

## REVIEW

# Mixed Methodology of Scientific Research in Healthcare

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## ABSTRACT

**Background:** Scientific research is usually classified as quantitative or qualitative. However, methodologists are increasingly emphasizing the integration of qualitative and quantitative data as the center of mixed methods (mix methodologies). Mixed research method implies the use of different research methods, ie. quantitative and qualitative methods in one study. **Objective:** The aim of this review paper is to present the purpose of using a mixed methodology in health research. **Methods:** The relevant articles were searched from online data sources including PubMed and Google Scholar. **Results:** This approach to the use of mixed methods creates opportunities for a deeper study of various problems. The purpose of using mixed research methods is to obtain valid answers to research questions, however the researcher may still have different reasons or purposes for which he wants to strengthen the research study and its conclusions by applying mixed methods. The use of mixed scientific methodology is widely used in the field of health outcomes and should not be limited to a closed list of possible methodological options. **Conclusion:** Recently, there has been an increase in the number of scientific studies in healthcare that use mixed research methods. The advantage of applying this scientific method is that through the triangulation of data obtained by different (quantitative / qualitative) approaches, we get a deeper and more complete picture of the phenomenon in health care that we observe.

**Keywords:** mixed methods, methodology, health science.

## 1. BACKGROUND

In health science research, there is a priority to develop new methodologies to improve the quality and scientific strength of data leading to an extraordinary increase in methodological diversity. This diversity reflects the nature of public health problems, such as differences between populations, age groups, ethnic groups and cultures, poor adherence to treatments considered effective, behavioral factors contributing to disability and health, and translational needs for health research. Diversity also signals a growing acceptance of qualitative and social science research, the formation of interdisciplinary research teams, and the use of multilevel approaches to research complex health issues such as patient attitudes and cultural and social models of disease and health (1).

## 2. OBJECTIVE

The aim of this review paper is to present the purpose of using a mixed methodology in health research.

## 3. METHODS

The relevant articles were searched from online data sources including PubMed and Google Scholar.

## 4. RESULTS

The retrieved articles were reviewed by the authors and the results are presented along with the relevant discussion

### 4.1. MIXED METHODOLOGY

Scientific research is usually classified as quantitative or qualitative. However, methodologists are increasingly emphasizing the integration of qualitative and quantitative data as the center of mixed methods (mix methodologies). Inte-

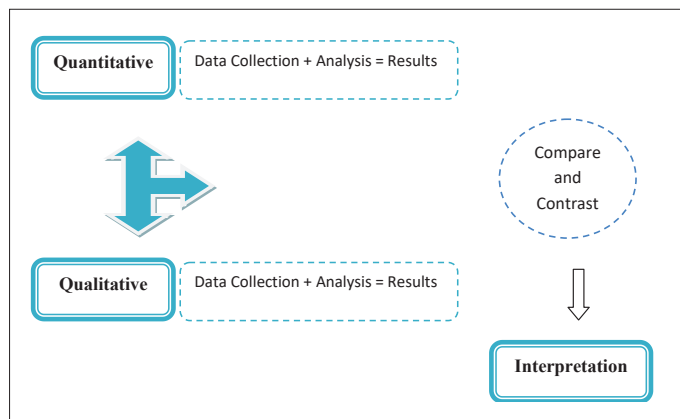


Figure 1. A mixed method data collection approach using both research techniques

gration is a deliberate process by which the researcher combines quantitative and qualitative approaches in the study. Quantitative and qualitative data then become interdependent in solving questions and hypotheses. Mixed research method implies the use of different research methods, quantitative and qualitative methods in one study (2,3). Research on mixed methods should be distinguished from multi-method research (method-combination) in which either multiple qualitative approaches or only multiple quantitative approaches are combined (4).

The most accepted definition of a mixed research method is that it is a research in which a researcher or team of researchers combines elements of a qualitative and quantitative approach to research (use of qualitative and quantitative perspectives, data collection, analysis, inference techniques) to understand and support research. As we see in the definition, the use of both quantitative and qualitative methods in a single study (or series of related studies) is crucial, unlike the use of combined methods that combine two or more quantitative or two or more qualitative research methods (2,4).

