Making Sense of Mixed Method Design in Health Research: Reconciliation of the Findings in a Study of the Doctors' Decision Making Process in Engaging Male Patients in Health Checks

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ABSTRACT

Mixed method design is often noted as a methodology capitalizing on the advantage of in-depth study in qualitative approaches and the power of generalization in quantitative approaches. However, researchers may face difficulty in reconciling the findings of the two if the results are contradicting from each other. This paper aims to illustrate the findings of grounded theory methods (in phase 1) complementing the quantitative survey (in phase 2) in providing a more complete picture of doctors' decision making process in engaging male patients in health checks. In phase 1, the important determinants in the decision making process were perceived receptivity of male patients, perceived importance of health checks, perceived personal competency in health checks and external barriers. However, in phase 2, the importance of external barriers and perceived competency were deemphasized. The findings make sense if we are aware of the individualistic nature of qualitative approach and normative nature of quantitative approach.

Introduction

Mixed methods research has gain popularity since late 1950s. Essentially, it is an approach where the researcher combines both qualitative methods and quantitative methods in an attempt to understand a social or psychological phenomenon of interest. Many argued that mixed methods research is invaluable because it has the advantage of capitalizing on the in-depth study of qualitative methods and the power of generalization in quantitative methods to understand complex human world. Mixing quantitative methods and qualitative methods allows some forms of triangulation and contributes to the better understanding of human phenomena. Some use mixed methods as a form of exploratory design where qualitative approach is used to explore early concepts in order to pave the design of instruments for the subsequent quantitative approach. Others may use it as an explanatory design where qualitative approach is used to obtain an understanding to the collected quantitative data (Creswell, 2009). Because of such flexibility, and its practical contributions to the solution of problems, mixed methods design is increasingly used by researchers working in applied sciences and professionals such as health care.

Mixed methods design, however, should not be seen as a mere mixing of methods in terms of techniques of data collection and analysis, but should warrant a clear statement of its own assumptions underpinning the design. (Bryman, 1984; Sale, 2002; Biesta, 2010) Clarifying the assumptions is important because the interpretation of the results is anchored at the assumptions. The results are supposed to be inferred to a wider population outside the initial research settings within the set boundaries. The boundaries are obviously demarcated by the

assumptions laid down prior to research. Addressing these assumptions is particularly challenging in mixed methods design because quantitative and qualitative approaches have obvious contradicting assumptions. These assumptions are basically the researchers' worldview of what constitutes truth (the ontology) and what can constitute knowledge (the epistemology). Most qualitative researchers are comfortable to adopt constructivist position as oppose to quantitative researchers adopting post-positivist position. In a mixed methods study, there should not be two contradicting assumptions, which render interpretation of the results difficult because the interpretations may swing from one anchoring point to the other while making claims. Fortunately, the argument is clearer now, because many mixed methods researchers are happy to adopt pragmatism as opposed to the traditional assumptions of constructivism and post-positivism. The essence of pragmatism is the purpose of the research and its practicality (Tashakkori & Teddlie, 1998; Nastasi & Hitchcock & Brown, 2010; Biesta, 2010), the issues that are not often raised in the discussion of traditional dimensions of epistemology and ontology (Tashakkori & Teddlie, 1998; Biesta, 2010). In pragmatism, knowledge is regarded both as constructed and as a function of a people environment interaction. Knowledge is meaningful if there is a practical consequence to it. (Biesta, 2010; Greene, 2010) Therefore, mixed methods design is a valid methodology if the study purpose is clear and the practicality of generated knowledge is fulfilled. The challenge is to clearly state the purpose of the study and acknowledging the fundamental assumptions (hence the knowledge generated) of qualitative and quantitative approaches –qualitative approach is individualistic where the findings are rich in explaining a phenomenon of interest in *an individual context* while quantitative approach is normative where the findings represent an *average* pattern of a phenomenon of interest in a population. The ignorance of these assumptions leads to wrong interpretation of study findings and impracticality of the knowledge generated. Also, because of this ignorance, researchers often find the reconciliation of the study findings a challenge.

In this paper, we attempt to illustrate, with an example of the study of the doctors' decision making process in engaging male patients in health checks, the importance of having a clear statement of purpose and assumptions underpinning quantitative and qualitative research. The example also illustrates the logic reconciliation of differences in study findings from the two methods.

