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MIXED METHODOLOGY APPROACH IN PHARMACY PRACTICE RESEARCH

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Abstract: Healthcare providers play a major role in attending to all domains of health in a population. In terms of modern healthcare delivery, better health outcomes for population can be achieved by engaging multi-disciplinary expertise. In the last decade, pharmacy profession had transformed tremendously in terms of health and pharmaceutical service provision to both patients and general population. Within this practice transformation, pharmacists, especially those in developed countries, now occupy a respectable position within the healthcare system. In contrast, services and expertise offered by pharmacists in developing countries are still underutilized, and their role as healthcare professionals is not deemed to be important either by the community or by other healthcare providers, especially doctors and nurses. In order to explore the current perspectives regarding the role of pharmacists in the context of a developing country, a systematic research is needed. Mixed methodology research should be used for evidence generation. The philosophy of mixed method research came up decades ago. This approach is widely recommended for social and human sciences research. In recent existence, many researchers have begun to recommend mixed methods research as a separate methodology or design. Many factors have brought into the evolution of mixed methods research. A combination of both forms of data can provide the most complete analysis of the issues related to the pharmacy practice research. Numbers in quantitative and words in qualitative can be enclosed together to give the better understanding of research questions. Both forms of data are necessary for pharmacy practice research especially in case of developing countries where there is a need to generate the evidence for future health policy.

Keywords: Pharmacy practice, mixed method, quantitative, qualitative research

It had been widely recognized that traditional healthcare providers comprised of doctors, nurses, pharmacists and paramedics. Healthcare providers play a major role in attending to all domains of health in a population. In terms of modern healthcare delivery, studies have shown that better health outcomes for population can be achieved by engaging multi-disciplinary expertise. Although the pharmacy profession has been recognized for its importance in many developed countries and being recognized as the third largest healthcare providers in the world, in most developing countries their professional role is still underutilized (1).

Evolution of pharmacy profession into pharmacy practice

Evolution of pharmacy began with mankinds' history since it fulfilled one of our most basic demands (2). Much of the early history of pharmacy covered the entire history of medicine (3). This history is clouded with mystery, but there are good evidences that early civilization used many substances from the plant and animals kingdoms and available minerals for cure and prevention of sickness (4, 5).

In Britain, in early 1900s pharmacists fulfilled the role of *apothecary*, preparing products for medicinal use. This is the time when state pharmacy acts mainly by established standards for pharmacists and pharmacies (3). By the 1950s, large scale manufacturing of medicinal products by the pharmaceutical industries brought many new drugs in "ready-to-use" form. The introduction of "prescription-only" legal status for most therapeutic agents, limited the role of pharmacists to compounding, dispensing and labeling prefabricated products (6). By the mid of 1960s, pharmacy profession shifted to more patient-oriented practice and developed the

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concept of clinical pharmacy. This marked the beginning of a period of transition that was characterized by an expansion and integration of professional functions. There was an increased professional diversity and closer interaction with physicians and other healthcare professionals (7, 8). Traditionally, pharmacy was regarded as a transitional discipline between the health and chemical sciences and as profession charged with ensuring the safe use of medicine (9).

Concept of pharmaceutical care

The initial definition of pharmaceutical care by Hepler and Strand emphasizes that the role of the pharmacist involves "*the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life*" (7). In 1997, Linda Strand provided a new definition of pharmaceutical care "*a practice in which the practitioner takes responsibility for a patients' drug related needs and is held accountable for this commitment*" (10).

In the current era of rapid change in healthcare delivery, the pharmacy profession is experiencing significant growth and development. An increase in health demands with an everlasting and complex range of medicines, and poor adherence to prescribed medicines have forced the pharmacists' role towards a patient centered approach (11). Direct contact with patients and other health care providers help to achieve maximum therapeutic results. The paradigm shift for pharmacy practice took shape in 1990, when Hepler and Strand introduced the term "pharmaceutical care" (7). Over the next decade, pharmacy organizations and academic training programs around the world promoted pharmaceutical care as a philosophy and standard of provision of care for patients (12). In essence, the concept of pharmaceutical care transformed the pharmacy profession to be more accountable in patient care especially to ensure that a patient achieves positive outcomes from drug therapy (13). This promotes pharmacist as a key member of health care team with additional responsibility for the outcome of medication therapy. The pharmacists have many areas of expertise and they are a critical source of drug knowledge in clinics, hospitals, and community pharmacies throughout the world. It is also believed that a pharmacist could make a great contribution to the provision of the primary healthcare, especially in the developing countries (14, 15). Being medicines experts, their role varies in different parts of the world. Some deal with preparation and supply of medicines while some focus on sharing pharmaceutical expertise and knowledge with doctors, nurses and patients (16).

