers in government and other agencies [7]. Accordingly, research uptake starts from the inception of a research project. The Development Research Uptake in Sub-Saharan Africa emphasized that research uptake is a comprehensive process that focuses on the entire research cycle, from the proposal right through to practice and policy development [8]. This process is significant for all stakeholders as they become aware and can shape the project from the onset, stimulating interest in the research project [6-8]. Subsequently in this paper, research uptake refers to the adoption of health research project activities by the local research committee with the aim of informing planning, healthcare practice and policy development.

The successful implementation of research uptake is a joint effort. It requires a mirrored identification and selection of appropriate stakeholders from the onset of a research project to stimulate ownership and understanding among stakeholders. Uprety indicates that when research uptake is embedded within relevant programmers, the probability of research outcomes being considered for its intended audience becomes high [9]. According to the United Kingdom's Department for International Development, there are varied healthcare research stakeholders and include anyone with the potential or an interest in health research [10]. Importantly, Reed, et al. recently argued that a health research stakeholder has a possible two-way interaction of influence, either influencing or influenced by organizational actions, decisions, policies, practices, or goals [11]. A further important part is that engaging stakeholders begins with mapping who are the relevant stakeholders [12]. Essentially, engagements and communications with relevant stakeholders are integral in realizing health research's impact [13]. The mapping process is facilitated by determining each stakeholder's potential interest and the nature and extent of the required engagement to facilitate research uptake [14]. This paper presents the development of a research uptake model designed to encourage and provide a practical approach to improving research uptake in low-resource countries.

Models and frameworks associated with research uptake

Increasing demands for accountability from research stakeholders have placed pressure on researchers to provide information systematically, timely, and thoroughly to funders and end-users [15]. To comply with the demands for accountability, various theories, frameworks and models have been developed in a quest to describe the process of implementing research findings for healthcare practice and policy development [16-27]. The table below depicts a fraction of prominent models and frameworks associated with research uptake. Most of these frameworks/models have been used in high-income countries to determine the impact of health research, accountability (value for money), advocacy (increase awareness), and the learning purposes for identifying opportunities, challenges, and successes emanating research performed in an institution **(Table 1).**

Table 1: Models and frameworks associated with Research Uptake.

Model or framework and Origin	Description	Limitations	References
CAHS framework: The Canadian Academy of Health Sciences (CAHS) framework is mainly referred to as the CAHS Payback Framework, adapted from the payback model developed by Buxton and Hanney in 1996.	The framework aims to capture specific impacts in multiple domains, at various levels, and for a wide range of audiences to determine how research activity influences decision making.	Labour intensive and could require substantial investment in some circumstances, and the framework itself is tailored to the Canadian context.	[17,18]
IOWA model: The Iowa Model was founded by a group of nurses from the University of Iowa Hospitals, Iowa Clinics, and Nursing College in 1994.	The model is intended to use research findings to improve healthcare quality, monitor healthcare costs, and improve nursing practice.	Although the literature has shown increasing trends in applying this model, many low-resource countries lack interest in using the model, mainly due to healthcare practice barriers such as lack of time, relevant research studies, resources, and insufficient organisational support.	[19,20,21]
Ottawa Model of Research Use: The Ottawa Model of Research Use (OMRU) was established by Logan and Graham in the late nineties for use by policymakers with an interest in evidence-based research for healthcare practice by practitioners and researchers.	The model assists administrators to control factors that will influence the likelihood of organisational-level changes occurring and how the changes occur. In this model, patients play a significant role when the innovation is developed, implemented and evaluated	Using OMRU requires considerable time and resources to plan and implement strategies to change practice. The model does not yet provide detailed information on specific strategies to use in various circumstances to translate new knowledge. This could likely results in limited use in low-resource countries.	[22]