The background of the study of doctors' decision making process in engaging male patients in health checks

The health status of men is consistently shown to be disadvantaged compared to women's health. (WHO, 2011; Tong & Low & Ng, 2011) Men have a shorter life expectancy at birth and a higher mortality rate in almost all non-sex specific diseases. The main causes of death in men are noncommunicable diseases and injuries. Many of these causes of death are lifestyle related, such as smoking, unhealthy diet, high consumption of alcohol, risk-taking behaviours and violence, and are preventable or amenable to early intervention. (White & Cash, 2004; White & Holmes, 2006; Tong & Ho & Tan, 2011) Furthermore, many male-specific disorders which adversely impact men's quality of life such as erectile dysfunction, premature ejaculation, and androgen deficiency syndrome go under-reported to health care providers. (Trueman et al, 1999; Ng et al, 2007; Shabsign et al, 2010) Silent diseases such as hypertension, hypercholesterolaemia and diabetes are also under-detected. Hence, improving the health status of men should be an important agenda in health care delivery.

Strategies should target both men in the community and improving health care delivery tailored to their needs. (Hall, 2003; Bank, 2008) The ultimate goal is to engage more men in health care. Primary care is identified as the key player. Doctors at the primary care level are

encouraged to be proactive in raising the issue of preventive care and health check-ups for discussion during clinic encounters with men. (Hall, 2003) However, despite having guidelines and recommendations to improve our preventive health services for men, we are yet to grasp the appropriate strategies to implement these guidelines to assist primary care doctors. Literature informing effective strategies is lacking. Therefore, we need to explore the current process of care and develop a substantive theoretical framework covering the practice behaviour of doctors in relation to preventive men's health care, before recommending appropriate strategies.

Hence, the purpose of the study was to develop an explanatory model of the process of how primary care doctors (PCDs) make the decision to undertake men's health check-ups in Malaysia. Essentially there are two specific objectives to this. First, it aims to identify the determinants and how they would interact with each other in the process of *individual* doctors deciding whether to initiate a health check-up for men. The second specific objective aims to quantify the *average* impact of each determinant, and rank its a*verage* significance on the decision-making processes among Malaysian PCDs. Identifying the common and important determinants allows a more targeted development of an intervention program aimed at improving the quality of men's health check-ups in primary care settings.

The rationale and approach of mixed methods design

Since nothing has yet been written about such a substantive theoretical framework, we have embarked on an exploratory approach with a sequential mixed methods design. In sequential exploratory mixed methods design, the first phase is a qualitative approach, followed by a quantitative approach in second phase. (Creswell, 2009)

The first phase is to fulfil the first objective –to explore the issue with an approach that does not require a pre-determined set of hypotheses. The qualitative approach, which allows the inductive development of an empirically based theory, (Patton, 2002; Creswell, 2009) is appropriate. In contrast, the quantitative stage requires an *a priori* theory as a starting point. There is no clear empirical data to provide substantive concepts for the development of the hypotheses or theories for the quantitative approach. Therefore, the first part of the objective necessitates a qualitative approach. Its findings will direct the design of a questionnaire and conceptual framework in the second phase of the study, which in turn utilises a quantitative approach to achieve the second objective. Further, it is important to understand all important concepts in determining the practice behaviour of PCDs acting at individual level. This is best explored using qualitative approach.

Grounded theory methods (GTM) were chosen as the methodological process that would achieve the objective of developing a useful theory (Glaser & Strauss 1967) to base an intervention on. GTM provides systematic guidelines on data collection, analysis and producing an inductively derived theoretical framework. (Charmaz, 2006) It has its basis in symbolic interactionism (Charmaz, 2006) which assumes humans act on the meaning they assign to an object (people or things) they interact with. (Benzies & Allen, 2001) Symbolic interactionism arises from the earlier thought of pragmatism. (Crotty, 1998) Given the overarching issue being studied—decision making as a result of a series of actions based on how doctors perceive or assign meanings to the issues at hand—this theoretical underpinning suits the study of social psychological processes (Charmaz, 2006) within the context of PCDs initiating men's health check-ups. The procedures in detail have been published. (Tong et al, 2011) In brief, 52 primary care doctors participated in in-depth interviews (14 doctors) and focus group discussions (8 focus groups). The interviews were recorded and transcribed

verbatim. Line by line coding of the initial three transcripts captured early concepts of the decision making processes. The early concepts directed the subsequent sampling of participants. The concepts were consolidated, modified and adjusted through constant comparative methods, memoing and diagram sketching. Selective coding and theoretical coding were employed towards the end of analysis to construct the substantive theoretical model (Figure 2).

