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A scoping review of theoretical models and conceptual frameworks used in Public Health Services and Systems Research (PHSSR) literature

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ABSTRACT

Objectives

Theoretical models and conceptual frameworks are often used to design research methods. This study aims to provide an overview of the application of theoretical models and conceptual frameworks in Public Health Services and Systems Research (PHSSR). We also examine how the integration of such terms in research can improve intervention designs and support the decision-making process within the field of public health practice.

Methods

A scoping review was conducted using publications from public health journals to identify relevant articles in the field of PHSSR. The eligibility of studies was determined after performing evaluations through a full-text review of each article. The inclusion criteria included the requirement that articles applied a theoretical model or conceptual framework.

Results

Eighteen published articles were selected for this review to detect the impact of theories and frameworks on research designs and processes. In the studies, various conceptual frameworks and theoretical models were used in the research design. Our review showed that researchers opted to use conceptual frameworks more frequently than theories and theoretical models. Given the variety of public health topics, it was challenging to identify which types of theories and conceptual frameworks are best suited for the field of PHSSR.

Conclusion

Although the application of theory and framework is of great importance in designing and strengthening the research process, we observed that certain challenges often accompany the successful use of theories and conceptual frameworks. Researchers should use appropriate theoretical and conceptual frameworks to guide research design, to render more credibility and to make study findings more relevant to practice and policy.

Keywords: Theories, Conceptual Frameworks, Public Health Services and Systems Research (PHSSR)

INTRODUCTION

Public Health Services and Systems Research (PHSSR) was previously called Public Health System Research; it was defined as a field of study that investigates organizations' financing and delivery of public health services as well as the impacts of such services on communities.¹ The focus of PHSSR is to provide the scientific foundation and evidence-based strategic planning to support decision making across

the field of public health practice.¹ PHSSR plays a significant role in prioritizing and addressing community health needs and developing intervention programmes to help public health officials and policymakers determine how to allocate and utilize limited resources wisely.¹⁻² The field of PHSSR also uses theory-based planning and frameworks to improve interventions and programme development processes.³ Applying theory and conceptual

frameworks in research contributes to the development of cost-effective programmes that encourage collaboration among decision-makers in order to improve population health.⁶

Theories and theoretical models are a group of interconnected concepts that layout a systematic explanation and prediction of events by describing relations among variables.⁴ Theoretical models help explain behaviour and guide researchers in achieving behavioural change and reducing the burden of preventable disease and death in societies.⁴ Theories are used to construct and evaluate health behaviours and to alter the intervention process into more powerful and robust designs. Theoretical models are essential in new efforts to create evidence for policies and programme guidance. Interventions that align best with theories are often the most promising.⁸

Likewise, a conceptual framework is used to synthesize and guide research analysis and intervention. The conceptual framework allows the audience to better understand the main theories and specific relationships related to the topic at hand.⁹ The conceptual framework can also be used in PHSSR to guide intervention processes and to highlight the complex and dynamic nature of the system, as well as the relationships related to system performance.⁵⁻⁶

This study explores the application of theories and conceptual frameworks in PHSSR in recent years and investigates the role of different models and frameworks in guiding the project design and implementation.

Thus, the following research questions were generated to guide the process of this study:

- 1) Between theoretical models and conceptual frameworks, which are more frequently used in the field of PHSSR?
- 2) How vital are theoretical models and conceptual frameworks in designing and implementing intervention programmes in PHSSR?
- 3) Which theories and conceptual frameworks are most appropriate for PHSSR?

METHOD AND MATERIALS

A scoping review was conducted using articles from four of the top 10 public health journals that publish research on PHSSR:

American Journal of Public Health (AJPH),

Journal of Public Health Management and Practice (JPHMP),

Public Health Reports (PHR), and

American Journal of Preventive Medicine (AJPM).