Knowledge-to-Action framework: First reported in 2006, the Knowledge to Action (KTA) framework is a conceptual evidence-based framework developed in Canada in response to confusion caused by the numerous terms used to describe the process of translating knowledge into action.	The KTA Framework is based on the analysis of 31 planned action theories to offer a holistic view of the phenomenon by integrating concepts of knowledge creation and action (Action cycle). It is viewed as a cyclical process in which research features, knowledge transfer intervention, and the evaluation process lead to the identification of novel problems. KTA allows the identification of barriers to the use of knowledge, while it allows the transfer of knowledge to action into manageable sections.	The framework does not prescribe specifically what needs to be done at each phase, making it difficult for adoption in low-resource countries.	[23]
PARIHS framework: The Promoting Action on Research Implementation in Health Services (PARIHS) framework was founded in 1998 by Kitson and colleagues, to provide an alternative to existing one-dimensional models of transferring research to practice.	The PARIHS framework was developed and tested in an international arena, mainly for research within the nursing fraternity to signify the complexities of undertaking research uptake. The PARIHS framework views successful research uptake as a function of the relationships between three domains, namely evidence, context, and facilitation.	There is no scaling provided with statements of the framework (constructs are not operationalised), which implies the need for further developmental work on these measures to provide usable scores for easy application	[24,25]
STAR model of Knowledge Transformation: Founded by Stevens in the early 2000s at the Academic Centre for Evidence-Based Practice at the University of Texas Health Science Center in San Antonio.	The Star Model of Knowledge Transformation was aimed at providing an understanding of the cycles, nature, and characteristics of knowledge used in several aspects of evidence-based practice. The model helps in the systematic conversion of the best available evidence through different stages To impact health outcomes.	A disadvantage of this model is the long period it takes to translate evidence due to the rigorous practice involved in understanding the cycle.	[26,27]

Most of these developed frameworks were tailored to the context of respective countries of origin, which were mainly high-income countries. There is a common assertion from scholars that public health research uptake depends on considering several local barriers and applying tailored research uptake strategies to overcome those barriers [28]. While there seems to be an agreement on developing tailored strategies for research uptake, traditionally, very little is done actively to promote research uptake. Hence, the researchers in this paper presented a practical approach to research uptake. The novelty of the research uptake model discussed in this paper promotes accountability by all research stakeholders. The local research committee plays a central role in availing essential strategies to enable research uptake in low-resource countries.

Theoretical framework

The Promoting Action on Research Implementation in Health Services (PARIHS) framework, advanced by Rycroft-Malone, guides the study's overall conduct [29]. The PARIHS framework was developed and tested in international arena research within the nursing fraternity to signify the complexities of undertaking research uptake [30]. The study could not wholesomely adopt the PARIHS framework guiding statements; instead, statements were amended for the framework to suit the local context. The PARIHS framework views successful research uptake as a function of the relationships between three domains: evidence, context, and facilitation. In other words, for research uptake to succeed, there should be clarity about the strength of evidence used, the environment (context) in which research will be used, and the method required for facilitating research uptake [31]. The PARIHS framework for determining research uptake factors was integrated with the logical framework to offer a more practical approach towards improving research uptake [32].

Methodology

Although the study initially employs a two-phase exploratory sequential approach [33], this paper focuses on the results generated from quantitative approach.

Research setting

The study was conducted in a rural province of South Africa which has a population size of just over 4.6 million people, representing 7.8% of the total country's population [34]. Due to the international borders and health challenges associated with people's migration across borders [35], our province is an ideal research hub for several research organizations.

Population and sampling

According to data from internal records (research files) of our province, 399 public health research studies were conducted from 2014 to 2019. This translates to an equivalent of 67 public health research studies conducted per annum. Postgraduate students conducted research studies for academic purposes, research institutions for academic or non-academic reasons, and

in-house research, mainly for quality improvement plans. We, therefore, used 399 primary investigators who conducted public health research studies as the primary sources of data for both the qualitative and quantitative phases of this study. Initially, participants were not categorized as researchers, frontline workers, programmer managers, senior managers or directors at higher education institutions, but participants were allowed to categories themselves into any group.

