Continuing to enhance the quality of case study methodology in health services research

Shannon L. Sibbald, BHSc, MSc, PhD[1,2,3]; Stefan Paciocco, BHSc, MSc[1];
Meghan Fournie, BHS, MHIS[1]; Rachelle Van Asseldonk, BA, MSc[1];
and Tiffany Scurr, BAS, MHIS[1]

Abstract

Case study methodology has grown in popularity within Health Services Research (HSR). However, its use and merit as a methodology are frequently criticized due to its flexible approach and inconsistent application. Nevertheless, case study methodology is well suited to HSR because it can track and examine complex relationships, contexts, and systems as they evolve. Applied appropriately, it can help generate information on how multiple forms of knowledge come together to inform decision-making within healthcare contexts. In this article, we aim to demystify case study methodology by outlining its philosophical underpinnings and three foundational approaches. We provide literature-based guidance to decision-makers, policy-makers, and health leaders on how to engage in and critically appraise case study design. We advocate that researchers work in collaboration with health leaders to detail their research process with an aim of strengthening the validity and integrity of case study for its continued and advanced use in HSR.

Introduction

The popularity of case study research methodology in Health Services Research (HSR) has grown over the past 40 years.[1] This may be attributed to a shift towards the use of implementation research and a newfound appreciation of contextual factors affecting the uptake of evidence-based interventions within diverse settings.[2] Incorporating context-specific information on the delivery and implementation of programs can increase the likelihood of success.[3,4] Case study methodology is particularly well suited for implementation research in health services because it can provide insight into the nuances of diverse contexts.[5,6] In 1999, Yin[7] published a paper on how to enhance the quality of case study in HSR, which was foundational for the emergence of case study in this field. Yin[7] maintains case study is an appropriate methodology in HSR because health systems are constantly evolving, and the multiple affiliations and diverse motivations are difficult to track and understand with traditional linear methodologies.

Despite its increased popularity, there is debate whether a case study is a methodology (ie, a principle or process that guides research) or a method (ie, a tool to answer research questions). Some criticize case study for its high level of flexibility, perceiving it as less rigorous, and maintain that it generates inadequate results.[8] Others have noted issues with quality and consistency in how case studies are conducted and reported.[9] Reporting is often varied and inconsistent, using a mix of approaches such as case reports, case findings, and/or case study. Authors sometimes use incongruent methods of data collection and analysis or use the case study as a default when other methodologies do not fit.[9,10] Despite these criticisms, case study methodology is becoming more common as a viable approach for HSR.[11] An abundance of articles and textbooks are available to guide researchers through case study research, including field-specific resources for business,[12,13] nursing,[14] and family medicine.[15] However, there remains confusion and a lack of clarity on the key tenets of case study methodology.

Several common philosophical underpinnings have contributed to the development of case study research[1] which has led to different approaches to planning, data collection, and analysis. This presents challenges in assessing quality and rigour for researchers conducting case studies and stakeholders reading results.

This article discusses the various approaches and philosophical underpinnings to case study methodology. Our goal is to explain it in a way that provides guidance for decision-makers, policy-makers, and health leaders on how to understand, critically appraise, and engage in case study research and design, as such guidance is largely absent in the literature. This article is by no means exhaustive or authoritative. Instead, we aim to provide guidance and encourage dialogue around case study methodology, facilitating critical thinking around the variety of approaches and ways quality and rigour can be bolstered for its use within HSR.

Purpose of case study methodology

Case study methodology is often used to develop an in-depth, holistic understanding of a specific phenomenon within a

[1] Faculty of Health Sciences, Western University, London, Ontario, Canada.
[2] Department of Family Medicine, Schulich School of Medicine and Dentistry, Western University, London, Ontario, Canada.
[3] The Schulich Interfaculty Program in Public Health, Schulich School of Medicine and Dentistry, Western University, London, Ontario, Canada.

