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### REVIEW PAPER

## ANALYZING AND INTERPRETING RESEARCH IN HEALTH EDUCATION

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### ABSTRACT

The research carried out in health education is holistic and all embracing. It may be qualitative, quantitative or mixed. While qualitative research is used when little or nothing is known about the subject, quantitative research is required when there are quantifiable variables to be measured. By implication, health education research is based on phenomenological, ethnographical and/or grounded theoretical approaches that are analyzable by comparison, or sometimes a cross sectional study, cohort study, case-control study, and randomized controlled trial, which are in turn analyzable by statistical values and tests of significance. While qualitative research is interpreted by inductive reasoning, quantitative research is by deductive interpretation. Health education Research may therefore be one of concept formation and development, concept modification and integration in a research based on grounded theory, culture characterization in ethnographical studies and data ranking and classification in phenomenological studies. It counts occurrences, establishes statistical links among variables, and generalizes findings to the population from which the sample was drawn. Acceptance or rejection of data is a common feature in the process of reconciling conflicting evidence. Consequently, the goal of research in health education is generation of theory, cultural taxonomy/themes, and application of findings in other settings/geographical locations.

**Keywords:** *Analyzing, Interpreting, Research, Health Education*

### INTRODUCTION

The data generated from research in health education are from in depth interviews, focus group discussions, field observations, primary or secondary qualitative data (e.g., diaries, meeting minutes, annual reports), or a combination of these data collection approaches (Bradley et al., 2007). In many cases however, research in health education is of the qualitative type especially when little is known about the subject of the research. According to several authors, qualitative research is well suited for understanding phenomena within their context, uncovering links among concepts and behaviors, and generating and refining theory (Patton, 2002; Campbell and Gregor, 2004; Bradley et al., 2007). The qualitative type of research involves concept formation and development, concept modification and integration in research based on grounded theory, culture characterization in ethnographical studies and data ranking and classification in phenomenological studies.

Furthermore, qualitative research is well suited for understanding phenomena within their context, uncovering links among concepts and behaviors, and generating and refining theory. However, there is sometimes a need for quantitative research, which counts occurrences, establishes statistical links among variables, and generalizes findings to the population from which the sample was drawn (Bradley et al., 2007). In many cases, there may be a need for the simultaneous use of qualitative and quantitative methods of research (Creswell, 2003). For example, in an article on the prevention of Lassa fever in Nigeria by Inegbenebor et al. (2010), qualitative approach was used in

the determination of the socioeconomic predisposing factors, while quantitative methods was used for the determination of the case fatality rates.

It can therefore be said that research in health education include the common methods in phenomenological, ethnographic and grounded theory approaches in research. This led Cote and Turgeo (2005) to emphasize that analysis and interpretation of research findings in health education is unique in several ways and different from what most clinical teachers are familiar with. Therefore, health educators and health policy makers need to understand the methods of analyzing research in health education. Hence, this article provides practical strategies for analyzing and interpreting research in health education. Also, clinical teachers and health workers may find it useful in analyzing and interpreting findings.

## **DESIGNING A RESEARCH IN HEALTH EDUCATION**

Research design in quantitative studies usually include cross sectional study, cohort study, case-control study, and randomized controlled trial, according to Jack et al. (2010) and the section on methods should contain information on the inclusion and exclusion criteria used in identifying participants in the study.

According to Bryman (2006), it is useful to take typological approaches of the research into consideration in designing health education research. This includes phenomenological, ethnographic and theoretical approaches. Design of a phenomenological qualitative research in health education requires the research question on the existence of feeling or experience concerning the phenomenon to be explored and its constituents. For this type of study, the targets are persons, who are willing to express and share their inner feelings and experiences in situations of focus group discussions, in depth interviews and observational studies. Furthermore, videotaping, audio taping and written records may be used for observed events, expressions of feelings and experiences respectively. (Schensul, 1999)

For example, in a study of waste disposal habits of a factory located in a community, which has been reported to be suffering from the adverse effects of toxic waste being deposited in a river, which is the only source of water for the community, videotaping may be used for recording waste disposal habits of the factory, while photography may be used in recording the site of disposal within the community. Audio taping may be used in recording the residents' feelings and expressions about what the government or community can do to improve the sanitary conditions. The expressions can be written down, when reporting the problem in an article.

