Knowledge and Skills of Community Midwives about Nutrition during Pregnancy: An Interventional Study Design

Shahnaz Akhtar

Post RN BSc (Nursing) to MSN

Texila American University

Georgetown, Guyana, South America

Dedication

I dedicate my thesis work to my very dear parents. A special feeling of gratitude to my loving husband, Mr Mohammad Ayub and my sons Waleed Bin Ayub, Talha Bin Ayub, and Ahmad Bilal, whose words of encouragement and push for tenacity ring in my ears.

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Abstract

Objectives: Community midwives play a vital role in imparting knowledge regarding the nutritional requirements in pregnancy. Therefore, this study aimed at assessing the current knowledge of the community midwives of the area, identify gaps in the knowledge and skills, design an intervention and evaluate the effect of the intervention.

Material and Method: In order to achieve this aim, an interventional study design was adapted. A sample of 25 community midwives was taken from the community midwives` population of District Multan, Punjab, Pakistan. A questionnaire was used to conduct a pre-intervention test. After this pretest, a two day intervention or training program was carried out involving all study subjects. The post tests were conducted at the end of the first day training after teaching sessions as well as the end of the second day`s training and teaching sessions. Thus, the data was taken at three points i.e. pre intervention, during intervention and post intervention.

Results and Discussion: The means of test scores for pre and post tests were compared using different techniques and it was found that the intervention had statistically significant effect on the mean test scores. The effect size for the difference of means was also calculated and it was found that the effect size for the intervention was considerably large. The data was analyzed using a one way ANOVA with repeated measures and it was confirmed that the means of pre and post test scores differ significantly. The correlation analysis was also conducted to discover what other factors affected the difference in mean scores.

Conclusion: Study revealed lack of knowledge and skill about nutrition during pregnancy among Community midwives. Moreover the pre and posttests confirmed

that the intervention had significantly improved the knowledge and skills of the study subjects regarding nutritional requirements during pregnancy.

Keywords: midwives, nutrition, knowledge, skill training, education, pregnancy, pregnant women, nutrients, deficiency, requirement. Pre and posttest, interventions.

Chapter 1

Introduction

1.1 Introduction and Context

Healthy children in a community indicate a healthy population. In order to ensure good health for the children, a community must adopt healthy practices before and during pregnancy (Pasinlioğlu, 2004). Among these healthy practices, good nutrition is one of the fundamental components that affects not only the health of pregnant women but also affects the development and health of the fetus(Saravanan & Yajnik, 2010). Malnutrition or deficiency in nutrition has been reported to be linked with obesity in mothers, pre-term births, pre-eclampsia or sometimes a miscarriage (Williamson, 2006).

Poor maternal nutrition is also linked with poor outcomes for the fetal development such as low birth weight, incomplete development and higher risk of developing chronic diseases at later stages of life (Girard & Olude, 2012). It has been found that adult diseases such as diabetes, cardiovascular issues and issues linked to bone mass formation may have a fetal origin and they may be linked with nutritional deficiencies during pregnancy (Graff, Yount, Ramakrishnan, Martorell, & Stein, 2010).

It has been reported that pregnant women show enhanced awareness regarding their nutritional status and requirements during pregnancy. It may be due to their perception that they can protect and improve the health of their babies by bringing a change in their routine lives (E. Szwajcer, Hiddink, Koelen, & Van Woerkum, 2005). A study conducted in Australia have shown that pregnant women are interested in consulting nutritional information through different sources, and want to get

information about healthy eating habits, vegetarian diet, breastfeeding, hurt burn, morning sickness and weight management during pregnancy (Barker, Osmond, Winter, Margetts, & Simmonds, 1989). Nutrition counseling during pregnancy is essential because pregnancy period is a unique life experience that not only affects the current health of a woman and her fetus but also the nutritional behavior of a woman in long term.

