

## Advocating mixed-methods approaches in health research

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### Review Article

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### Abstract

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This methods paper provides researchers in Nepal with a broad overview of the practical and philosophical aspects of mixed-methods research. The three authors have a wide-ranging expertise in planning and conducting mixed-methods studies. The paper outlines the different paradigms or philosophies underlying quantitative and qualitative methods and some of the on-going debates about mixed-methods. The paper further highlights a number of practical issues, such as (a) the particular mix and order of quantitative and qualitative methods; (b) the way of integrating methods from different philosophical stance;

and (c) how to synthesise mixed-methods findings.

**Keywords:** Quantitative research; Qualitative research; Mixed Methods Research

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#### Background

With the growing number of health studies in Nepal using more than one research methods, this paper offers insight into the 'pragmatic paradigm' or, 'mixed-methods approach' as it is more commonly known. In mixed-methods studies a number of quantitative and qualitative methods can be combined within one research project. Mixed-methods may be used at any stage of research from the beginning including defining the research question to the end stage to help determine the generalisability of the findings<sup>1</sup>. The approach is not new in high-income countries<sup>2-4</sup>, where it has a growing support in the health services and health care research field<sup>1,5</sup>. This paper provides an overview of the development and use of mixed-methods research as a paradigmatic framework and draw lessons for the use of mixed-methods in health services and public health research.

## Methodology & Methods in healthcare research

The terms methodology and methods are sometimes used interchangeably, but each has a distinct meaning.

**Methodology** is the theory, sometimes referred to as the paradigm, behind the technical tools or **methods** which are used to gather and analyse information<sup>6</sup>. This distinction between methodology and methods is important in our understanding of mixed-methods.

Until recently, two distinct research methodologies were recognised. The positivist paradigm is based on objectivism, rational and scientific assumptions that nature is an ordered and complex phenomenon best understood by reducing it to basic quantitative parts<sup>7</sup>, and epidemiology fits well into this paradigm. An example of this is the quantitative method of the collection of data on the weight of newborn babies, or the number of adults who have bowel cancer Kathmandu Valley in 2015.

Quantitative research begins with predetermined, instrument-based questions, designed to test a priori hypotheses. Whilst qualitative methods typically involve a naturalistic or holistic collection of data through interviews or observation<sup>8</sup>.

Out of dissatisfaction with this established approach, a second methodology called the constructivist or naturalistic paradigm emerged<sup>6</sup>. This paradigm is based on social constructions and relativism and contends that reality is shaped by the individual and the culture rather than being absolute<sup>9</sup>. The example here would be the researcher might want to find out not only the baby's weight but try through a qualitative approach to understand how and why this was affected by behavioural, social or cultural factors.

From the 'incompatibility' of both these methodologies came an exploration of alternatives and gradually new paradigms, based on post-modernism and a 'compatibility' emerged<sup>10-13</sup>. The most prominent is pragmatism or mixed-methods. This creates a bridge between qualitative and quantitative research, and is rapidly becoming the dominant methodology in the twenty-first century<sup>7</sup>.

It is seen as 'a compatibility thesis', a more 'applied' philosophy, and one that considers the research question more important than the method: the so-called 'dictatorship of the question'<sup>14</sup>. It embraces the idea of 'methodological pluralism'<sup>15</sup>, and it rejects the idea of having to make a forced choice between qualitative and quantitative methods and the use of metaphysical concepts such as 'truth' and 'reality'. Mertens reasons that the questions and approach come first, and the applied paradigm is a framework used to clarify the assumptions about ethics, knowledge and systematic enquiry<sup>16</sup>. It is important to note that although widely adopted, pragmatism and the use of mixed-methods, has been criticised because of the perception that anything goes in the field<sup>17</sup>.