Social dimension of pharmacy practice

Sociology is a branch of social science that examines the organization of the society, and sociologists study a variety of issues concerned with pharmacy, such as profession and role theory. Social science focuses on theory, whereas pharmacy can be viewed as a field of application, taking concepts and facts from the other fields and applying them into practice (17). It was not until the mid 1960s that the seminal papers on social pharmacy topics were published in the pharmacy literature. Harding and Taylor discussed the social dimensions of pharmacy and pointed out that our actions on healthcare professionals are embedded in a social context. Societal change and increased risk awareness prompted health providers to rethink their professional roles and define their activities as an exemplar of social action (18).

General public perceptions towards pharmacist

In recent years, pharmacy profession has extended its role of product-oriented to consumer-oriented with an emphasis on the provision of consumer care services (19, 20). Although there are barriers to pharmacist-consumers communication due to personal and social factors that influence pharmacy practice (21), but the involvement of the patients in their own healthcare is the present need of today (22). The consumers' perception of the benefits of pharmaceutical care is based on the ability of the pharmacist to help them. More frequent interaction with the consumers increases the opportunities to improve the outcomes of the therapy (23).

In developed countries, studies showed that pharmacists were willing to provide evidence based advice to people. It also showed that patients believed that they were at lower risk if they were able to meet with a pharmacist regularly, and the pharmacist was identified as the predominant source of information for medicines (22-24). This scenario in developing countries is totally different. The pharmacist population ratio is very low, and a majority of the population, especially in poor and rural areas rarely come in contact with the trained pharmacist (25, 26).

Role of pharmacist in current context of healthcare delivery

The World Health Organization (WHO) has effectively contributed in encouraging and defending the role of pharmacists worldwide. Although all

health care providers and the public are rationally involved in the use of drugs, WHO has recommended a special role for pharmacists, particularly in quality assurance and the safe and effective administration of drugs (27). The International Pharmaceutical Federation and World Health Organization came up with the concept of "The seven star pharmacist." According to WHO, future pharmacists must possess specific knowledge, attitudes, skills and behaviors in support of their roles (11, 28). Due to the increasing demand of pharmacists required in public health, WHO recommends 1 pharmacist per 2000 population so that optimal healthcare can be delivered. They should be held responsible for the cost, quality and results of pharmaceutical care provided to patients. Furthermore, pharmacists act as advisors to physicians and nurses and contribute in policy decisions (29).

The identification of pharmacists' roles and the benefits of pharmacy care from the pharmacist perspective are widely discussed in the literature in the context of developed countries. Few studies have been conducted in developing countries which have highlighted the role of pharmacist (30-32). The pharmacists' role was limited to drug delivery, procurement and inventory control. There was a lack of pharmacy services in the hospitals and community pharmacies because of the isolation and lack of recognition of pharmacists as health care professionals. Along with a lack of human resources, the profession seriously lacks government interest (33).

Mixed Methodology

Merging the quantitative and qualitative methodology has recently become popular in areas of applied research. It is one the best approach to explore the perception from respondents.

Qualitative methodology

A qualitative approach allows flexible exploration and an interactive approach as well as identifying barriers and facilitators to change (34-36). Qualitative research has also been explained as an important tool in understanding the emotions, perceptions and actions of people, since the reason for a particular type of behavior can be understood more clearly when it is observed and inquired about. A clear understanding therefore enables health and educational policies to be developed through qualitative research (37). In qualitative research, the interview is one of the main data collection tools, in which researchers are often more concerned about gathering knowledge than about how people think and feel about the circumstances (36, 38, 39).

Types of interviews

Qualitative interviews are appropriate for researchers who seek to assess participants' understanding of the world and their experiences in detail, and to give their perspectives and interpretations of these experiences (37). The aim of qualitative interviews is to gain access to the feelings, experience and the social world of participants. Therefore, interviews are designed to produce data that are relevant to the research question of the study (40, 41). The types of interviews are defined by the researcher in several ways (36, 37, 42,). Researchers argue that no research interviews can be lacking in structure, even if that structure is the use of a single pen question to initiate discussion. The majority of qualitative research interviews are, therefore, structured or semi-structured. Moreover, stress is placed on the flexibility and adaptability of the in-depth interviews (43, 44). The types of interviews are also termed as "the family of qualitative interviews", whereas classification of interviews are defined differently by researchers namely as "formal and informal" and as "structured or unstructured" (36).

At least three major categories have so far been identified and defined: standardized interviews, unstandardized interviews and the semi-standardized interviews (42).

Semi-structured interviews

Semi-structured interviews are conducted on the basis of a loose structure consisting of open ended questions that define the area to be explored while trying to keep the agenda flexible (45, 46). The interview guide in semi-structured interviews serves as a check list and ensures that the same scope of information is obtained from different participants. Within the list of the subject area, the researcher is free to pursue the question in depth (47). Moreover, the semi-structured interview guide does not permit the researchers to pursue topics that are not elaborated in the guide (46).