The basic premise of using mixed research methods is that some research issues can be addressed more comprehensively than using either quantitative or qualitative methods. The issues that benefit most from the design of mixed methods tend to be broad and complex, with multiple aspects that each can have. Mixed research methods can exploit the strengths and weaknesses of both approaches and can be particularly useful when addressing complex, multifaceted issues such as health service interventions and living with chronic diseases (2). This approach to the use of mixed methods creates opportunities for a deeper study of various problems (5).

**4.2. PURPOSE OF USING MIXED RESEARCH**

The purpose of using mixed research

methods is to obtain valid answers to research questions, however the researcher may still have different reasons or purposes for which he wants to strengthen the research study and its conclusions by applying mixed methods. The purpose classification of mixed research methods was first introduced in 1989 by Greene, Caracelli, and Graham, based on an analysis of published studies of mixed methods. This classification is still used and we have a total of five “purposes” for why a mixed methodology is used in research (4). Classification of the purpose of using mixed methodology:

- Complementarity. Using data obtained from one method to illustrate the results of another method.
- Development. Using the results of one method to develop or inform about the use of another method.
- Initiation. We can use the results of different methods to search for areas of non-compliance in certain areas in order to create new insights.
- Expansion. Examining different aspects of a research question, with each aspect justifying different methods.
- Triangulation. Use of data obtained by both methods to support the findings (2).

In the last 28 years, this classification has been supplemented by several other authors. So in 2006 Bryman compiled a list of more specific rationales for the use or purpose of mixed research methods. Bryman’s classification decomposes the categorization of Greene et al. on several aspects and adds a number of additional aspects (3).

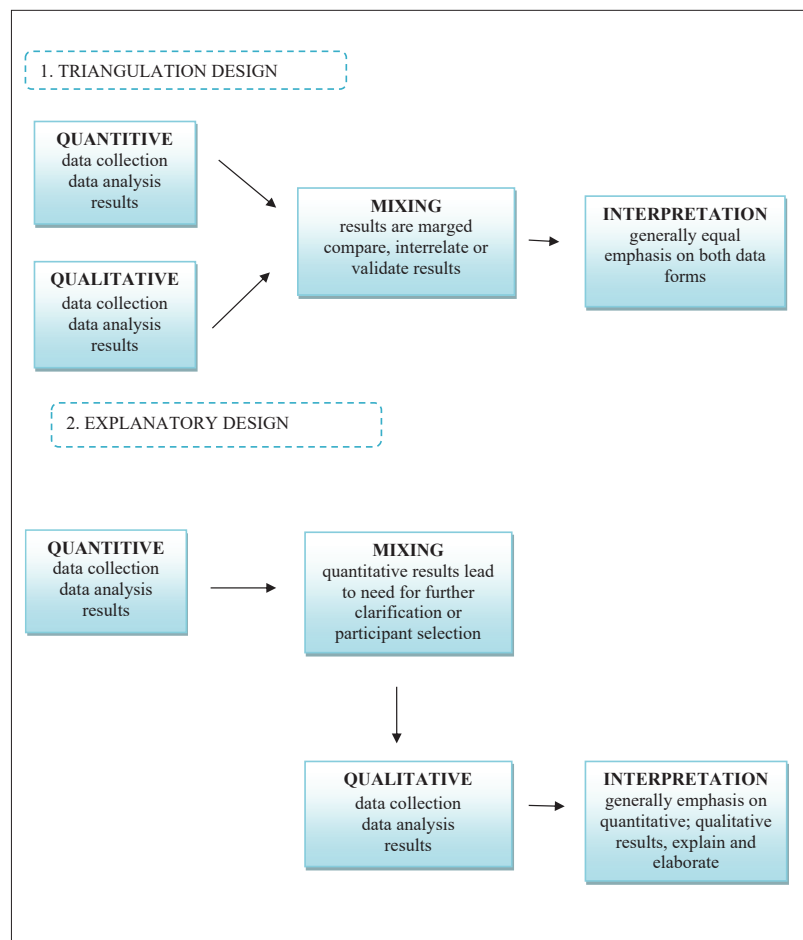


Figure 2. Major types of mixed methods designs (6)

Bryman's addition to the classification of Greene et al.