Corresponding author:
Shannon L. Sibbald, Western University, London, Ontario, Canada.
E-mail: ssibbald@uwo.ca

specified context.[11] It focuses on studying one or multiple cases over time and uses an in-depth analysis of multiple information sources.[16,17] It is ideal for situations including, but not limited to, exploring under-researched and real-life phenomena,[18] especially when the contexts are complex and the researcher has little control over the phenomena.[19,20] Case studies can be useful when researchers want to understand how interventions are implemented in different contexts, and how context shapes the phenomenon of interest.

Key tenets

In addition to demonstrating coherency with the type of questions case study is suited to answer, there are four key tenets to case study methodologies: (1) be transparent in the paradigmatic and theoretical perspectives influencing study design; (2) clearly define the case and phenomenon of interest; (3) clearly define and justify the type of case study design; and (4) use multiple data collection sources and analysis methods to present the findings in ways that are consistent with the methodology and the study's paradigmatic base.[9,16] The goal is to appropriately match the methods to empirical questions and issues and not to universally advocate any single approach for all problems.[21]

Approaches to case study methodology

Three authors propose distinct foundational approaches to case study methodology positioned within different paradigms: Yin,[19,22] Stake,[5,23] and Merriam[24,25] (Table 1). Yin is strongly post-positivist whereas Stake and Merriam are grounded in a constructivist paradigm. Researchers should locate their research within a paradigm that explains the philosophies guiding their research[26] and adhere to the underlying paradigmatic assumptions and key tenets of the appropriate author's methodology. This will enhance the consistency and coherency of the methods and findings. However, researchers often do not report their paradigmatic position, nor do they adhere to one approach.[9] Although deliberately blending methodologies may be defensible and methodologically appropriate, more often it is done in an ad hoc and haphazard way, without consideration for limitations.

The post-positive paradigm postulates there is one reality that can be objectively described and understood by "bracketing" oneself from the research to remove prejudice or bias.[27] Yin focuses on general explanation and prediction, emphasizing the formulation of propositions, akin to hypothesis testing. This approach is best suited for structured and objective data collection[9,11] and is often used for mixed-method studies.

Constructivism assumes that the phenomenon of interest is constructed and influenced by local contexts, including the interaction between researchers, individuals, and their environment.[27] It acknowledges multiple interpretations of reality[24] constructed within the context by the researcher and participants which are unlikely to be replicated, should either change.[5,20] Stake and Merriam's constructivist approaches emphasize a story-like rendering of a problem and an iterative

process of constructing the case study.[7] This stance values researcher reflexivity and transparency,[28] acknowledging how researchers' experiences and disciplinary lenses influence their assumptions and beliefs about the nature of the phenomenon and development of the findings.

Defining a case

A key tenet of case study methodology often underemphasized in literature is the importance of defining the case and phenomenon. Researches should clearly describe the case with sufficient detail to allow readers to fully understand the setting and context and determine applicability. Trying to answer a question that is too broad often leads to an unclear definition of the case and phenomenon.[20] Cases should therefore be bound by time and place to ensure rigor and feasibility.[6]

Yin[22] defines a case as "a contemporary phenomenon within its real-life context,"[(p13)] which may contain a single unit of analysis, including individuals, programs, corporations, or clinics[29] (holistic), or be broken into sub-units of analysis, such as projects, meetings, roles, or locations within the case (embedded).[30] Merriam[24] and Stake[5] similarly define a case as a single unit studied within a bounded system. Stake[5] suggests bounding cases by contexts and experiences where the phenomenon of interest can be a program, process, or experience.[5,23] However, the line between the case and phenomenon can become muddy. For guidance, Stake[23] describes the case as the noun or entity and the phenomenon of interest as the verb, functioning, or activity of the case.

Designing the case study approach

Yin's approach to a case study is rooted in a formal proposition or theory which guides the case and is used to test the outcome.[1] Stake[5] advocates for a flexible design and explicitly states that data collection and analysis may commence at any point. Merriam's[24] approach blends both Yin and Stake's, allowing the necessary flexibility in data collection and analysis to meet the needs.