Data collection methods

The qualitative phase findings were quantitatively tested in a structured online questionnaire including all stakeholder groups (i.e. researchers, programmer managers, frontline workers and senior managers or directors). After establishing the total number of research studies that were conducted within the sampled period (from the year 2014 to 2019), an online email Likert Scale (5 scales) survey questionnaire was sent to all identified stakeholders who conducted research in our province to assess whether research uptake relates to healthcare practice and policy development [36].

Initially, a questionnaire was sent to five respondents for piloting purposes. These responses did not form part of the study but were only used for testing purposes. Inputs from the five respondents were used to modify or improve the instruments' content before being used in the main study. A statistician was consulted for input, which further assisted in refining the data collection instruments. The pilot study's responses were also exposed to a reliability test using 'Cronbach's alpha coefficient [37]. The overall 'Cronbach's alpha for four primary constructs (Research uptake (questions B2-B6), individual factors (questions C1-C21), organizational factors (questions D1-D20), and research characteristics (questions E1-E20)) representing 66 items was 0.706, illustrating that the questionnaire was reliable. Scholars have proposed a Cronbach's alpha value of 0.5 or more significant in assessing an instrument's internal consistency [38-45].

Results

Data analysis

Data gathered from research records were collected using RED Cap Survey (web-based secure application). SAS Version 15 and Microsoft Excel were used to analyse data.

Study outcomes

The statistical analysis of the main factors affecting research uptake factors is presented.

Biographical information of respondents

In **Table 2**, the age group composition for this study is illustrated. Of the total 212 respondents, 55 (26%) were aged between 35-44 years, followed by 25-34 years, which contributed 54 (26%) respondents. It could thus be noted that those with ages 25-34 years, 35-44 years and 45-54 years represented approximately 77% of the sample size **(Table 2)**.

Table 2: Biographic information respondents.

Education versus age group								
Count								
		Age group						Total
		18-24	25-34	35-44	45-54	55-64	65+	
Education	Degree	5	10	6	1	3	1	26
	Honours degree	0	10	1	2	0	0	13
	Master's degree	0	26	24	29	13	1	93
	Doctoral degree	0	6	18	16	17	5	62
	Post-doctoral	0	2	6	5	3	2	18
Employment sector versus age group								
Employment sector	Government	2	27	14	20	11	1	75
	Universities/ Institutions of Higher Learning	0	8	24	20	18	7	77
	Private/Non-Governmental Research Institution (NGOs)	30	30	30	30	30	30	30
	Student at academic institution	0	9	11	10	4	0	34
	Other/Unemployed	2	5	4	1	0	0	12
Position versus age group								
Position	Frontline staff or Practitioner	2	23	10	6	6	0	47
	Researcher	3	22	22	16	13	3	79
	Policy level/Programme Managers	0	7	9	15	5	2	38
	Senior Management / Director	0	2	14	16	12	4	48

Work experience versus age group								
Work experience	0-2 years	1	11	8	3	0	1	24
	2-5 years	2	16	9	4	0	0	31
	5-10 years	1	22	24	12	9	1	69
	10+ years	0	2	14	33	27	7	83
	not applicable	1	3	0	1	0	0	5
Total (in each category)		5	54	55	53	36	9	212

Both the median and the mode scores were 3, representing the age group 35-44 years. The mean age for respondents was 43.7, ± 0.7 standard deviation, which indicates a heterogeneous sample regarding age. Overall, the 'respondents' age groups suggest that they were reasonably experienced to provide insight into research uptake factors. Qualifications obtained by respondents were of particular importance for this study. As reflected in Table 2, about 12% of the respondents had an undergraduate qualification degree or equivalent. This leaves approximately 88% of the respondents with a postgraduate qualification, of whom 13 (6%) had an honors degree, and 92 (44%) had a master's degree. Respondents with a doctorate and above contributed 38% of the study population.

Respondents were asked to indicate their employment sector during the completion of the questionnaire. The researcher could thereby attempt to establish the pattern that mainly contributed to health research in the province, which was also significant for this study. The majority of the 212 respondents who conducted research were from institutions of higher learning (universities and colleges for obtaining a degree or diploma), contributing approximately 36.0%, while 35% were working at government institutions. The remaining participants either worked for the public sector (16%), were full-time students (6%), or other (7%). Cross-tabulating, the employment sector with work experience revealed that the most experienced respondents had ten years or more work experience and contributed 39% of the sample size.