Scoping reviews have become a common approach for consolidating research evidence and presenting overviews of diverse bodies of literature pertaining to broad topics.⁷ It provides more flexibility to search for more general questions and to map related literature,³³ to identify key concepts and sources of evidence, and to identify research gaps in order to inform practice, policymaking and research.³⁴

Study selection

The initial search for applicable studies returned 1063 articles. Studies were screened a second time, and 202 research articles were selected. The research team determined the content of each article through a review of the published abstract: the year of publication; and applications of theories and conceptual frameworks in research, design and implementation in the area of PHSSR.

This review includes studies conducted in the United States, published between 2015 and 2020, that used one or more theories or conceptual frameworks in designing PHSSR interventions. It excludes articles from countries other than the U.S., and those without the inclusion of theories and frameworks.

Based on the inclusion and exclusion criteria, 87 articles were included. Following a full-text review of the studies and a further assessment of the articles for eligibility, a total of 18 articles were selected for this review. Figure 1, on the following page, explains the process for selecting studies based on the inclusion and exclusion criteria.

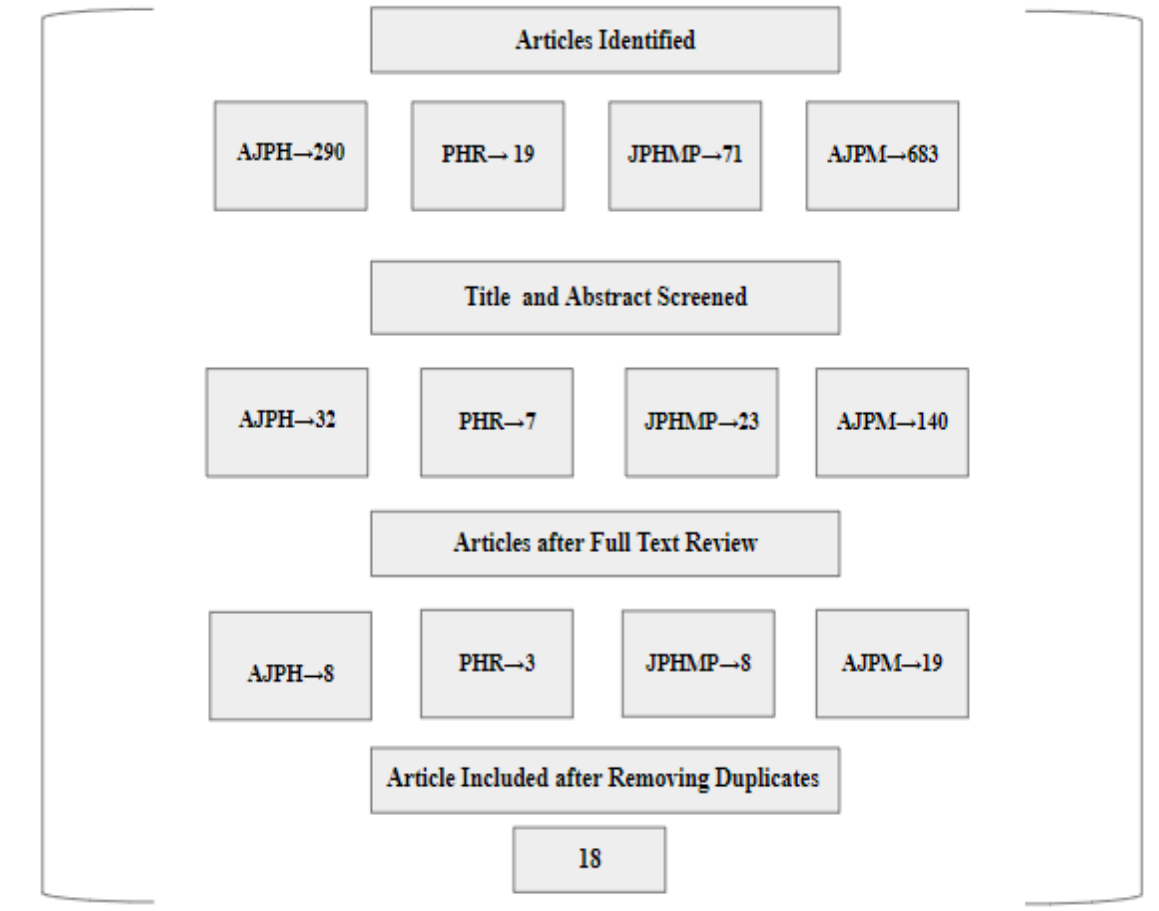


Fig 1 Process of study selections

RESULTS

Eighteen out of 87 studies, which included theoretical models and conceptual frameworks, were selected for this scoping review. This review entailed 11 conceptual frameworks and eight theoretical models. The types of models and frameworks that were identified by this review included conceptual frameworks for several topics in PHSSR. These topics included: (a) the culture of health action,¹⁰ (b) the frameworks of community health workers (CHWs),^{14,20,27} (c) equity-oriented obesity prevention action,¹⁶ (d) intervention mapping,¹⁸ (e) analytic framework of the U.S. Preventive Services Task Force (USPSTF) and prevention framework,^{12,19,21} (f) foundational public health services framework,²² (g) potential impacts of the healthy community framework,²³ (h) a 5-step framework for practice-based teaching,²⁴ (i) community-based participatory

research (CBPR) framework,²⁵ (j) the consolidated framework for implementation research,²⁶ and (k) the framework of policy research continuum.²⁷ Types of theoretical models included multi-disciplinary theoretical perspectives,^{10,11,13,15,17,20} such as, (a) the theory of change,^{15,23} (b) social network theory,¹⁰ (c) minority stress theory,¹¹ (d) the stigma theory,¹¹ (e) the interpersonal psychological theory of suicidal behaviour,¹³ (f) Bandura's social cognitive theory,^{14,17} (g) social support theory,¹⁴ and (h) socio-ecological theory.²³