Nutrition education to pregnant women by community midwives has been associated with positive outcomes for women and their babies. Community midwives have been reported to be the trusted source of nutritional information by pregnant women because of the perception that they possess the necessary knowledge and expertise (E. M. Szwajcer, Hiddink, Koelen, & van Woerkum, 2009).This perception of community midwives and their influence on maternal and fetal health outcomes is reflected by the concepts such as primary healthcare (Hughes, Maher, Baillie, & Shelton, 2011). Thus, community midwives have a significant impact on the health of pregnant lady, her growing baby and, the whole community.

Community midwives have been playing a critical role in providing nutritional education to pregnant women and this role is being increasingly realized. For instance, the NICE (National Institute of Health and Clinical Excellence) have issued recommendations and guidelines for health professional including community midwives to provide nutritional counseling to women during pregnancy and nutritional requirements before conception (National Institute for Clinical Excellence, 2008).

However, there is a lack of nutritional guidelines for pregnant women from health departments to inform health professional including midwives to provide

nutritional counseling in most of the countries including Pakistan. Due to their role in healthcare and perception among pregnant women, community midwives are in a key position to provide nutritional counseling to them.

The studies show that midwives lack the necessary knowledge regarding nutritional requirements during pregnancy and there is a need for intervention to provide additional education to midwives in order to enable them to conduct effective nutritional counseling and provide useful information to their clients. (Davis et al., 2012).

In light of the above discussion, this study focuses on quantifying the current knowledge & skills of the community midwives regarding the nutritional requirements of a woman during pregnancy. It hypothesizes that midwives working in the locality lack essential knowledge regarding the nutritional requirements of pregnant women and there is a need for intervention to improve their knowledge to protect the health of pregnant women as well as the fetuses. The significance of this study is discussed below.

1.2 Significance of study

The study was of great help in understanding the current knowledge of the community midwives regarding the nutritional requirements of pregnant women operating in the locality. The findings of the study not only add to the literature for the role of midwives in educating pregnant women regarding nutrition but also provide a practical solution to deal with the problem of lack of nutritional knowledge among the midwives. The result of the study shows implementation of the intervention programs to improve the current knowledge of community midwives is required.

The successful completion of the study will help to prevent the nutritional deficiencies and imbalances among the pregnant women in Pakistan by training the Midwives. This will be a milestone in decreasing problematic pregnancies due to the nutritional misconceptions. The overall health of pregnant women and the infants will substantially increase and the percentage of malnourished and low birth weight infants will decrease.

1.3 Research Aim

The aim of the research was to find out the present level of knowledge and skills of Community Midwives (CMWs) about the nutrition during pregnancy and to improve their knowledge and skills via trainings.

1.4 Research Objectives

The objectives of this research project were as follows;

1. To determine the present knowledge & skills of community midwives about nutrition during pregnancy.
2. Knowledge & skills gap of community midwives about nutrition during pregnancy
3. To intervene the study subjects for gaps in knowledge and skills
4. To evaluate the results of intervention in study subject
5. To forward the results of the study and recommendations to the authorities for further planning to solve this issue.

Chapter 2

Literature Review

2.1 Introduction

This chapter provides an extensive and in depth review of literature regarding the significance of nutrition during pregnancy, the need of nutritional education for pregnant women and the role of community midwives to provide nutritional advice to pregnant women. The emerging literature relevant to nutritional requirements of pregnant women and the role of midwives for protecting the health of women during pregnancy and the fetus is critically reviewed.

2.2 Significance of Nutrition during Pregnancy and Midwives knowledge

Nutrition during pregnancy and its impacts on fetal health have been the subject of research during last two decades due to the Barker hypothesis i.e. some diseases such as diabetes, hypertension and cardiac issues in adults have fetal origin(Arrish, Yeatman, & Williamson, 2014; Barger, 2010; Harding, 2001; Lucas, Fewtrell, & Cole, 1999; Yajnik & Deshmukh, 2012). Moreover, there are range of nutrition related issues such as folic acid supplementation, food safety, constipation, vomiting and morning sickness (Begley, 2002; Sangeetha et al., 2013; Sharifirad et al., 2013).