In comparison, the least experienced had between zero to two years' work experience, contributed only 2% of the sample size. Cumulatively, respondents who had five years and above contributed approximately 72% of the sample size. The result revealed that those with ten or more years' work experience were four times more likely to contribute to health research than those with zero to two years, three times more likely than those with two to five years' work experience, and just above one times more likely to contribute to health research than those with between five to ten years' work experience. From **Table 2**, it is evident that researchers accounted for 37% of the respondents, with senior managers and frontline workers accounting for 23% and 22%, respectively, of the sample size. Policy/programmer managers only contributed 18% of the sample size for this study. Approximately 62% of frontline workers who participated in this survey were from government institutions. A total of 39% of programmer managers who participated in this study were from government institutions, while a further 39% were programmer managers at higher education institutions. Senior managers who participated in this study included 42% of directors from institutions of higher learning and 33% of directors from government institutions. Private institutions contributed 23% of the senior managers of the sample size.

Discussion

Factors affecting research uptake

Considering this research area is new in the current setting, the items were tested using Exploratory Factor Analysis (EFA) to measure the items' internal consistency and determine the number of factors and items for each construct. EFA is a technique that statistically explores the underlying factors of a variable through factor rotation based on factor loading values so that researchers assume that some indicators may be related to several factors [46]. EFA was conducted in this study and employed Principal Component Analysis (PCA) as the factor extraction method and a Varimax rotation as the rotation method.

The EFA indicated a total of 13 components from the survey responses which were categorized as individual factors (support, experience, motivation and time factor), organizational factors (local research agenda, funding, resources and partnerships), and research characteristic factors (gatekeeping process, local research committee, accessibility of evidence, quality of evidence and critical appraisal skills). **Figure 1** indicates the average mean on research uptake factors per classification. A mean average of 3.00 showed that respondents were neither agreeing nor disagreeing with the listed items of factors affecting research uptake. In contrast, a mean average of 1.00 indicated a strong disagreement and 5.00 strong agreements with detailed items **(Figure 1).**

In comparison with the other groups of respondents, researchers had higher mean average values on the variables 'time factor' (mean=3.69), 'support' (mean=3.55), 'resources' (mean=3.72), 'research agenda' (mean=2.94), 'partnerships' (mean=2.93), and 'critical appraisal skills' (mean=4.10). Whereas, senior managers/ directors had higher mean average scores on the variables: 'experience' (mean=4.41), 'motivation' (mean=4.54), 'private funders' (mean=2.93), and the 'quality of research evidence' (mean=3.48) compared to the other groups of respondents.

Figure 2 illustrates the average overall mean for research uptake factors against respondents' employment sector, namely government employee, private or non-governmental research institution, universities or institutions of higher learning, student at academic institution, and other or unemployed **(Figure 2)** .

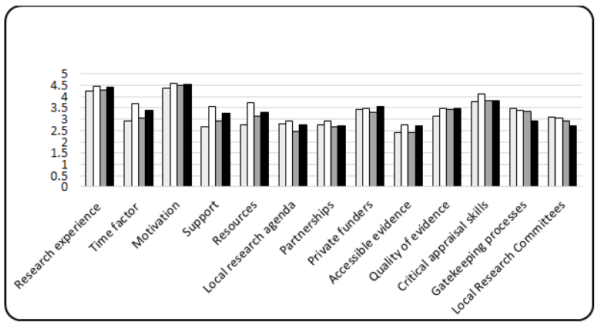

Figure 1: Average mean on research uptake factors per classification.
Note : ( ) Frontline staff or Practitioner; ( ) Research; ( ) Policy level/Programme Managers ; ( ) Senior Management/Director.