Interesting parallels appear when this is applied to the field of maternal and child health (MCH). The use of mixed-methods brings together elements that may be transferable

## Advocating mixed-methods approaches

into MCH knowledge: being able to describe reality in its complex state: holistic, cultural, political, economic and cultural rather than reduced to absolutes<sup>16</sup>. This can support the way we manage the 'whole woman' or 'unique normality' and moves away from the simplistic elements of reduction, for instance, dividing labour into three stages. Overall, this fits well with the development of evidence-based care and a move away from the assumption that there is a straightforward relationship between cause and effect, especially with regards the physiology of birth<sup>9,18</sup>.

### Mixed-methods: how and why

Mixed-methods approaches have become more popular over the past two decades, for two key reasons: First to address research questions that a single method is unable to do: quantitative verifies theory, or addresses the 'how many' question while qualitative generates theory or addresses the 'why' question<sup>7</sup>. Mixed-methods combines both approaches, for example, answers the quantitative how many women use the contraceptive pill question while qualitative methods address the why questions: why do some women use the pill and others use other forms of contraceptives? Secondly, the use of mixed-methods provides stronger inference and offset the disadvantages of a single method; and the results of each can validate each other.

Mixed-methods refers to how the various combinations of research methods are used at different stages of a study<sup>19</sup>. These stages can be at the same time, or carried out in a linear fashion. Table 1 summarises how qualitative and quantitative methods can be used in combination. It is useful and important to distinguish between 'mixed-methods' and 'multi-methods' studies. Using mixed-methods requires the integration, mixing, or linkage between the methods and their analyses, not just that more than one method is being used within the same study. According to Cresswell and colleagues<sup>20</sup> its key strength lies in combining both qualitative and quantitative research provides a better understanding of a research problem than either research approach on its own.

**Table 1: Ways of combining methods**

Sequence of Methods	Example
Qualitative before quantitative	Use focus groups (qualitative) to establish the questions and question order for large-survey questionnaire (quantitative).
Quantitative before qualitative	Study of patient records (quantitative) to find a correlation between treatment and alcohol use in women over 30 and use interviews (qualitative) to find out why.
Quantitative & qualitative in parallel	Questionnaire study (quantitative) to establish how many pregnant women smoke and interview (qualitative) a sub-sample of these women to find out what would help to smoke less.

The important point of these different sequences is to use the methods best suited to answer the overall research question, i.e. back to the dictatorship of the question.<sup>21</sup> As examples, Mumtaz and Salway used a large scale quantitative survey and detailed ethnography to examine patterns of women's mobility and their relationship with antenatal care provision in Pakistan<sup>22</sup>. Pitchforth and colleagues used a mixed-methods qualitative approach that involved ethnographic observations, questionnaires for demographic data collections and semi-structured interviews with staff and patients as part of a larger project examining access to emergency obstetric care in Bangladesh<sup>23</sup>.

Mixed-methods studies are not necessarily limited to two methods, for example, Pitchforth et al. (2006) used a mixed-methods qualitative approach that involved: (a) ethnographic observations; (b) questionnaires for demographic data collections; and (c) semi-structured interviews with staff and patients as part of a larger project examining access to emergency obstetric care in Bangladesh<sup>23</sup>. Mixed-methods would also appear to fit well with primary care research where the questions can often be more complex than in an acute care setting<sup>24</sup>.

There are several good reasons for conducting mixed-methods research: (1) triangulation; (2) complementarily; (3) development; (4) initiation; and (5) expansion.<sup>25-26</sup>

Triangulation is used when the researcher seeks corroboration between: (a) sources; (b) data collection methods; (c) researchers and disciplines; and (d) quantitative and qualitative data analyses<sup>27-28</sup>.

Complementarily refers to using one method to elaborate, expand or clarify the results of another. We can also use one method to help develop another, for example, focus groups to establish the questions for a quantitative questionnaire. Initiation seeks the discovery of paradox and contradiction, or recasting questions or results from one method, using another; and expansion refers to extending the breadth and range of study by using more than one method at the same time.