Yin[30] proposed three types of case study approaches—descriptive, explanatory, and exploratory. Each can be designed around single or multiple cases, creating six basic case study methodologies. Descriptive studies provide a rich description of the phenomenon within its context, which can be helpful in developing theories. To test a theory or determine cause and effect relationships, researchers can use an explanatory design. An exploratory model is typically used in the pilot-test phase to develop propositions (eg, Sibbald et al.[31] used this approach to explore interprofessional network complexity). Despite having distinct characteristics, the boundaries between case study types are flexible with significant overlap.[30] Each has five key components: (1) research question; (2) proposition; (3) unit of analysis; (4) logical linking that connects the theory with proposition; and (5) criteria for analyzing findings.

Table 1. Cross-analysis of three case study approaches, adapted from Yazan 2015

Dimension of interest	Yin	Stake	Merriam
Case study design	Logical sequence = connecting empirical data to initial research question Four types: single holistic, single embedded, multiple holistic, multiple embedded	Flexible design = allow major changes to take place while the study is proceeding	Theoretical framework = literature review to mold research question and emphasis points
Case study paradigm	Positivism	Constructivism and existentialism	Constructivism
Components of study	1. Question 2. Propositions 3. Unit of analysis 4. Logic linking 5. Criteria for interpreting findings	"Progressive focusing" = "the course of the study cannot be charted in advance" (1998, p 22) Must have 2-3 research questions to structure the study	1. Conduct literature review 2. Construct theoretical framework 3. Identify research problem 4. Sharpen research question 5. Select sample
Collecting data	Quantitative and qualitative evidentiary influenced by: 1. Investigator's skills 2. Protocol for investigation 3. Inclusion criteria 4. Conduct of pilot study	Qualitative data influenced by: 1. Knowledge 2. Data with increased validity	Qualitative data research must have necessary skills and follow certain procedures to: 1. Conduct effective interviews 2. Collect data from documents
Data collection techniques	1. Documentation 2. Archival records 3. Interviews 4. Direct observations 5. Participant observation 6. Physical artifacts	1. Observations 2. Interview 3. Document review	1. Interviews 2. Observations 3. Analyzing documents
Data analysis	Use both quantitative and qualitative techniques to answer research question 1. Pattern matching 2. Explanation building 3. Time-series analysis 4. Program logic models 5. Cross-case synthesis	Use researcher's intuition and impression as a guiding factor for analysis 1. Categorical 2. Aggregation 3. Direct interpretation	"it is the process of making meaning" (1998, p 178) 1. Ethnographic analysis 2. Narrative analysis 3. Phenomenological analysis 4. Constant comparative method 5. Content analysis 6. Analytic induction
Validating data	1. Construct validity 2. Internal validity 3. External validity 4. Reliability	Use triangulation 1. Data source 2. Investigator 3. Theory 4. Methodological	Increase internal validity 1. Triangulation 2. Member checks 3. Long-term observation 4. Peer examination 5. Participatory research 6. Disclosure of research bias Ensure reliability and increase external validity

Contrary to Yin, Stake[5] believes the research process cannot be planned in its entirety because research evolves as it is performed. Consequently, researchers can adjust the design of their methods even after data collection has begun. Stake classifies case studies into three categories: intrinsic, instrumental, and collective/multiple.[5] Intrinsic case studies focus on gaining a better understanding of the case. These are often undertaken when the researcher has an interest in a specific case. Instrumental case study is used when the case itself is not of the utmost importance, and the issue or phenomenon (ie, the research question) being explored becomes the focus instead (eg, Paciocco[32] used an instrumental case study to evaluate the implementation of a chronic disease management program).[5] Collective designs are rooted in an instrumental case study and

include multiple cases to gain an in-depth understanding of the complexity and particularity of a phenomenon across diverse contexts.[5,23] In collective designs, studying similarities and differences between the cases allows the phenomenon to be understood more intimately (for examples of this in the field, see van Zelm et al.[33] and Burrows et al.[34] In addition, Sibbald et al.[35] present an example where a cross-case analysis method is used to compare instrumental cases).