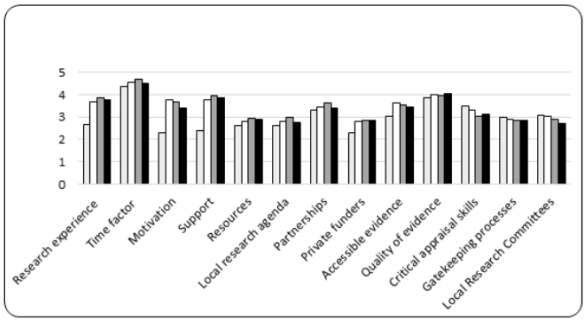

Figure 2: Average mean on research uptake factors per employment sector.
Note : ( ) Government employee; ( ) Universities/Institutions of Higher Learning; ( ) Private/Non-Governmental Research Institution (NGOs) ; ( ) Student at academic institution, and other/unemployed.

The results show similar patterns regarding the overall mean averages among respondents as per the employment sector. However, the mean averages for government employees were lower on a number of variables than for respondents from other employment sectors. Evidently from the figure above, low average mean scores for government employees were observed in almost all variables except on 'critical appraisal skills', 'gatekeeping processes' and 'research committees' in comparison with the other employment sectors. Variables' time factor' (mean score=2.68), 'support' (mean score=2.32), and 'resources' (mean score=2.4) were the most predominant outliers with low mean average scores for government employees [39].

Spearman's correlation

A correlation was conducted to examine a relationship between research uptake and various potential predictors [40].

Individual factors: The results indicated that there was a significant positive association between research uptake and research experience (rs (212)=0.421, p<0.01), and research uptake and motivation (rs (212)=0.398, p<0.01). These suggest a moderate concurrence between research uptake and the two variables (experience and motivation). However, there was a significant positive association between research uptake and time factor (rs (212)=0.283, p<0.01), and research uptake and support (rs (212)=0.260, p<0.01). The results suggest a weak concurrence between research uptake and the two variables (time factor and support).

Organizational factors: Results of the Spearman correlation indicated that there was a non-significant weak positive association between research uptake and organizational factors of (rs (212)=0.172, p<0.05) for resources, (rs (212)=0.079, p<0.01) for local research agenda, (rs (212)=0.088, p<0.01) for partnerships, and very weak positive association of (rs (212)=0.007, p<0.01) for funding. However, there was a significantly strong positive correlation of (rs (212)=0.565, p<0.01) between partnerships and local research agenda.

Research characteristics: Furthermore, the results of the Spearman correlation indicated that there was a significant weak positive association between research uptake and critical appraisal skills of (rs (212)=0.203, p<0.01). There was a non-

significant weak positive association between research uptake and the other research characteristic factors. However, there seems to be a significant moderate association between critical appraisal skills and quality of evidence (rs (212)=0.340, p<0.01), and between accessibility of evidence and quality of evidence (rs (212)=0.403, p<0.01).

Designing the research uptake model

As an exploratory study seeking to understand factors associated with research uptake for healthcare practice and policy development, the researchers adopted the logical framework to develop a research uptake model with the hope of improving the uptake of research findings to practice and policy. In terms of utilization of the logical framework, an important consideration is that logical framework is a bottom-up approach that begins by observing views from the target group on the assessment of the phenomenon investigated and their needs [41]. The approach enabled the development of a user-friendly tailored model which is practical to apply despite limited resources. This incorporated the establishment of specific long-term outcomes as it is necessary when applying a logical framework [42].

Research uptake model structure

Based on the findings of the two phases (qualitative and quantitative) of the current study, the essential elements of the research uptake model for healthcare practice and policy development in a low-resource setting are visually represented in **(Figure 3)**.

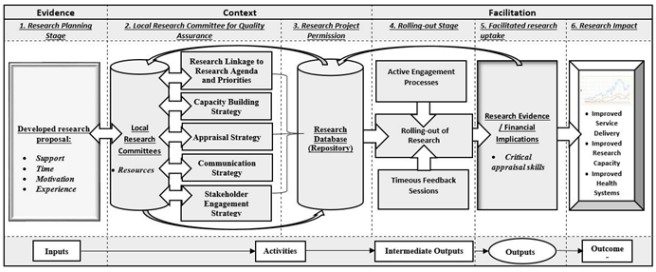

Figure 3: Research uptake model for healthcare practice and policy development.