Therefore, it is vital that pregnant women are provided adequate nutritional advice and counseling. Community midwives are the most common source of nutritional advice for pregnant women. For instance, midwives provide care and counseling to nearly 70% of the pregnant women in New Zealand (Elias & Green, 2007). In this context, it becomes vital that midwives should be aware of the maternal nutritional needs. In some advanced countries such as USA and UK, health

department and government agencies have established policies for educating health professional including midwives regarding nutritional requirements during pregnancy as reported by Elias and Green (2007). However, most of the countries such Australia, New Zealand and developing countries like Pakistan lack such policies.

According to Elias and Green (2007), there is a little emphasis on the nutrition in the curriculum for the midwifery studies. However, midwives may obtain information regarding nutrition during pregnancy from other sources such as media and magazines. A study reported that media was the largest source of nutrition information for practicing midwives in the UK (Barrowclough & Ford, 2001; Mulliner, Spiby, & Fraser, 1995).

Review of the existing research on nutritional knowledge of midwives indicate that midwives get nutritional information from media and feel confident in imparting this information to pregnant women (Mulliner et al., 1995; Sinikovic, Yeatman, Cameron, & Meyer, 2009). Studies (Symon, Gibb, & Laing, 2002) have revealed that Scottish midwives lacked necessary information to provide nutritional advice to pregnant women. Similarly, no empirical evidence or data exist to prove the accuracy of nutritional information imparted by midwives to pregnant women (Elias & Green, 2007).

2.3 Midwives and Nutrition Education to Pregnant Women

The role of midwives in providing nutrition education to pregnant women has been extensively reviewed (Arrish et al., 2014; Sharifirad et al., 2013).Girard (2012) reported that nutrition education and counseling was a common strategy for improving nutrition during pregnancy. The lack of essential knowledge, information and skills on the part of midwives has been reported (Barrowclough & Ford, 2001;

Mulliner et al., 1995). It may be contrary to the confidence and expectations of pregnant women under their care but has been empirically proved.

Mullinar et al. (1995) conducted a mixed methods study involving registered midwives in the UK and found that 86% of the registered midwives had no formal education as far as nutritional requirements during pregnancy were concerned. The study also reported that 46% of its participants demonstrated poor knowledge on nutrition and more than 70% of the participants felt that they were not qualified to provide nutritional advice to pregnant women. Despite the small sample size, the study asserted that there was lack of knowledge about nutrition among registered midwives and they should benefit from an intervention program to improve their knowledge.

Barrowclough & Ford (2001) conducted a similar study involving 35 registered midwives and found that midwives showed poor knowledge regarding weight gain, increasing energy requirements, risks due to iron deficiency and timing of folic acid supplement. Elias and Green (2007) conducted a similar study in New Zealand involving 370 registered midwives. The purpose of the study was to evaluate midwives` knowledge on nutrition and how much the perceived nutritional advice was significant to the women under their care.

Elias and Green (2007) reported that only 40% of the midwives had obtained formal nutrition education out of which 75% had got it as a component of their midwifery syllabus. Despite the low level of formal nutrition education, majority of the midwives realized that nutrition was very important during pregnancy and nearly 95% of their participants believed that they had a ‘significant to very significant role’ in educating pregnant women about their nutritional requirements.

It is evident from emerging literature that majority of the midwives are involved in providing nutrition education to pregnant women but have no formal nutrition education(Biro, 2011; Kennedy, Anderson, & Leap, 2010). It raises serious questions on healthcare standards and preparedness of healthcare professionals, especially the community midwives, for provision of nutrition counseling (Arrish et al., 2014). In Australia, a recent report has identified core competencies and education requirements of maternity service providers and concluded that promotion of healthy eating among pregnant women was an important role of maternity services providers (Homer et al., 2009).