The second specific objective demands quantifying the *average* impact of each determinant and discerning its significance on doctors' decisions to undertake health check-ups for their male patients. This is to inform an appropriate strategy that suits most PCDs in Malaysia. The impact is examined from two perspectives: 1) the *average* impact of each determinant on doctors' decision making in undertaking men's health checks, and 2) the *prevalence* of the determinants and hence their relevance to Malaysian PCDs. It is expected that there will be a number of related determinants. The process of quantifying the impact of each determinant is expected to require a multivariate analysis. (Cohen et al, 2003) By quantifying the average impacts, it should be possible to rank the determinants according to their importance in the sample (Keith, 2006) of PCDs, and thereby direct the efforts of improving the service delivery of men's health check-ups.

It is clear that the deterministic nature and need to quantify the relationships of phase II in this project requires a quantitative design.(Bryman, 2008, Creswell, 2009) With an *a priori* theoretical framework developed from Phase I, it permits the use of regression analysis to identify the significant determinants (explanatory variables) on the doctors' intentions and examines the relationship between them. The procedures in detail have been published. (Tong, 2013) In its philosophy, quantitative methodology tries to establish an "average" for the parameters measured, and hence the findings aim to be generalisable (Creswell, 2009) to the Malaysian PCDs. This fits well with the purpose and objective of phase II.

The discussion so far has put forward the utility of developing a practical theoretical framework to guide intervention as the underlying justification of a mixed methods design. Consistent with sequential exploratory mixed method designs, (Creswell, 2009) the initial 'mixing' occurs during the phase II development where findings from phase I will inform both the theoretical framework and scale development in phase II (Figure 1). The subsequent 'mixing' occurs during the interpretation of the findings. The reconciliation of the findings can easily discussed as the findings in phase I operate at individual level and the findings in phase II represents an average pattern which operates at population levels.

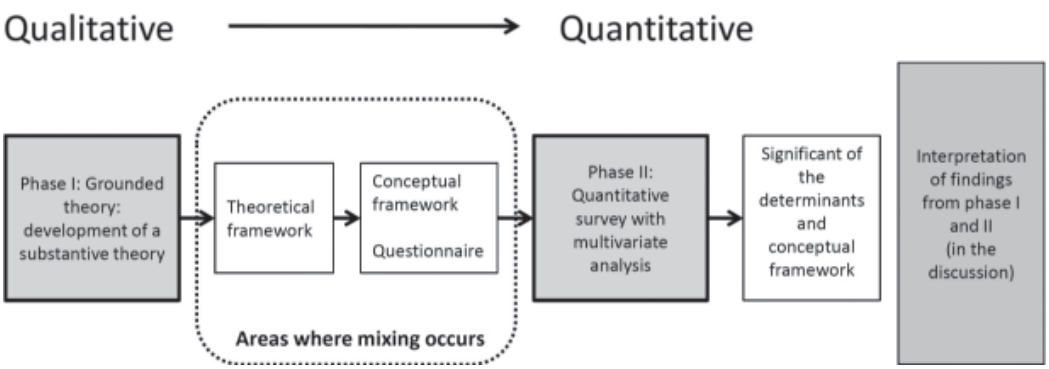

Figure 1. The overall design of sequential exploratory mixed methods

The results of the study: a brief account

Phase 1
From phase I, a theoretical framework was constructed. In engaging male patients in health check-ups, PCDs were required to weigh many considerations before deciding to proceed. The intention to initiate health check-ups started with a mental act of balancing the perceived degree of male patients' receptivity with the importance of a range of potential medical issues facing men (Figure 2).