In ethnographic studies, the culture of the community is identified and effort is made to gain entrance into the culture. Informants are acquired and data is gathered through direct observation and interaction with members of the community. In a community with a low literacy rate and high maternal mortality rate in Nigeria, It has been found that their knowledge, attitude and behavior are rooted in traditional customs and practices (Kawuwa et al., 2007). A practical example of gaining entrance into such region has been done through the introduction of midwives serving under the Midwives Service Scheme into the primary health centers (Abimbola et al., 2012).

Also, more knowledge can be acquired through home visiting of antenatal women and interaction with traditional birth attendants. By implication, the midwives, traditional birth attendants and women attending the antenatal clinics can serve as informants. In addition, the midwives can be involved in direct observational studies of the culture. Such a research methodology can be useful in modifying the behavior of the community towards pregnancy and child birth.

Grounded theory is used in discovering what problems exist in the community and how these problems are handled. It involves concept formulation, testing and re-development of proposal until a theory is developed (Al-Busaidi, 2008). Data collection is done by interviews, observations and record review or a combination of any or all of these methods. For example, in a study by Inegbenebor and Ebomoyi (2012) to determine the etiology of fetal macrosomia in southern Nigeria, a concept of over-nutrition was developed. In order to establish this concept by Inegbenebor and Ebomoyi (2012), a record review of the of the birth weights of babies delivered in the maternities of hospitals in Southern Nigeria will establish the enormity of the problem, while a survey of the dietary habits of pregnant women in the community will serve for advocacy. Hence, a controlled prospective study of the dietary habits of pregnant women combined with a survey of the birth weights of babies of the pregnant women involved in the study will generate data on the concept.

## **UNDERSTANDING THE TERMINOLOGIES IN HEALTH EDUCATION RESEARCH**

Certain terminologies are frequently used in research in health education. Understanding these terminologies is important in appraising the quality and rigor of a health education research. These terminologies include themes, taxonomy and theory.

### **Themes**

Themes are fundamental concepts that characterize specific experiences of individual participants by the more general insights that are apparent from the whole of the data. Themes are recurrent unifying concepts or statements (Boyatzis 1998) about the subject of inquiry (Bradley et al., 2007).

### **Taxonomy**

Taxonomy is a formal system for classifying multifaceted, complex phenomena (Patton 2002) according to a set of common conceptual domains and dimensions. Taxonomies promote increased clarity in defining and hence comparing diverse, complex interventions (Sofaer, 1999), which are common in health policy and management (Bradley et al., 2007).

### **Theory**

Theory is a set of general, modifiable propositions that help explain, predict, and interpret events or phenomena of interest (Patton 2002). Theory is important for understanding potential causal links and confounding variables, for understanding the context within which a phenomenon occurs, and for providing a potential framework for guiding subsequent empirical research (Bradley et al., 2007).

## **ANALYZING A QUALITATIVE RESEARCH IN HEALTH EDUCATION**

There is no singularly appropriate way to conduct qualitative data analysis, although there is a general agreement that analysis is an ongoing, iterative process that begins in the early stages of data collection and continues throughout the study. Qualitative data analysis, wherein one is making sense of the data collected, may seem particularly mysterious (Campbell and Gregor, 2004). The aim is to generate taxonomy, themes and theory from evolving concepts (Bradley et al., 2007).

In phenomenological studies, analysis of qualitative data requires classification and ranking of data, while in the case of ethnographic studies, characterization of culture is the usual pattern of analysis (Al-Busaidi, 2008). However, grounded theory requires the formation of concept, concept modification and integration (Tavakol et al., 2006). In all types of qualitative research, the data must be reviewed thoroughly for proper understanding. Thereafter, the qualitative data is coded in order to provide the analyst with a formal system to organize the data (Bradley et al., 2007).

Some researchers (Morse and Richards, 2002) believe that a single researcher conducting all the coding is both sufficient and preferred while others (Pope et al., 2000) recommend that the coding process involve a team of researchers with differing backgrounds to improve the breadth and depth of the analysis and subsequent findings.