Each study's selection of theories or conceptual frameworks was driven primarily by the purpose of the research to guide the study in the field of PHSSR. Most studies used descriptive design to explain what outcome would result from using theories or frameworks. A few of the studies incorporated a

combination of theory and conceptual framework; in these studies, the authors either used a combination of theories and conceptual frameworks or multiple theoretical models to construct the research design and describe the process of intervention.¹⁰⁻¹¹

A brief description of the applications of theoretical and conceptual frameworks in the field of PHHSR for the 18 studies is provided in the following sections.

Application of theories and conceptual frameworks

The use of theories or conceptual frameworks differed across the studies, and few studies used the same theory or conceptual framework. To illustrate, only two studies used the theory of change,^{15, 23} and two studies used the community health workers (CHWs) framework.^{14,20} Three of these four studies used a combination of other theories or conceptual frameworks to guide the research method.^{14,20,23} Three studies used the analytical framework of the U.S. Preventive Services Task Force (USPSTF).

From these three studies, one study used the USPSTF framework to prioritize addressing the social determinants of health (SDH) and used this to discuss how to assess the role of expanding clinical prevention services in screening and counselling with regard to social risk.¹⁹

In contrast, the second study used the analytical framework of the USPSTF along with key questions to create research plans and to evaluate topics in order to develop certain recommendations regarding evidence on the benefits and harms of screening tests, preventive medications, and counselling, especially in relation to behavioural interventions.²¹

In the third study, the framework helped researchers to demonstrate behavioural counselling interventions that were beneficial to patients and to evaluate the direct and indirect evidence base on the effectiveness of preventive clinical services on health outcomes.¹² Researchers also presented five strategies for coordinating efforts that involve the Society of Behavioural Medicine (SBM) in meeting USPSTF standards and achieving appropriate interventions.¹²

Application of a theory or a conceptual framework

Our review found that 14 out of 18 studies used only one theory or a conceptual framework to design the study methodology.^{10,12,15,16,17,18,19,21,22,24-27} For instance the theory of change was used as an approach to measure levels of collaboration or joint action between local health departments (LHDs) and non-profit hospitals through a content analysis of community health needs assessment (CHNA),¹⁵ while Bronfenbrenner's ecological systems theory was used to organize and identify tools used in recruitment strategies to enroll African-American children and adolescents in qualitative and quantitative research.¹⁷