Merriam's approach is flexible (similar to Stake) as well as stepwise and linear (similar to Yin). She advocates for conducting a literature review before designing the study to better understand the theoretical underpinnings.[24,25] Unlike Stake or Yin, Merriam proposes a step-by-step guide for researchers to design a case study. These steps include performing a literature review, creating a theoretical framework, identifying the problem, creating and refining the research question(s), and selecting a study sample that fits the question(s).[24,25,36]

Data collection and analysis

Using multiple data collection methods is a key characteristic of all case study methodology; it enhances the credibility of the findings by allowing different facets and views of the phenomenon to be explored.[23] Common methods include interviews, focus groups, observation, and document analysis.[5,37] By seeking patterns within and across data sources, a thick description of the case can be generated to support a greater understanding and interpretation of the whole phenomenon.[5,17,20,23] This technique is called triangulation and is used to explore cases with greater accuracy.[5] Although Stake[5] maintains case study is most often used in qualitative research, Yin[17] supports a mix of both quantitative and qualitative methods to triangulate data. This deliberate convergence of data sources (or mixed methods) allows researchers to find greater depth in their analysis and develop converging lines of inquiry. For example, case studies evaluating interventions commonly use qualitative interviews to describe the implementation process, barriers, and facilitators paired with a quantitative survey of comparative outcomes and effectiveness.[33,38,39]

Yin[30] describes analysis as dependent on the chosen approach, whether it be (1) deductive and rely on theoretical propositions; (2) inductive and analyze data from the "ground up"; (3) organized to create a case description; or (4) used to examine plausible rival explanations. According to Yin's approach to descriptive case studies, carefully considering theory development is an important part of study design.[40] "Theory" refers to field-relevant propositions, commonly agreed upon assumptions, or fully developed theories.[40] Stake advocates for using the researcher's intuition and impression to guide analysis through a categorical aggregation and direct interpretation.[5] Merriam[24] uses six different methods to guide the "process of making meaning" [(p178)]: (1) ethnographic analysis; (2) narrative analysis; (3) phenomenological analysis;

(4) constant comparative method; (5) content analysis; and (6) analytic induction.

Drawing upon a theoretical or conceptual framework to inform analysis improves the quality of case study and avoids the risk of description without meaning.[18] Using Stake's[5] approach, researchers rely on protocols and previous knowledge to help make sense of new ideas; theory can guide the research and assist researchers in understanding how new information fits into existing knowledge.

Practical applications of case study research

Columbia University has recently demonstrated how case studies can help train future health leaders.[41] Case studies encompass components of systems thinking—considering connections and interactions between components of a system, alongside the implications and consequences of those relationships—to equip health leaders with tools to tackle global health issues.[41] Greenwood[42] evaluated Indigenous peoples' relationship with the healthcare system in British Columbia and used a case study to challenge and educate health leaders across the country to enhance culturally sensitive health service environments.

An important but often omitted step in case study research is an assessment of quality and rigour. We recommend using a framework or set of criteria to assess the rigour of the qualitative research. Suitable resources include Caelli et al.,[43] Houghten et al.,[44] Ravenek and Rudman,[45] and Tracy.[46]

New directions in case study

Although "pragmatic" case studies (ie, utilizing practical and applicable methods) have existed within psychotherapy for some time,[47,48] only recently has the applicability of pragmatism as an underlying paradigmatic perspective been considered in HSR.[49] This is marked by uptake of pragmatism in Randomized Control Trials, recognizing that "gold standard" testing conditions do not reflect the reality of clinical settings[50,51] nor do a handful of epistemologically guided methodologies suit every research inquiry.