There are only a few research articles that explore the nutritional knowledge, role and attitude of midwives towards providing nutrition education during pregnancy (Arrish et al., 2014). A study reported that Australian midwives were involved in providing nutritional advice in general and only provided nutritional advice to the women having issues such as obesity, digestive problems or those who have to follow a vegetarian diet (Bondarianzadeh, Yeatman, & Condon-Paoloni, 2011).

In another study conducted by schmeid et al. (2011), it was reported that the midwives and other health professionals dealing with pregnant women realized that they lacked the necessary information, resources and communication skills to deal with the ever increasing obesity epidemic among pregnant women. The UK midwives reported the lack of background knowledge, training and communication skills to conduct counseling sessions with pregnant women for healthy eating practices (Lee, Haynes, & Garrod, 2010). Therefore, it can be stated that the results obtained from different countries such as New Zealand, Australia and UK are consistent and emphasize the need to educate community midwives regarding nutritional requirements during pregnancy.

Szwajcer et al. (2009) undertook a study in Holland to explore the written and verbal communication of midwives and found that nutrition communication was inadequate and quite late in the emergency. The study found that brochures and pamphlets containing nutritional information were distributed by midwives to pregnant women but that information was never reinforced by the community midwives. As a result, the pregnant women neglected the information given on brochures. Another study found that nutritional advice given by midwives lacked scientific evidence (Wills & Forster, 2008).

The literature cited above suggests that midwives throughout the developed and developing world would benefit from the provision of more information on nutritional requirements of pregnant women (Barrowclough & Ford, 2001; Wills & Forster, 2008). Based on this assumption, Barrowclough & Ford (2001) developed learning materials for practicing midwives in the UK in order to improve their nutritional knowledge. The midwives who accessed and reviewed that open learning material showed significantly improved scores of knowledge on information. The mean scores reached 71.29 in post questionnaire as compared to only 46.81 in pre-questionnaire with $p<0.001$ (Barrowclough & Ford, 2001).

Therefore, the authors recommended including such education in the healthcare officials` annual training programs(Ilmonen, Isolauri, & Laitinen, 2012; Shieh & Carter, 2011). Based on these findings, the current study also devised an intervention of two days to provide nutrition knowledge and skill to the midwives and evaluate the effectiveness of the intervention by comparing the mean scores obtained by the participants in pre and post questionnaire.

2.4 Midwives: The Primary Source of Nutrition Information for Pregnant Women

Dieticians and nutritionists are the key professionals for providing dietary or nutrition advice to the people including the pregnant women. A study conducted in Australia confirmed that pregnant women preferred to get nutritional advice from a nutritionist but they had not access to such specialists (Wilkinson & Tolcher, 2010). Moreover, the lower number of qualified nutritionists makes it unlikely for pregnant women to consult nutritionists available in maternity services.

It is more likely for pregnant women, particularly with low health risks, to have the services of a midwife. As the primary care providers to pregnant women, the community midwives are the primary source of nutritional advice. Therefore, midwives should be given the opportunity to benefit from guidelines developed by nutritionists for pregnant women or they should be facilitated to collaborate with nutritionists to provide effective nutrition information (Arrish et al., 2014; Davis et al., 2012; Saravanan & Yajnik, 2010; Schmied et al., 2011).

As the primary source of nutritional information to pregnant women, the midwives should be equipped with all the essential knowledge and skills to improve nutritional education of pregnant women including health issues like obesity and overweight. The studies (Kolasa, Zinn, & Moss, 1997; Schaller & James, 2005) have emphasized to address the issue of nutritional education by including the nutritional education in the midwifery curricula.