The use of conceptual frameworks in selected studies covered by this review was more evident than theoretical models. To demonstrate, step 5 of the intervention mapping framework was used as a systematic approach to design a project for HIV pre-exposure prophylaxis adaption, implementation and maintenance,¹⁸ while a 5-step framework for practice-based teaching (PBT) was used to guide public health faculty in the development of a practice-based curriculum for public health education and preparing students for the workforce.²⁴ A foundational public health services framework (FPHS) was also used to estimate the cost of all governmental state agencies' spending on total non-hospital spending and basic public health services needed in communities.²² Although the FPHS framework showed limitations on estimating the total cost of individual public health services and programmes, the model's flexibility allowed researchers to learn how to include programmes that are specific to the community's needs.²² One study also offered an equity-oriented obesity prevention action framework to prioritize health inequity when pursuing policies, systems and environmental change strategies, and when selecting and evaluating a combination of intervention programmes related to social determinants of health and economic disadvantages.¹⁶ Another study discussed how the process of the health action framework guides the grant-making decisions and strategic collaboration of the Robert Wood Johnson Foundation.¹⁶ This illustrated that such a framework offers important grounds for further development to improve collective well-being through new research

and can help to achieve long-term desired outcomes for health and health systems.¹⁶ Furthermore, researchers used community-based participatory research (CBPR) as a framework to gather information about health behaviour and risk factors on colorectal cancer among Alaska Native people.²⁵ Researchers also used the consolidated framework for implementation research (CFIR) to design effective interventions that increase the uptake of the human papillomavirus (HPV) vaccine to prevent cervical cancer among Hispanic and African-American women.²⁶

Finally, the framework of policy research continuum was used as five interconnected phases to assist and improve the implementation of policy interventions to improve decision making; to develop strategies and enhance public health impacts; and to inform the wise use of resources and dollars spent.²⁷

Application of combination of theories and conceptual frameworks

This review also found that several studies used a combination of theory and conceptual frameworks; in these studies, the authors used a combination of two or more theoretical models and conceptual frameworks to support the research design and present the intervention process.¹⁰⁻¹¹ For instance, a study used the interpersonal psychological theory of suicide, and the health impact pyramid framework to

develop strategies that reduce the risk of suicidal thoughts and behaviour among youth. In this study, the interpersonal psychological theory of suicide helped to provide strategies to reduce the burden from Nonsuicidal Self-Injury (NSSI) and safeguard youths. The pyramid framework helped the development of sustained efforts to promote access to mental health care for all young people.¹³

In addition, one study used a conceptual framework to explain the processes through which CHWs facilitate the adoption of healthy behaviours and guide CHW intervention, training and evaluation. Bandura's social cognitive theory and social support theory were also used to construct coding and research design process.¹⁴ Another study used the minority stress model to understand the psychological impacts of minority sexual orientations – including lesbian, gay, and bisexual people – and stigma theory to understand factors and operations of HIV stigma at individual and intersectional levels.¹¹

Researchers also used a conceptual framework of potential impacts of healthy communities study (HCS), based on theories of change and a socio-ecological model, to assess dietary intake, school nutrition environments and additional nutrition-related behaviours.²³ A summary of characteristics of the 18 articles that are included in this scoping review are provided in Table 1.

Table 1 Characteristics of the included articles

Theory and framework	Public Health Services and Systems Research (PHSSR) Topic	Research Agenda question (category)	Study citations
The interpersonal psychological theory of suicide The health impact pyramid framework	Non-suicidal Self-Injury: A Small Step Toward Addressing a Neglected Public Health Problem Among Adolescents.	To identify youths involved in high-risk behaviors those who commit suicide. To conceptualize the public health impact of NSSI and identify intervention opportunities beyond traditional individual-based approaches.	Westers NJ, Culyba AJ. Nonsuicidal Self-Injury: A Small Step Toward Addressing a Neglected Public Health Problem Among Adolescents. <i>Am J Public Health.</i> 2018;108(8):981-983
Equity oriented obesity prevention action framework	A Framework for Increasing Equity Impact in Obesity Prevention	To identify approaches that prioritize equity issues when pursuing policies, systems, and environmental change strategies.	Kumanyika SK. A Framework for Increasing Equity Impact in Obesity Prevention. <i>Am J Public Health.</i> m2019;109(10):1350-1357.