Pragmatism positions the research question as the basis for methodological choices, rather than a theory or epistemology, allowing researchers to pursue the most practical approach to understanding a problem or discovering an actionable solution.[52] Mixed methods are commonly used to create a deeper understanding of the case through converging qualitative and quantitative data.[52] Pragmatic case study is suited to HSR because its flexibility throughout the research process accommodates complexity, ever-changing systems, and disruptions to research plans.[49,50] Much like case study, pragmatism has been criticized for its flexibility and use when other approaches are seemingly ill-fit.[53,54] Similarly, authors argue that this results from a lack of investigation and proper application rather than a reflection of validity, legitimizing the need for more exploration and conversation among researchers and practitioners.[55]

Conclusion

Although occasionally misunderstood as a less rigourous research methodology,[8] case study research is highly flexible and allows for contextual nuances.[5,6] Its use is valuable when the researcher desires a thorough understanding of a phenomenon or case bound by context.[11] If needed, multiple similar cases can be studied simultaneously, or one case within another.[16,17] There are currently three main approaches to case study,[5,19,24] each with their own definitions of a case, ontological and epistemological paradigms, methodologies, and data collection and analysis procedures.[37]

Individuals' experiences within health systems are influenced heavily by contextual factors, participant experience, and intricate relationships between different organizations and actors.[55] Case study research is well suited for HSR because it can track and examine these complex relationships and systems as they evolve over time.[6,7] It is important that researchers and health leaders using this methodology understand its key tenets and how to conduct a proper case study. Although there are many examples of case study in action, they are often under-reported and, when reported, not rigorously conducted.[9] Thus, decision-makers and health leaders should use these examples with caution. The proper reporting of case studies is necessary to bolster their credibility in HSR literature and provide readers sufficient information to critically assess the methodology. We also call on health leaders who frequently use case studies[56-58] to report them in the primary research literature.

The purpose of this article is to advocate for the continued and advanced use of case study in HSR and to provide literature-based guidance for decision-makers, policy-makers, and health leaders on how to engage in, read, and interpret findings from case study research. As health systems progress and evolve, the application of case study research will continue to increase as researchers and health leaders aim to capture the inherent complexities, nuances, and contextual factors.[7]

ORCID iD

Tiffany Scurr, BAS, MHIS ⬤ https://orcid.org/0000-0002-1132-2940

References

1. Harrison H, Birks M, Franklin R, Mills J. Case study research: foundations and methodological orientations. *Forum Qual Soc Res*. 2017;18(1):19.

2. Peirson L, Ciliska D, Dobbins M, Mowat D. Building capacity for evidence informed decision making in public health: a case study of organizational change. *BMC Public Health*. 2012;12(1):137. doi:10.1186/1471-2458-12-137

3. Edwards N, Barker PM. The importance of context in implementation research. *J Acquir Immune Defic Syndr*. 2014; 67(suppl 2):S157-S162.

4. Milat AJ, King L, Bauman AE, Redman S. The concept of scalability: increasing the scale and potential adoption of health promotion interventions into policy and practice. *Health Prompt Int*. 2013;28(3):285-298.

5. Stake RE. *The Art of Case Study Research*. SAGE; 1995.

6. Vanwynsberghe R, Khan S. Redefining case study. *Int J Qual Methods*. 2007;6(2):80-94. doi:10.1177/160940690700600208

7. Yin RK. Enhancing the quality of case studies in health services research. *Health Serv Res*. 1999; 34(5 pt 2):1209-1224.

8. Streb CK. Exploratory case study. In: Mills A, Durepos G, Wiebe E, eds. *Encyclopedia of Case Study Research*. Sage; 2010;372-373.

9. Hyett N, Kenny A, Dickson-Swift V. Methodology or method? a critical review of qualitative case study reports. *Int J Qual Stud Health Well-being*. 2014;9(1): 23606.