### Strengths of mixed-methods

By combining methods the researcher can gain insight into the problem from different perspectives and is able to answer broader and more complex health questions. Using more than one method through triangulation of results, can help corroborate or confirm the findings, or offer a how many answer at the same time as a why one<sup>29</sup> For example, adding qualitative interviews to a quantitative questionnaire can answer questions (what is x) which the statistics highlight (how many x)<sup>30</sup>. When findings are corroborated, or support each other across different approaches, then there is more confidence in the conclusions. When the results conflict, the researcher then has more information available and can modify interpretation and conclusions<sup>29</sup>.

This means that, in order to make best use of mixed-methods, the researcher must have a good understanding of the strengths and weaknesses of both qualitative and quantitative research<sup>31</sup>. The advantage of this is that the

### Advocating mixed-methods approaches

researcher becomes open to a broad range of research methods and can seek to answer a wider range of research questions. The integration of different types of methods has become acceptable in health services research as the strength of combining data from quantitative and qualitative sources becomes more apparent<sup>6</sup>. Its strength lies in the reduced bias and increased validity that comes through different approaches to the subject, a thoroughness of approaching a subject from different angles. The results can be therefore more persuasive, as each method has its own strength neither quantitative nor qualitative methods is all encompassing, i.e. even its area of greatest strength each method can be enhanced by triangulation with other methods. When the results conflict, the researcher then has more information and can modify interpretation and conclusions<sup>29</sup>.

### Weaknesses of mixed-methods

As with any method, there are weaknesses in a mixed-methods approach<sup>6</sup>. One key weakness of a mixed-methods approach is that one divides limited resources, especially time and money among different methods, or to do it well a mixed-methods approach is more expensive and time consuming than using a single method. This opportunity costs means running each methods to a lesser level or it requires more resources to both methods well. In addition, work can be divided between academic disciplines as diverse as epidemiology and public health. This can lead to qualitative, quantitative researchers working together; however these disciplines operate with a different underlying philosophy and this can pose challenges in the interpretation and analysis<sup>6</sup>.

As mentioned above one weakness of a mixed-methods approach is that it divides limited resources. Thus using mixed-methods may result in a lost opportunity to conduct one large quantitative study or one more detailed qualitative study examining interviewees in further detail or conducting a deeper exploration of the topic<sup>29</sup>. Conducting a questionnaire study in conjunction with face-to-face interviews in a sub-sample one may end up with a smaller sample in the questionnaire or a lower response rate in the questionnaire study as some of the funding is diverted to the qualitative part of the study.

A further challenge of mixed-methods limiting its application is in integration. Integration is the defining feature of mixed methods but often poorly achieved or reported. If done well quantitative and qualitative analyses are integrated to become interdependent in reaching a common theoretical or research goal, thereby producing findings that are greater than the sum of the parts.<sup>32</sup>

Practical and philosophical difficulties may have to be overcome to achieve integration. Different research methods are affiliated with different approaches to research which can operate with a different underlying philosophy and associated assumptions about the topic, the data collection, analysis and interpretation. Integration also requires a range of skills and resources which are not always

available.

**Data analysis**

Once the component studies in a mixed-methods approach are completed, there is a challenge in how to pull them together to in a comprehensive way and address the overarching themes.

There are several practical issues relating to combining data, these may include: how to reduce and manage large volumes of data; how to facilitate the combining of them, for example which variables to focus on in the analysis. As mixed methods approach is relatively new researchers have had the freedom to experiment and influence combinations and techniques- and as a result, have become less rigid in their approach to analysis<sup>33</sup>. Recently, Fakis and colleagues used quantitative methods to analyse qualitative data interviews and concluded that complex qualitative information would benefit from further development of advanced statistical modeling methods suited to the data<sup>34</sup>.