2.5 Conclusion

The review of literature has highlighted the fact that midwives are the primary source of nutrition information for pregnant women. There is relatively low

knowledge about the current role of community midwives in nutritional education of pregnant women. There is a lack of research on the role of midwives in providing nutrition education except for a few countries such as New Zealand, UK, USA, Holland and Australia. No such study was found from Pakistan emphasizing the value and need of conducting the current study. The review of literature revealed that midwives realized the significance of nutritional advice during pregnancy and their role in educating women regarding their nutritional needs. It was also concluded from the review that some midwives realized the lack of their background knowledge on nutritional requirements of pregnant women. The lack of nutrition information among community midwives may be attributed to the inadequacy of emphasis on nutritional part/ nutritional guidelines in midwifery syllabus.

Chapter 3

Methodology – Research Design

3.1 Study Design

Research methodology encompasses the entire steps involved in a study. Keeping in view the aim and objectives of this study, the study followed quantitative design involving an interventional study. For this purpose, the practicing community midwives were randomly selected as participants. In order to tackle the ethical issues, the participants were requested to sign a consent form. They were told that theirparticipation in the study will be entirely voluntary and they could withdraw their consent at any stage of the study. In order to assess the baseline knowledge of the community midwives who showed consent to participate in the study, were requested to fill a pretest form containing demographic as well as the questions relevant to nutritional needs during pregnancy.

A two days training program was organized in which the participants were given the basic and essential knowledge and skill for imparting nutritional information to pregnant women. The purpose of using this study design was to evaluate the knowledge and skills of the participants regarding the nutritional requirements during pregnancy prior to and after the interventional program so that the changes or improvement in the approach and knowledge of the participants can be identified and reported.

3.2 Location and Setting of the Study

The interventional study was conducted at the College of Nursing, Nishtar Medical College and Hospital, Multan, Punjab, Pakistan. The population under study was the entire number of community midwives working in District Multan, Punjab,

Pakistan. The community midwives working in this area belong to different social and economic background. Therefore, the demographic data about the participants was also collected (AppendixI). The inclusion and exclusion criteria of participants utilized for this study is discussed below.

3.2.1 Inclusion and Exclusion Criteria

The inclusion criteria were the willingness of a midwife to participate in the study, minimum age 18 years, minimum field experience of one year after successfully completing the diploma or training program of the community midwifery from a recognized institute.

The following were the exclusion criteria for this study. Any midwife having experience less than a year was not allowed to participate in this study. None of the participants was less than 18 years of age. The consent of the midwives to participate in the program was essential and midwives who did not sign the consent form were excluded from this investigation.

3.3 The Pre and Post Training Questionnaire

In order to assess the knowledge of the participants with respect to nutritional requirement of pregnant women, the pre-test questionnaire included questions such as the normal weight gain during pregnancy, calories required during first, second and third trimester, follate, vitamin B12, iodine, iron and, zinc requirement and effects of deficiency of certain nutritional elements on pregnant lady and her growing fetus were designed(appendix III). Moreover, the skill of the midwives relevant to nutritional requirements of the pregnant women, a pre-test was also designed (Appendix IV). The demographic details of the participants including name, age, educational qualification, experience and current status of work i.e. either working currently or not was also

collected(appendix1).The same questionnaires were utilized as post tests to the selected sample of participants i.e. community midwives.

3.4 Sample

As stated earlier, the sample was taken from the target population of the community midwives working in district Multan, Punjab, Pakistan. The inclusion criteria were observed to randomly select the sample from this population. The sample contained 25 registered midwives from the target population. All the sampled participants showed consent to participate in the study by signing the consent form given in (appendix II).The participants filled the pre-test questionnaire described above and were asked to attend a two day training program as described below.

3.5 Intervention: Training Program

Intervention is defined as an activity that is aimed at changing the current situation or state of an affair. In the context of the current study, the intervention encompasses the training and teaching of the community midwives who were the participants of this study. The purpose of this intervention was to impart adequate knowledge and skills to the participants so the difference between the value of their knowledge and skills before and after this intervention could be computed. The training program was arranged and designed in such a way that it could impart knowledge and skill related to the dietary needs of the pregnant women considering the health history of each woman. Moreover, the knowledge regarding the appropriate amount of nutrients and frequency of intake during different stages of the pregnancy was also imparted to the participants of this study.