10. Starman AB. The case study as a type of qualitative research. *J Contemp Educ Stud*. 2013;16(1):28-43.

11. Crowe S, Cresswell K, Robertson A, Huby G, Avery A, Sheikh A. The case study approach. *BMC Med Res Methodol*. 2011;11(1):100.

12. Rashid Y, Rashid A, Warraich MA, Sabir SS, Waseem A. Case study method: a step-by-step guide for business researchers. *Int J Qual Methods*. 2019;18:1-13.

13. Brogan P, Hasson F, McIlfatrick S. Lessons learnt: examining the use of case study methodology for nursing research in the context of palliative care. *J Nurs Res*. 2019;24(6):446-459.

14. Heale R, Twycross A. What is a case study?. *Evid Based Nurs*. 2018;21(1):7-8.

15. Fàbregues S, Fetters MD. Fundamentals of case study research in family medicine and community health. *Fam Med Community Health*. 2019;7(2). doi:10.1136/fmch-2018-000074

16. Anderson RA, Crabtree BF, Steele DJ, McDaniel RR Jr. Case study research: the view from complexity science. *Qual Health Res*. 2005;15(5):669-685.

17. Yin RK. *Case Study Research: Design and Methods*. SAGE Publications; 2002.

18. Meyer CB. A case in case study methodology. *Field Method*. 2001;13(4):329-352.

19. Creswell JW, Poth CN. *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. 4th ed. Sage Publications; 2016.

20. Baxter P, Jack S. Qualitative case study methodology: study design and implementation for novice researchers. *Qual Rep*. 2008;13(4):544-559.

21. Patton MQ. Enhancing the quality and credibility of qualitative analysis. *Health Serv Res*. 1999;34(5 pt 2):1189-1208.

22. Yin RK. *Case Study Research*. SAGE Publications; 2014.

23. Stake RE. *Multiple Case Study Analysis*. The Guilford Press; 2006.

24. Merriam SB. *Qualitative Research and Case Study Applications in Education*. Jossey-Bass Publishers; 1998.

25. Merriam SB. *Qualitative Research: A Guide to Design and Implementation*. John Wiley & Sons; 2009.

26. Holloway I, Todres L. The status of method: flexibility, consistency and coherence. *Qual Res*. 2003;3(3):345-357.

27. Guba EG, Lincoln YS. Competing paradigms in qualitative research. In: Densin NK, Lincoln YS, eds. *Handbook of Qualitative Research*. SAGE; 1994:105-117.

28. Mills J, Bonner A, Francis K. The development of constructivist grounded theory. *Int J Qual Methods*. 2006;5(1):25-35. doi:10.1177/160940690600500103

29. Abma TA, Stake RE. Science of the particular: an advocacy of naturalistic case study in health research. *Qual Health Res*. 2014; 24(8):1150-1161.

30. Yin RK. *Case Study Research and Applications: Design and Methods*. SAGE Publications; 2017.

31. Sibbald S, Schouten K, Sedig K, Maskell R, Licskai C. Key characteristics and critical junctures for successful interprofessional networks in healthcare—a case study. *BMC Health Serv Res*. 2020;20(1):700.

32. Paciocco S. *Evaluating the Implementation of a Chronic Obstructive Pulmonary Disease Management Program Using the Consolidated Framework for Implementation Research: A Case Study* [master's thesis]. London: Western University; 2020.

33. van Zelm R, Coeckelberghs E, Sermeus W, Wolthuis A, Bruyneel L, Panella M, Vanhaecht K. A mixed methods multiple case study to evaluate the implementation of a care pathway for colorectal cancer surgery using extended normalization process theory. *BMC Health Serv Res*. 2021;21(1):1-5.

34. Burrows KE, Abelson J, Miller PA, Levine M, Vanstone M. Understanding health professional role integration in complex adaptive systems: a multiple-case study of physician assistants in Ontario, Canada. *BMC Health Serv Res*. 2020;20(1):1-4.