Dixon-Woods and colleagues reviewed possible methods for synthesising qualitative and quantitative evidence and developed a framework of approaches<sup>35</sup>. It is now acceptable to use numeric techniques to analyse the vast amounts of qualitative data and narrative techniques to describe or explain quantitative data. New nomenclature has been devised: ‘quantitise’ refers to dealing with qualitative data in a quantitative manner and ‘qualitise’ refers to dealing with quantitative data in a qualitative manner<sup>35</sup>. Clearly, both qualitative and quantitative data individually need to be analysed in the most appropriate way and the research team must have the expertise to do this<sup>36</sup>.

**Pulling it all together: Triangulation and Thematic Synthesis**

One way to address the bringing together of qualitative and quantitative data is to use an explanatory framework<sup>27</sup>. This follows a thematic synthesis process which entails taking the results of the component studies and generating new explanations and theory<sup>37-38</sup>. The accurate reporting of the use of mixed-methods and where and how integration is achieved is crucial in high quality research.

**Stage 1:** the base of the pyramid illustrates the foundation of the synthesis, the data collected and the analysis drawn from the component studies. This results in a large volume of information for analysis and write-up. These data can then be validated by categorising, content (thematic) analysis and concurrent triangulation<sup>39</sup>.

**Stage 2:** shows how the data are re-constructed using thematic analysis to re-categorise the data. This can be done by reading through the results and analysis and coding emerging themes, and going back to the component studies to test new themes in each.

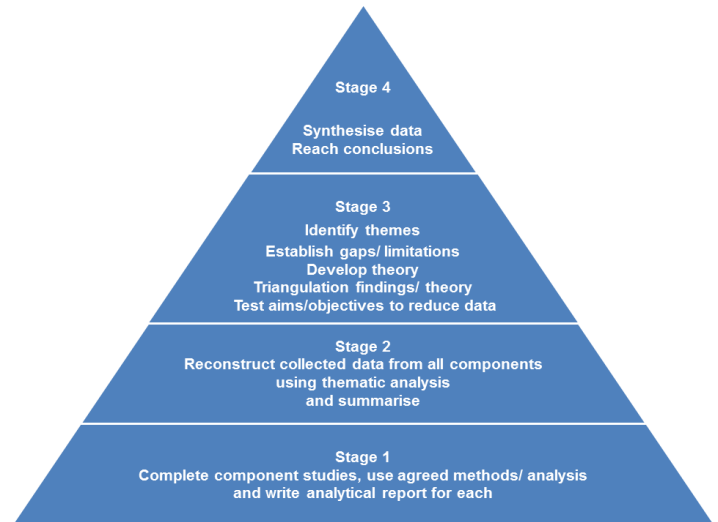
**Stage 3:** triangulation can be used in various ways. First, the developed themes should be re-checked and retested, (this is called inter-investigator triangulation). Secondly, the aims and objectives of the overall study should be reviewed

**Advocating mixed-methods approaches**

against the themes and analysed to establish how well objectives. From these theme tables the overall bulk of the data can be reduced further.

**Stage 4:** This leads to emergence of the overall explanatory and theoretical themes from which conclusions and recommendations are reached.

**Figure 1: Explanatory Framework for Analysis.**



**Conclusion**

Traditionally, the aims of qualitative and quantitative research were sometimes regarded as being opposed, with the more purist proponents of each method claiming their approach to be better and a need to retain the different perspectives. Nonetheless, we have moved to a point where there is a broad recognition that both are necessary to explore the range of phenomena in healthcare and each method addresses another question or the same question differently. We, in line with a growing number of health researchers, argue that such antagonism or competition is negative and destructive and not conducive to good collaborative working. It also fails to recognise the unique contribution each methodological approach can make to our understanding of health in the wider social environment.

The challenges to conducting and maintaining high quality research using mixed methods are outlined in this paper. Nonetheless, the authors support the view that the sum of the parts when qualitative and quantitative methods are brought together is greater than either alone. The approach enables researchers with diverse expertise to work together in order to advance the evidence-base for practice. We hope that the guidance in this paper will encourage researchers to use the approach.

**Conflict of interest:**

None



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