**Credibility.** It refers to suggestions that the application of both methodological approaches improves the integrity of the results.

**Context.** Refers to cases where the combination is justified in terms of qualitative research that provides contextual understanding, along with generalized, externally valid results, or broad relationships between the variables identified by the survey.

**Illustration.** It refers to the use of qualitative data to illustrate quantitative findings, often referred to as putting "meat on the bone" "dry" quantitative findings.

**Usefulness or improvement of usefulness of results.** It refers to the suggestion, which is more likely to be highlighted among articles with an applied focus, that combining the two approaches will be more useful for practitioners.

**Confirmation and discovery.** It involves the use of qualitative data to generate hypotheses and the use of quantitative research to test them within a single project.

**Diversity of views.** This includes two slightly different explanations—namely, combining the perspective of researchers and participants through quantitative and qualitative research, and discovering the relationship between variables through quantitative research, while revealing meanings among research participants through qualitative research (3).

#### 4.3. RESEARCH DESIGN

Research designs are procedures for collecting, analyzing, interpreting, and reporting data in research studies. They represent different models for doing research, and these models have distinct names and procedures associated with them (6).

The four major types of mixed methods designs are the Triangulation Design, the Embedded Design, the Explanatory Design, and the Exploratory Design (6).

#### 4.4. HEALTH APPLICATION

There is a wide range of methods used to collect both quantitative and qualitative data. And the research question and the necessary data are the main determinants of the methods used. To a lesser extent, the choice of methods may be influenced by feasibility. Method priority refers to the emphasis on each method in the study. For example, a study may be predominantly quantitative with a small qualitative component or vice versa. Alternatively, both quantitative and qualitative methods and data may be equally weighted. The emphasis on each methodological component of the study will be driven mainly by the research question, research team skills and feasibility. Finally, researchers must decide when each method will be used in research (2). By analyzing the research methods and research designs used, Bryman suggests that on the quantitative side, structured interview and questionnaire research within cross-sectional design predominates, while on the qualitative side, semi-structured interviews within cross-sectional design predominate (7). A key feature of mixed-method research is its methodological pluralism, which often results in research that provides broader perspectives than those offered by monomethodal designs (8).

The use of mixed scientific methodology is widely used in the field of health outcomes and should not be limited to a closed list of possible methodological options, but should be seen as a framework for a specific research issue to be addressed using quantitative and qualitative components (data and / or methods) , when quantitative and qualitative components are articulated intentionally and prospectively in a well-defined, pre-specified research design and as a framework for meta-inference (9).

The importance of applying mixed research methods can be reflected in the trend of "measuring / analysing what is important" for patients and the treatment outcomes reported by patients are increasingly used in clinical care and research. However, a recent review of studies documenting the development of outcome measures reported by patients highlights that only 11% of them were developed actually asking patients which outcomes are important to them. This emphasizes the importance of applying mixed qualitative and quantitative methods in health research to ensure a focus on the priorities identified by the patient, scientific rigor, and improved patient outcomes (9). Mixed methods are also an increasingly accepted approach used to investigate organizational phenomena in health care (10).

The application of the mix methodology is considered a significant contribution to health science. By combining quantitative and qualitative data in the same study, health researchers can reap the benefits of each approach while minimizing their disadvantages. In practice, this endeavor facilitates research by health science researchers on the complex and multifactorial nature of human health and disease. Researchers using the mixed method approach for the first time can easily feel overwhelmed by uncertainty about the philosophical foundations of the method, as well as the multitude of typologies of mixed method research. Although further research and debate are warranted, health researchers seeking solutions to real problems are increasingly embracing pragmatism as a paradigm of choice (11).

## 5. CONCLUSION

Recently, there has been an increase in the number of scientific studies in healthcare that use mixed research methods. The advantage of applying this scientific method is that through the triangulation of data obtained by different (quantitative / qualitative) approaches, we get a deeper and more complete picture of the phenomenon in health care that we observe.

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