35. Sibbald SL, Ziegler BR, Maskell R, Schouten K. Implementation of interprofessional team-based care: a cross-case analysis. *J Interprof Care*. 2020;12:1-8.

36. Brown PA. A review of the literature on case study research. *Can J New Scholars Educ*. 2008;1(1):1-13.

37. Yazan B. Three approaches to case study methods in education: Yin, Merriam, and Stake. *Qual Report*. 2015;20(2):134-152.

38. Luitel NP, Breuer E, Adhikari A, et al. Process evaluation of a district mental healthcare plan in Nepal: a mixed-methods case study. *BJPsych Open*. 2020;6(4):e77.

39. Barnett S, Jones SC, Caton T, Iverson D, Bennett S, Robinson L. Implementing a virtual community of practice for family physician training: a mixed-methods case study. *J Med Internet Res*. 2014;16(3):e83.

40. Yin RK. *Applications of Case Study Research*. SAGE Publications; 2012.

41. Paxton A, Frost LJ. Using systems thinking to train future leaders in global health. *Glob Public Health*. 2018;13(9):1287-1295.

42. Greenwood M. Modeling change and cultural safety: a case study in northern British Columbia healthcare system transformation. *Healthc Manage Forum*. 2019;32(1):11-14.

43. Caelli K, Ray L, Mill J. Clear as mud: toward greater clarity in generic qualitative research. *Int J Qual Methods*. 2003;2(2):1-3.

44. Houghton C, Casey D, Shaw D, Murphy K. Rigour in qualitative case-study research. *Nurse Res*. 2013;20(4):12-17.

45. Ravenek MJ, Rudman DL. Bridging conceptions of quality in moments of qualitative research. *Int J Qual Methods*. 2013; 12(1):436-456.

46. Tracy SJ. Qualitative quality: eight big-tent criteria for excellent qualitative research. *Qual Inq*. 2010;16(10):837-851.

47. About PCSP. Pragmatic case studies in psychotherapy. Available at: https://pcsp.libraries.rutgers.edu/index.php/pcsp/pages/view/pcspAbout Accessed April 4, 2021.

48. Fishman DB. The pragmatic case study method for creating rigorous and systematic, practitioner-friendly research. *Pragmat Case Stud Psych*. 2013;9(4):403-425.

49. Long KM, McDermott F, Meadows GN. Being pragmatic about healthcare complexity: our experiences applying complexity theory and pragmatism to health services research. *BMC Med*. 2018;16(1):1-9.

50. Barnish MS, Turner S. The value of pragmatic and observational studies in health care and public health. *Pragmat Obs Res*. 2017;8:49.

51. Bothwell LE, Greene JA, Podolsky SH, Jones DS. Assessing the gold standard—lessons from the history of RCTs. *N Engl J Med*. 2016;374(22):2175-2181.

52. Parvaiz GS, Mufti O, Wahab M. Pragmatism for mixed method research at higher education level. *Bus Econ Rev*. 2016; 8(2):67-79.

53. Everest T. Resolving the qualitative-quantitative debate in healthcare research. *Med Pract Rev*. 2014;5(1):6-15.

54. Kaushik V, Walsh CA. Pragmatism as a research paradigm and its implications for social work research. *Soc Sci*. 2019;8(9):255.

55. Gilson L, ed. *Health Policy and Systems Research: a Methodology Reader*. World Health Organization; 2012. Available at: https://www.who.int/alliance-hpsr/alliancehpsr_reader.pdf Accessed February 3, 2021.

56. Baker GR, Fancott C, Judd M, O'Connor P. Expanding patient engagement in quality improvement and health system redesign: three Canadian case studies. *Healthc Manag Forum*. 2016;29(5): 176-182.

57. Boyer RA. Indigenous healthcare: caterpillars to butterflies, case study supporting transformation. *Healthc Manag Forum*. 2019; 32(1);40-43.

58. Dyck J. Introduction to case studies on integration. *Healthc Q*. 2013;13:55.