Conceptual framework of community health workers (CHWs) and patients as partners in health.	Partners in health: a conceptual framework for the role of community health workers in facilitating patients' adoption of healthy behaviors.	To improve healthcare access, delivery, and quality by explaining the processes through which community health workers (CHWs) facilitate patients' adoption of healthy behaviors.	Katigbak C, Devanter NV, Islam N, Trinh-Shevrin C. Partners in Health: A Conceptual Framework for the Role of Community Health Workers in Facilitating Patients' Adoption of Healthy Behaviors. <i>Am J Public Health.</i> 2015; 105 (5):872-880.
Bronfenbrenner's Ecological Systems Theory	Recruiting African American Children for Research: An Ecological Systems Theory Approach	To evaluate strategies for effective recruitment of African American children and adolescents for research.	Graves D, Sheldon JP. Recruiting African American Children for Research: An Ecological Systems Theory Approach. <i>Western Journal of Nursing.</i> 2018;40(10):1489-1521, 33p.
Intervention mapping	HIV Pre-exposure Prophylaxis Program Implementation Using Intervention Mapping	To offer guidance for organizations interested in developing and implementing HIV Prevention Programs (HPPs) by providing an outline of a systematic approach that utilizes an Intervention Mapping Framework.	Flash CA, Frost ELT, Giordano TP, Amico KR, Cully JA, Markham CM. HIV Pre-exposure Prophylaxis Program Implementation Using Intervention Mapping. <i>Am J Prev Med.</i> 2018;54(4):519-529.
USPSTF analytic framework and prevention framework	Social Determinants as a Preventive Service: U.S. Preventive Services Task Force Methods Considerations for Research	To conduct an assessment that allows the U.S. Preventive Services Task Force (USPSTF) to prioritize addressing SDH as a clinical preventive service, and also provide recommendations based on Analytic and Prevention Frameworks for future research in designing studies that evaluate the importance of incorporating aspects of social care into clinical care.	Krist AH, Davidson KW, Ngo-Metzger Q, Mills J. Social Determinants as a Preventive Service: U.S. Preventive Services Task Force Methods Considerations for Research. <i>Am J Prev Med.</i> 2019;57(6S1):S6-S12.
Conceptual framework of community health workers (CHWs)	Community Health Workers as Support for Sickle Cell Care	To examine community health workers in improving health care and health outcomes for sickle cell disease management on multiple levels.	Hsu LL, Green NS, Donnell Ivy E, et al. Community Health Workers as Support for Sickle Cell Care. <i>Am J Prev Med.</i> 2016;51(1S1):S87-S98.
The U.S. Preventive Services Task Force analytic framework (USPSTF)	Enhancing Coordination Among the U.S. Preventive Services Task Force, Agency for Healthcare Research and Quality, and National Institutes of Health	To discuss remaining challenges and consider possible solutions that NIH, AHRQ, and researchers can provide the USPSTF with the required data to provide recommendations, especially those related to behavioral interventions.	Murray DM, Kaplan RM, Ngo-Metzger Q, et al. Enhancing Coordination Among the U.S. Preventive Services Task Force, Agency for Healthcare Research and Quality, and National Institutes of Health. <i>Am J Prev Med.</i> 2015;49(3S2):S166-S173.