There are no specific rules to why a semi-structured interview should be chosen over other types of interviews or a questionnaire (46). But it is preferred when (46, 47):

- one is conducting research with people who may feel intimidated or confused by formal questioning;
- semi-structured interviews, as a more flexible tool, are likely to be more probing when finding out the information;
- compared to other methods, this method allows researchers to have much greater interest in the

interviewee's point of view rather than have the interview reflecting the researcher's concerns;
- there is no previous research available or very little guidance is provided to highlight the particular issues.

Sampling in qualitative research

There is a difference in the techniques involved for qualitative and quantitative research. In quantitative research, the researcher is concerned with probability sampling (36, 39). In qualitative research, in contrast, a researcher is presented with interesting and potentially important research questions that cannot be answered by a probability sampling technique. Within this context, researchers have discussed the use of two important principles in guiding qualitative sampling (47). The first principle is based on appropriateness, where participants can best inform the researcher according to the demand of the study.

In qualitative research, there are no published guidelines or tests of adequacy for estimating the sample size; the required sample size is estimated to reach the saturation point equivalent to formulae used in quantitative research, where the signals of the saturation point is determined by the researchers, depending on the adequateness of the results, i.e., they make sense and do not have gaps (46, 48). The five most common categories of non-probability sampling methods used in qualitative research are purposive sampling, convenience sampling, snowball sampling, theoretical sampling and quota sampling (36, 46, 47).

Sampling approaches

Snowball sampling is particularly popular among researchers interested in studying various classes of deviance-sensitive topics or populations that are difficult to reach. The snowball sampling approach involves using a group of informants with whom the researcher has made an initial contact. This initial group of informants are asked to put the researcher in touch with other people in their networks, these people are then asked to be informants and also to put the researcher in touch with more people in their networks as long as they fit the criteria for the research project and so on.

Data management and analysis in qualitative research

There are many different styles of qualitative research. The volume of data that qualitative researchers must manage is enormous. There are two issues that are needed to manage the amount of data as well as the data record (49). There are different approaches used for handling data but the process involved is essentially similar (36). Data are usually in the form of textual narrative that will be transcribed (generally verbatim from the tape-recording), written descriptions of observations such as field notes, and reflections, ideas, and conjectures recorded by the researcher (36, 46) As soon as the tape-recorded interview is completed, the tape should be replayed, with the researcher listening carefully to the contents that will include the questions asked and the participants' responses (34). Tape is transcribed directly into the computer in a form that will make it readily available for analysis (39). The tape should be transcribed exactly (word for word) from the interview and not paraphrased (39). The transcription is then checked against the tape for accuracy (39).

Validity and reliability of qualitative data

Although the term 'reliability' is a concept used for testing or evaluating quantitative research, the idea is most often used in all kinds of research. If the idea of testing is seen as a way of information elicitation, then the most important test of any qualitative study is on its quality (50). Qualitative research is often subject to criticism regarding validity and reliability (51-53). The specific processes that researchers actually undertake to achieve validity in qualitative research are rarely described in the literature (54), however, qualitative research, and the process of analysis in particular, involve continuous reflexivity and self-scrutiny (54). In qualitative work, the study objectives are more likely to be exploratory (39) The direction and the content of the interview are, therefore, guided by the responses of the interviewee rather than by following the agenda of the researcher (39). Validation of qualitative analysis can be performed in three ways (34): the first is communicative validation that involves the researchers returning to the field to collect additional data to verify or further develop their findings; the second is argumentative validation in which an attempt is made to use the data set to argue a contradictory viewpoint; and the third way of validating qualitative data is by using cumulative validation whereby the researchers may use the literature to demonstrate how their findings are consistent with existing knowledge of the subject (34). The main way in which qualitative researchers ensure retest reliability of their analyses is by maintaining meticulous records of the interviews and observations through documenting the process of analysis in detail (51). Thus, qualitative research depends, par-

ticularly for its validity, on the skills, training, insights and capabilities of the researcher at every stage (46).

Quantitative methodology

Quantitative methodology is widely used in social sciences. One of the best method which is used for proving and disproving the hypothesis is quantitative method. Surveys are the main tool to gather the quantitative data.

Surveys

Surveys are especially useful for non-experimental descriptive designs that seek to illustrate reality (39). Survey research is used to collect information on perception, attitude, behavior, knowledge and belief of the respondents.

Advantages and disadvantages of surveys

It is hard to compare the advantages and disadvantages of the main different types of survey, even though each type has some general advantages and disadvantages.

The advantages of surveys are:

- Cost effective

Surveys are inexpensive and cost effective as they are an easy way of discovering what people think and want. Surveys can be a random sampling technique to inscribe respondents. Even a small sample size can be used to draw conclusions; no other method of observation can provide this general capability (34, 55).