In this research uptake model, the evidence domain of the PARIHS framework was associated with individual factors affecting research uptake as was evident within the empirical research phases of this study. The research uptake model proposes that for low-resource countries, support, time, motivation and experience represent the initial stimulating process of the research planning stage (inputs). As a result, a well-motivated health research stakeholder will have the urge to successfully contribute to research uptake initiatives. Furthermore, an experienced health research stakeholder will enhance the health research uptake systems' credibility.

The context domain of the PARIHS framework is associated with both the Local Research Committee (LRC) for quality assurance and research project permission stages of the model. The research results confirmed the factor 'resources' and several strategies which are critical for these stages. It is clear from the empirical data that the local research committee is essential to creating strategies to facilitate research uptake. Implementing the model depends on the availability of an up-to-date research repository for enabling communication between research users and producers (activities).

The facilitation domain of the PARIHS framework was associated with three stages of the research uptake model: rolling-out (intermediate outputs), facilitated uptake (outputs), and research impact stages (outcomes). The empirical research phases of this research confirmed the critical appraisal skills as essential for these stages. For a successful research uptake, from stage two to stage six of the model, the LRC assumes an active role in facilitating the processes. Timeous feedback and consistent engagements are the cornerstones of this research uptake model (outputs). They are critical to sustaining interest and buy-in for the research project. A significant investment is needed in low-resource countries to improve critical appraisal skills for practitioners and policy developers to impact health outcomes. The subsequent section provides details on how this model could be used to enhance research uptake.

Research uptake model elements

The current research uptake model indicates that improving research uptake can only be successful when the process is systematically and logically managed.

Research planning stage: The stage refers to the drafting of a research proposal to conduct a study. This process is done in-house, outsourced, or initiated by a third party in the study's current settings. Importantly, participants in this current study highlighted the need for all relevant stakeholders to be involved during the initial stages of the research for research uptake to succeed. Scholars agree that research uptake benefits from involving research stakeholders in the design, execution and dissemination phases of a research project [7,8,43]. Institutionalizing a culture that supports research uptake through researchers, decision-makers, and relevant personnel within the institutions would aid with the implementation process.

Local research committee for quality assurance: The use of LRCs in preparing contextual knowledge and expertise for promoting research uptake has been established in the literature [43]. This model suggests that LRCs should serve as a bridge between research producers and research users by proactively availing different strategies to enable research uptake. These strategies include an up-to-date local research agenda, capacity building strategy, research appraisal strategy, research communication strategy and stakeholder engagement strategy.

Research project permission: Following the approval of a research project by an ethics committee, the research is uploaded to the research repository for the gatekeeper's permission process. A well-designed research repository will facilitate communication between researchers and gatekeepers by providing updates on the status of the research while also serving as a storage facility for research documents. Since most low-resource countries are

affected by a shortage of resources, personnel and competing priorities [2], this paper proposes that a research project should be evaluated based on two fundamental questions.

First, the availability of resources at the local institutions to support the research, these include personnel, facility equipment, availability of space, and others. Failure to understand these requirements from the onset of a research project could result in misunderstanding, which could have a devastating effect on an organization (service delivery) and the researcher, and this without any malice being intended. The LRC is expected to decide to accept, review, or as a last resort, reject the research project. Second, the suitability of the research project for adoption and subsequent research uptake. In this instance, LRCs consider its strategic research documents in consultation with experts in a related field to determine whether the project addresses any locally identified research priorities.

Rolling-out stage: This stage refers to the actual data collection process. Not enough can be said about effective communication, which is perhaps one of the most critical missing links observed in this current study. All stakeholders must receive regular feedback during the data collection process [44]. This is important to highlight research progress, challenges, and engage with stakeholders to solicit research ideas. Should the research project meet the criteria for adoption by the LRC, stakeholders are identified. These would include experts nominated because of expertise in a particular field of study, who will play a significant role in further assisting and 'shaping' the research project for successful research uptake. Relevant experts could be clinical experts, decision-makers, and a community member, all of whom may provide different expertise.