Common types of coding include

- conceptual codes and sub-codes, which identify key concept domains and essential dimensions of these concept domains,
- relationship codes, which identify links between other concepts coded with conceptual codes,
- participant perspective codes, which identify if the participant is positive, negative, or indifferent about a particular experience or part of an experience,
- participant characteristic codes, and
- Setting codes. (Bradley et al., 2007)

The time to stop developing new codes and coding structures is at the point of theoretical saturation, which is the point at which no new concepts emerge from reviewing of successive data from a theoretically sensitive sample of participants, i.e., a sample that is diverse in pertinent characteristics and experiences (Patton 2002).

Analysis is then based on comparison between concepts in different participant's groups or setting codes and statements and observations between groups. Formal mechanisms including use of truth tables (Ragin, 1999) and explanatory effects matrices (Miles and Huberman, 1994) have also been used to catalogue the presence of selected concepts among comparison groups.

### **ANALYZING A QUANTITATIVE RESEARCH IN HEALTH EDUCATION**

Quantitative data contains information that is quantifiable, perhaps through surveys that are analyzed using statistical tests to determine if the results happened by chance. Johnson and Onwuegbuze (2004) recommend the use of two types of statistical analyses; descriptive and inferential.

The descriptive statistics are used to describe the basic features of the study data and provide simple summaries about the sample and measures, while in the inferential statistics, researchers are trying to reach conclusions that extend beyond the immediate data alone. In this regards, Jack et al., (2010) recommend that inferential statistics be used to make inferences from the data to more general conditions.

### **INTERPRETING RESEARCH IN HEALTH EDUCATION**

Results need to be interpreted in an objective and critical way, before assessing their implications and before drawing conclusions. Interpretation of research results is not just a concern for researchers. Health professionals reading or hearing research results should be able to interpret them correctly, and to assess their implications for their work. Policymakers should also be aware of the possible pitfalls in interpreting research results and should be cautious in drawing conclusions for policy decisions.

However, method of interpreting results depends on the type research and data (Fathalla and Fathalla, 2004). Thus, qualitative research data require different interpretation from quantitative research data.

### **INTERPRETING A QUALITATIVE RESEARCH IN HEALTH EDUCATION**

A vast body of methodological work conducted over decades has produced impressive innovation and advancement in qualitative research techniques (Bradley et al, 2007). Taxonomies, themes, and theory produced with rigorous qualitative methods can be particularly useful in health services research. Taxonomies improve description and hence, measurement and evaluation, of real-world phenomena by allowing for multiple domains and dimensions of multifaceted interventions. Themes and theory guide researchers to explain and predict various outcomes within diverse contexts of the health care system (Bradley et al, 2007).

### **INTERPRETING A QUANTITATIVE RESEARCH IN HEALTH EDUCATION**

Quantitative research should be interpreted with caution against the background of sampling errors, statistical significance, bias and confounding variables.

A true sample should represent the population from which it is drawn otherwise it leads to misleading conclusions. In addition, non probability sampling methods leads to systematic errors called bias.(Araoye, 2004)

Fathalla and Fathalla (2004) have elaborated on bias and according to them, bias may be of different types; selection bias, information bias or measurement bias. Selection bias may be due to attrition, which may result from loss to follow up and failure to respond to questionnaire. Measurement or information bias may be due to failure to recall information or diagnostic errors (Fathalla and Fathalla, 2004).

Tests of statistical significance are based on probability sampling methods and should be interpreted with caution. The researcher should be aware that differences may not be statistically significant but may still be important. The differences may be real but, because of the small size of the sample, they may not be statistically significant. A p-value in the non-significant range tells a researcher that there is either no difference or the number of subjects is not large enough to show the difference.

If the research has been designed in such a way that sampling errors and bias are eliminated, confounding variable may distort the interpretation of results. Confounders are all of the other things that could explain the result and

which often lead to spurious associations (Araoye, 2004). A study may associate obesity, as indicated by body mass index, with hypertension. This may be valid up to the age of 50 years. Beyond the age of 50 years, age becomes an important confounding variable due to loss of elasticity of the blood vessels and consequent increase in peripheral resistance.

## CONCLUSION

Research in health education is holistic and all embracing, being sometimes qualitative, quantitative or mixed. Analysis and interpretation of results require caution because of the possibility of bias and confounding variables against the background of inductive and/or deductive reasoning.

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#### **AUTHOR(S) CONTRIBUTION**

Dr Ute Inegbenebor conducted the literature search and wrote all aspects of this article.