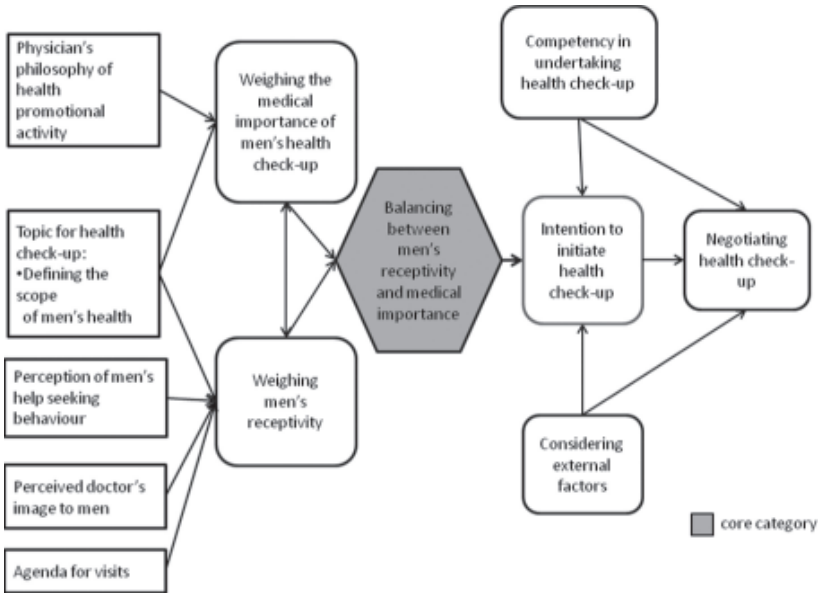

Figure 2. Substantive theoretical model of the doctor's decision making to engage men in health check-ups.

The level of receptivity of male patients to health check-ups was determined by doctors based on: their perception of their image in the eyes of male patients, the agenda for visits, their perception of men's help-seeking behaviour, and the topic of men's health at hand. The importance of medical issues, which reflected the attitude of PCDs towards areas of men's health check-ups, was determined by doctors based mainly on two factors: their philosophical stance on health promotional activities and their understanding of men's health issues. The PCDs' understanding of men's health determined the importance they attached to men's health checks and the perception of their patients' receptivity to health check-ups. However, even with a strong intention to initiate health check-ups, the actualization of health check-ups could be modified by perceived external factors and doctors' personal competency in negotiating health check-ups with patients. The external factors included time constraint, network system to support care delivery and cost constraint.

In a nutshell, the determinants were many and complex. Each of the concepts was important in its own way. Some were more important than the other in one PCD's decision making process and others were important for other PCD.

Phase II
In phase II, five areas of men's health were assessed using the framework from phase I. These were cardiovascular health, sexual health, psychosocial health, smoking and colon cancer

screening. Each concept was measured using questionnaires designed from the themes of phase I. The survey was carried out among randomly selected PCDs in Selangor/Kuala Lumpur and Kelantan. 198 PCDs participated representing a response rate of 70.4%. From the regression analyses, the significant determinants were the concept of receptivity and attitudes to health check-up. (Table 1) All the other determinants were deemphasized as shown by smaller β values.

Discussion: Making sense of the results

The results from the two methods demonstrated similarities and differences between each others. Although the concept of receptivity and medical importance (as denoted by attitude) was highlighted in the quantitative regression analysis, the other concepts indentified from GTM did not appear to be significantly associated with doctor's decision to undertake health check-ups. Perception of men's health seeking behaviour, perceived doctor's image, competency in undertaking health check-ups and many external factors were not significant in predicting the intention to initiate health check-ups.

To account for the differences in the findings from the two methods, we have to interpret them from the initial assumptions we have put up. As argued above, the fundamental assumptions are individualistic nature of qualitative study in phase I and normative nature of quantitative study in phase II. From an individual doctor's perspective, any determinant could be the key factors determining his intention to undertake health check-ups. For example, cost-constraints (as an external factor) could the most significant factor for a primary care doctors and perceived medical importance could be the other factors for another doctor. On the other hand, the quantitative methods help in explaining an average pattern seen for the determinants in influencing PCDs' decision making process. Because of the random selection of large group of PCDs and summation of their responses to the questionnaire while performing quantitative analyses, the results represent the normative pattern seen in the sampled participants. Looking from a different perspective, the results never meant to represent any individual doctor's opinion – it is an average of all doctors' opinion. Therefore, although the results from the two methods are different, they are not contradicting because they explain different things. The results are easily reconciled by examining the original purpose of choosing mixed methods i.e. the qualitative methods in exploring the concept at individual level and quantitative methods to measure the average impact of each determinant on the doctors' intention to undertake health check-ups for men. The original purpose fits the assumption of the respective methods as argued above.