- Geographically wide spread

Surveys can cover geographically a wide area by using different techniques and there is a flexibilty at the creation phase when deciding how questions will be administered: as face to face interviews, by telephone, as a group administered a written or an oral survey or by electronic means such as web-based surveys (55).

- Flexibility

Surveys can easily be combined with other methods, such as focus groups or in-depth interviews, to produce richer data (34, 37, 55, 56).

- Ethical advantages

Surveys are considered more ethical, as the respondents included in the survey are only exposed to the events that occur in the real world (34). Two important ethical issues in conducting survey research are confidentiality and informed consent from the respondents (57)

- Internal and external validity

Surveys use a sample that is representative of the whole population under investigation, and the findings can therefore be generalized to the entire population. The internal and external validity addresses the true causes of the outcomes that have been observed in the study (55).

The disadvantages of using surveys include:

- Dependency on study design

Surveys are inflexible in that they require an initial study design. Tools and questions are developed which should be appropriate for all respondents and remain unchanged throughout the data collection. Surveys are also dependent on the accuracy of the sample frame; sometimes it is difficult to define an exact and up-to-date sampling frame.

- Surveys are not so dependable at explaining "why"?

Surveys can inform how many people act in a certain way or how many patients were dissatisfied with their treatment, but they may be limited in the information they can provide as to why this is so (58). Qualitative research is one of the best options in answering the questions "why" (55).

- Surveys can generate error and bias

The outcome of a survey may be influenced by the error and bias of the interviewer. It is important that all interviewers receive proper training and are thoroughly briefed on each project (58).

Types of survey

Surveys come in a wide range of forms and can be classified into three types: written, oral and electronic (55). Written surveys are further divided into mail surveys, self-administered or group-administered questionnaires, and drop-off surveys (55). A questionnaire is an instrument consisting of a series of questions and/or attitude and opinion statements designed to elicit responses, which can be converted into measures of variables under investigation (59).

Selection of survey type

In order to conduct the surveys successfully, the issues include the practicality of access to the survey by potential respondents in addition to cost and time. Taking into account all of these issues, self-administered survey is the most appropriate survey type to be used for surveying the large sample size, as the low cost involved makes it an economical method of surveying large samples (59). Furthermore, a high response rate is likely, as a large proportion of people are asked to complete the questionnaire. One of the considered disadvantages of this approach is the time and effort involved in delivering and collecting the questionnaire. However, the benefits of accessing potential respondents, cost effectiveness and a high response rate

supersede these two limitations when compared to other survey methods. These survey methods have been mentioned in other studies of similar populations (30, 32, 60, 61).

Self-administered survey

Self-administered surveys are one of the most frequently used methods for collecting data in research studies where respondents are asked to complete the questionnaires themselves (62). There are two types of self-administered questionnaires: supervised and unsupervised. The former involves people answering in the presence of the surveyor and the latter permits the respondents to complete the questionnaires by themselves (63).

The advantages of self-administered or group-administered questionnaires include:

- Cost

One of the greatest advantages of self-administered surveys is the lower cost compared to other methods (63).

- Sampling

Self-administered questionnaires have three main advantages over the other survey methods. They allow wider geographical coverage, larger samples and wider coverage within a sample population (63).

- Implementation

Self-administered questionnaires are much easier to implement than other kinds of surveys because fewer personnel are required for data collection since there is no need for interviewers (63).

- Response rate

The researcher is able to collect the survey results in a short time, ensuring a very high response rate (63, 64).

- Sensitive issues

People are more likely to give complete and truthful information on sensitive topics in self-administered surveys rather than in interviews (63).

- Specificity

This type of written survey can be very flexible, allowing open and closed ended types of questions, and can serve a variety of specific purposes, particularly if the researchers are trying to survey very specific individuals or a group of people (64).

- Response rate

A high response rate is one of the advantages of self-administered questionnaires in which researchers are able to collect survey results in a short time (64).

The disadvantages of self-administered methods include:

- Literacy

Self-administered questionnaires are difficult to use particularly in general community samples, especially using those who are illiterate or who have difficulty reading and responding to the questionnaire (63).

- Scheduling

Since these methods require a group of respondents to answer the survey together, they require a time slot that is convenient for all the respondents (63).

- Ethical approval

Ethical approval is a mandatory requirement for any kind of research conducted. Research conducted with human participants without ethical approval will be reported as misconduct.

CONCLUSION

Studies are strengthened by the use of mixed methodology of data collection that is, qualitative and quantitative. Mixed method approach is the appropriate choice in order to get data which give the in depth information. By using both qualitative and quantitative methods this study showed the importance of pharmacist's role in the current healthcare system. This might probably help to document the role of pharmacist and will help the policy makers to bring a substantial change in highlighting the contribution of the profession for the improvement of the population health.

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