Facilitated research uptake and research impact: When communicating research findings, it is also important to understand the types of audience for which the research is intended to benefit research uptake. This refers to produced research evidence that must be disseminated to appropriate audiences using an appropriate platform. Research findings deemed suitable for healthcare practice and policy development are adopted by stakeholders to inform practice and policy. All research findings/reports are uploaded on the repository for future access and utilization of the information. A successful research uptake study should improve service delivery or healthcare practice, advances in policies, improved research capacity, and improved health research systems. The benefits are improved patients' outcomes [45].

Limitations

Research uptake is a complex process that requires the involvement of all relevant stakeholders, and the researchers felt that several stakeholders were left out in this study, which is a selection bias. In developing this model for low-resource countries, the researchers could not gather data from two key stakeholders for research uptake. These include members of the public and politicians in leadership who are responsible for policies. It would have been beneficial in this study to get their views and strategies for improving research uptake. De Freitas established the importance of involving lay citizens in research projects [46]. This enables them to have a voice in health decision-making processes to improve the quality of health research, healthcare practice and public health interventions. Furthermore, the need to speak to politicians in a more engaging narrative with the attention on returns on investment is critical to research uptake [47].

Conclusion

Several conclusions were drawn from the results that could be generalized across the general study population. It is clear from the empirical data that the LRC is critical in creating strategies which will facilitate research uptake, whereas the success of implementing the model depends on the availability of up-to-date research repository for enabling communication between research users and producers (activities). The findings suggest that it is critical to institutionalize a culture that supports research uptake through the engagement of researchers, decision-makers, and relevant personnel within the institutions to facilitate buy-in at the initial phase of the research process; this would aid with the implementation process. It is also critical to governments, particularly in low-resource countries, to invest substantially in developing strong research skills amongst government employees and retaining such skilled healthcare workers contributing to research uptake. Timeous feedback and consistent engagements are the cornerstones of this research uptake model (outputs).

This model is unique in that it successfully integrated the PARIHS framework with the logical framework to streamline the research uptake process for public healthcare practice and policy. The model encourages specific behaviours and activities associated with research uptake for individual stakeholders through the development of various essential strategies. Despite the model providing a comprehensive list of activities required for a successful research uptake process, the researchers are mindful that all the processes detailed in the model were designed specifically to address issues associated with low-resource countries as identified during the model conducting of the study. However, the model and its application can be modified for use in other settings based on conditions associated with respective settings, such as resource availability and critical appraisal skills. The model process is cyclic in nature, allowing a continuous engagement between the LRC, researchers, and all other relevant public health research uptake stakeholders. This assists in curtaining the existing gap between research producers and research users whilst promoting long-lasting partnerships.

Author Contributions

Both authors were involved in conceptualizing the article. The first author collected the data; both authors were involved in the data analysis and writing of the article. Both authors read and approved the final version.

What is Already Known about this Topic?

The translation of research is significant to healthcare practice and policy development. However, research uptake is a lengthy, complicated process, and despite a growing body of literature on effective strategies, many low-resourced countries continued to struggle.

What this Study Adds

To our knowledge, there is no other research uptake model developed for low-resourced countries uncovered during the appraisal of literature that considered improving research uptake despite limited resources. The primary value of the research uptake model is its usability in low-resource countries experiencing competing priorities. The model encourages specific behaviours and activities associated with research uptake for individual stakeholders. Not only does it lead to a better working relationship between researchers and research users, but it is vital for making an improved decision about Public Health.

Supplementary Data

Supplementary data is available at the Health Systems and Policy Research Journal online and additional data that support these finds are available from the authors on reasonable request.

Ethical Adherence

Permission to conduct the study was sought from the Research and Ethics Committee of the University of South Africa (Department of Health Studies (HSHDC/712/2017). The study was also approved by the Provincial Health Research Committee in Mpumalanga (MP-201711-006).

Conflict of Interest

The authors declare no conflicts of interest.

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