The practicality of the results is also easily put forward after taking the consideration of the assumptions and purpose discussed above. In explaining an individual doctor's decision making process, we have to tap on the results of qualitative methods. By using the substantive theoretical model on an individual doctor, we can easily map out the significant determinants for the doctor. Implementing changes to the identified determinants would likely yield changes in his intention to undertake health check-up for men. On the other hand, the average patterns of determinants as in quantitative results help us in focusing on the determinants that have the most important impact for most PCDs. This information would be useful for policy makers and health system designers. They would be interested to focus on a strategy that works for most PCDs rather on individual doctor.

Bringing the assumptions, purpose and practicality together, it is not difficult to make sense of the results, whether or not they are the same. This embraces the philosophy of pragmatism in mixed method design.

Table 1. Summary statistics for usefulness of the models in explaining doctors' intention to initiate health check-ups and their significant determinants

Topic of men's health check-ups	Contexts of consultation	R^2 / Nagelkerke R^2	Significant determinants arranging, from the left to right, in descending order of importance							
			β		β		B		β	
Cardiovascular risk screening	Acute minor complaint	0.293	Receptivity‡	0.331	Male patients' HSB†	-0.227	Male patients' expectation	0.193	Referral network	-0.152
	Follow-up	0.276	Receptivity‡	0.267	Male patients' HSB†	-0.237	Attitudes towards HCK‖	0.195	Male patients' comfort	0.168
	Health check-up	0.252	Attitudes§	0.231	Receptivity‡	0.183				
Asking about sexual dysfunction	Acute minor complaint	0.132	Receptivity‡	0.237						
	Follow-up	0.316	Receptivity‡	0.806	Competency¶	0.482	Male patients' HSB†	-0.413	Cost constraint	-0.399
	Health check-up	0.205	Competency¶	0.383	Receptivity‡	0.288				
Psychosocial health assessment	Acute minor complaint	0.219	Receptivity‡	0.312	Attitudes§	0.199				
	Follow-up	0.261	Attitudes§	0.303	Receptivity‡	0.224				
	Health check-up	0.247	Attitudes§	0.346						
Asking about smoking habit	Acute minor complaint	0.245	Receptivity‡	0.651	Male patients' HSB†	-0.217				
	Follow-up	0.258	Receptivity‡	0.389	Referral network	0.353	Attitudes towards HCK‖	0.292	Clinic system	-0.262
	Health check-up	0.339	Receptivity‡	0.720	Referral network	0.456	Attitudes§	0.276		
Discussing colon cancer screening	Acute minor complaint	0.078*	Receptivity‡	0.198						
	Follow-up	0.097*	–	–						
	Health check-up	0.210	Competency¶	0.415	Referral network	-0.214				

* $p > 0.05$. ‡ Perceptions of male patients' receptivity to the assessment in the corresponding context. § Attitudes towards the medical importance of proactive assessment.
† Perceptions of male patient's help-seeking behaviour in relation to health check-ups. ‖ Attitudes towards medical importance of health check-ups. ¶ Perceived personal competency in the management or assessment.

Conclusion

Mixed methods approach is not simply mixing of quantitative and qualitative methods, but it has its own philosophical underpinnings –pragmatism. Research for the purpose of practicality is the essence of pragmatism. The other related assumption that has to be acknowledged is the individualistic nature of qualitative methods and normative nature of quantitative methods. The mixed methods should not be seen as a way to make-up for the weakness of their counterpart because the two different assumptions are not weaknesses but inherent nature of the methods. Knowing these assumptions, the results are easily reconciled. As health care providers, mixed methods approach potentially offers us the way to explaining a phenomenon of interest both from an individual's perspective and from a population perspective.

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