The U.S. Preventive Services Task Force Analytic Framework (USPSTF)	Enhancing the Evidence for Behavioral Counseling: A Perspective from the Society of Behavioral Medicine	To increase awareness of USPSTF in place for behavioural counselling interventions and to improve the overall quality of the evidence base to inform national clinical guidelines by involving the Society of Behavioral Medicine (SBM) and maximize the potential for implementation across contexts.	Alcántara C, Klesges LM, Resnicow K, Stone A, Davidson KW. Enhancing the Evidence for Behavioral Counseling: A Perspective from the Society of Behavioral Medicine. <i>Am J Prev Med.</i> 2015;49(3 Suppl 2):S184-S193.
Theory of Change	Collaboration Among Missouri Nonprofit Hospitals and Local Health Departments: Content Analysis of Community Health Needs	To identify and establish a baseline description of collaboration among nonprofit hospitals and LHSs in Missouri through content analysis of hospital CHNAs.	Kate E. Beatty, Kristin D. Wilson, Amanda Ciecior, and Lisa Stringer. <i>American Journal of Public Health.</i> 2015; 105, S337-S344, https://doi.org/10.2105/AJPH.2014.302488
Minority stress theory, and structural and intersectional stigma	Framing Mechanisms Linking HIV-Related Stigma, Adherence to Treatment and Health Outcomes	To understand the effects of minority sexual orientations on mental health.	Turan B, Hatcher AM, Weiser SD, Johnson MO, Rice WS, Turan JM. <i>American Journal of Public Health.</i> 2017; 107(6):863-869. https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,shib&db=s3h&AN=123016482 . [Accessed Feb 26, 2020.]
Social network theory	Building a Culture of Health: A Critical Role for Public Health Services and Systems Research	To help create a national movement and a culture of health that leads to the improvement of collective well-being	Plough AL. <i>American Journal of Public Health.</i> 2015;105 Suppl 2:S150-S152. doi:10.2105/AJPH.2014.302410
Foundational public health services framework	The Foundational Public Health Services as a Framework for Estimating Spending	To improve the estimations of public health spending and display the value of using the FPHS model as a tool to determine the cost of public health services.	Resnick BA, Fisher JS, Colrick IP, Leider JP. The Foundational Public Health Services as a Framework for Estimating Spending. <i>Am J Prev Med.</i> 2017;53(5):646-651.
Conceptual framework of the health community study based on Theories of change from socio-ecological model	The Healthy Communities Study Nutrition Assessments: Child Diet and the School Nutrition Environment	To describe methods used in 2013–2015 in the Healthy Communities Study (HCS) to assess and improve diet and nutrition behaviors in elementary and middle school children through community programs and policies (CPP).	Ritchie LD, Wakimoto P, Woodward-Lopez G, et al. The Healthy Communities Study Nutrition Assessments: Child Diet and the School Nutrition Environment. <i>Am J Prev Med.</i> 2015;49(4):647-652.
PBT STEPS: A 5 step framework for practice-based teaching	A Framework for Practice- Based Teaching in Public Health	To provide opportunities for students through a pedagogical approach of practice-based learning to obtain competencies and practical skills, and work in collaboration with public health organizations on current public health problems.	Greece JA, Wolff J, McGrath D. A Framework for Practice-Based Teaching in Public Health. <i>J Public Health Manag Pract.</i> 2019;25(5):E30-E38.

Community-based Participatory Research (CBPR) Framework	Developing an Epidemiologic Study to Investigate Risk Factors for Colorectal Cancer Among Alaska Native People	To establish a community-based study of lifestyle and genetic factors for colorectal cancer risk among Alaskan Natives (AN).	Nash SH, Peters U, Redwood D. Developing an Epidemiologic Study to Investigate Risk Factors for Colorectal Cancer Among Alaska Native People. <i>J Public Health Manag Pract.</i> 2019;25:S54-S60.
The consolidated framework for implementation research	Using an Implementation Research Framework to Identify Potential Facilitators and Barriers of an Intervention to Increase HPV Vaccine Uptake	To understand and address the underutilization of HPV vaccine uptake by Hispanic and African American women to prevent cervical cancer.	Selove R, Foster M, Mack R, Sanderson M, Hull P. Using an Implementation Research Framework to Identify Potential Facilitators and Barriers of an Intervention to Increase HPV Vaccine Uptake. <i>J Public Health Manag Pract.</i> 2017;23(3):e1-e9.
Policy research continuum to enhance knowledge translation of CHW workforce development policy in the United States	Translating Workforce Development Policy Interventions for Community Health Workers: Application of a Policy Research Continuum	To improve knowledge translation among community health workers by using policy interventions to prevent and control cardiovascular disease and type 2 diabetes	Fulmer E, Barbero C, Gilchrist S, Shantharam SS, Bhuiya AR, Taylor LN, Jones CD. Translating Workforce Development Policy Interventions for Community Health Workers: Application of a Policy Research Continuum. <i>J Public Health Manag Pract.</i> 2020;26:S10-S18.

DISCUSSION

This scoping review has demonstrated some applications of theoretical models and conceptual frameworks that have been incorporated into diverse topics in the field of PHSSR. As pointed out earlier, researchers used conceptual frameworks^{14,16,18,19,21-23,25-27} more frequently than theories and theoretical models.^{13,15,17,20} Both theories and conceptual frameworks helped guide the research process in addressing specific public health issues and provided the basis for intervention programmes to reduce the burden of these issues.³² Only a few articles included the same theories or conceptual frameworks throughout this review,^{12,14,20,21} and the models and frameworks selected by authors were determined by the purpose of their research.

Although theoretical and conceptual frameworks provide structures to help researchers investigate and describe phenomena by predicting and determining the relationships among variables

and make research finding more meaningful,³¹ this review discovered that some studies had struggled over how to apply the process of such frameworks in the research design.²⁹ There appeared to be differences in understanding the application of theories and conceptual framework across the studies reviewed, which seemed to make it difficult for some researchers to determine how to construct their ideas in the research design and process. The ambiguity in some of the studies in the utilization of theory types and conceptual frameworks was evident. Several studies lacked information on how the application of theories or conceptual frameworks was guiding their research design process,^{14-15,23,25} particularly when studies used theories to describe the intervention process.

In contrast, in studies where the authors clearly articulated the application of theories and conceptual frameworks in their research design,^{17,18,22,26-27} an understanding of the relationship between various

components of the design approach and the analysis plan were apparent, as well as how they resulted in the achievement of the desired outcomes.^{28,29} To illustrate, the 5-step PBT framework created a roadmap for researchers to design their own research methodology and successfully implement the intervention in the real world by providing action-based research.²⁴ Further, Bronfenbrenner's ecological systems theory guided researchers to develop more effective strategies, to have better interaction with research participants and to overcome barriers in recruiting African-American populations for health-related research¹⁷. Step 5 of the intervention mapping framework led researchers to identify and define key facilitators and challenges of the HIV prevention programme (HPP), which led to the development of a sustainable strategy programme that ensures staff pressures, budget changes and patient volume are tolerated.¹⁸ Overall, this scoping review found that understanding the attribution of theories and conceptual frameworks during intervention design is critical in guiding the research process. Additionally, a clear understanding of the foundation on which interventions are built strengthens implementation and sustainability of the research construct.³⁰

LIMITATIONS

This review has several limitations that need to be acknowledged. First, based on our methodological approach, data selection was limited to papers from just four journals in the field of PHSSR. Second, since the focus of this review was on the broad application of theories and conceptual frameworks within various studies, we chose to exclude articles published before 2015; studies conducted outside of the United States; and articles that included theories and conceptual frameworks in the form of systematic reviews. Third, due to strict inclusion and exclusion criteria, some articles may have escaped from our collection, but we are confident that any additional articles would not have altered the results of this study. Finally, based on the research conducted, it is difficult to determine which types of theories and conceptual frameworks are most appropriate for the field of PHSSR, since the variety of topics demands different types of theoretical or conceptual frameworks.

CONCLUSION

To sum up, this scoping review presented various applications of theoretical models and conceptual frameworks in the field of PHSSR. Most theories and conceptual frameworks identified in this review had unique perspectives that were specifically related to the purpose of each study. This review also underscored how the appropriate use of theories and frameworks can influence the implementation and sustainability of interventions. These findings demonstrate the importance of using theories and frameworks to help with the implications of practice and research, and in measuring the impact of interventions on health outcomes. However, to provide further evidence on the application of conceptual theories and frameworks in research design, a systematic review should be conducted, casting a much wider net for the selection of articles and theoretical and conceptual frameworks relevant to the field of PHSSR. Further research is also needed to examine the practice and policy benefits associated with the application of these theories and conceptual frameworks.

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