The training and practice sessions of this intervention were designed so that the participants could learn how to provide counseling to pregnant woman i.e.

different steps required for counseling were demonstrated through role model techniques. The aim was to train the participants and enable them to provide dietary counseling to the pregnant women skillfully. The intervention was aimed at enabling the participants to take the health histories of pregnant women communicate effectively and impart essential dietary information in addition to solving the queries raised by the pregnant women they would visit.

After conducting the pre-test to assess the skills and knowledge of the participants regarding nutritional requirements of pregnant women, the participants of the study were given 2 days training and education. The training session basically consisted of two sessions. The first session emphasized on imparting knowledge regarding the nutritional requirements and nutritional deficiencies commonly reported in pregnant women. The main theme of this training session was to educate the community midwives of the area with the knowledge about the nutritional requirements of pregnant women during each trimesters of the pregnancy. Moreover, they were also educated about the harms and complexities caused by the nutritional deficiencies in pregnant women.

During the course of this training session, the participants were given presentations regarding how appropriate nutrition could help in preventing complexities due to nutritional deficiencies during and after pregnancy. They were taught the significance of intake of vitamins and nutrition rich in iron, zinc and iodine at appropriate times.The second session of the training program emphasized on the counseling skill development of community midwives i.e. the demonstrations were made in order to train the participants how to communicate and impart the acquired knowledge during the first session to the pregnant women in the area. The researcher performed the demonstrations in this two day interventional training. The skills to

impart the learned knowledge to the target (i.e. pregnant women) are equally important for the better performance of the community midwives. The activities performed during this training sessions are discussed below.

Tutorials and presentations containing relevant knowledge were conducted in the first part of the training program followed by practice session in the afternoon. On the same day, the presentation was given regarding the communication skills, their relevance and importance in midwifery. The role model techniques were also demonstrated to the participants by the researcher. During practice sessions, each participant was made to perform a counseling session with a pregnant woman. On second day all participants were evaluated individually by re-demonstration of learned counseling skills. To see the efficiency of counseling session the researcher utilized a self-developed checklist (Appendix IV).The criteria for qualifying as a knowledgeable and skilled midwife were set to show 100% efficiency in the counseling session. The participants who fulfilled the criteria of 100% efficiency were certified as nutrition specialists for pregnant ladies and will be titled the midwives who have knowledge and skill of being a nutrition specialist for pregnant women.

In terms of knowledge, it was required that each participant must have 85% of the accurate knowledge at the end of the intervention or training program. However, 100% efficiency was required in terms of the skills and communication methods to impart the acquired knowledge to the pregnant women. The checklist was filled by the researcher who assessed the skills based on the criterion that the midwives followed all the steps accurately during the counseling session. Checklist was rated at the scale of 1 to 3 with 1 for not followed at all, 2 for partially followed and 3 for the appropriately followed. It was essential for a midwife to fall within the category of 2

or 3 in order to be certified as the skilled midwife in terms of nutrition of a pregnant woman.

3.6 Ethical Approval

The ethical approval of this study was taken from the Ethical Review Committee set by the District Health Officer, Multan, Punjab, Pakistan. Before signing the consent form (Appendix V) the participants were informed about the purpose of the study, its implications for the mother and child in general and for the future of the community midwives in particular. They were assured of the confidentiality of the data that could lead to their identification. They were also assured that the study would address their concerns such as privacy, anonymity and autonomy to participate or decline to participate in the research. The privacy and anonymity was maintained by using codes instead of the names of participants. They were informed that nobody could force them to participate in the study and they could leave the study at any stage if they had any concerns.

3.7 Data Collection

The overall research plan can be summarized in four steps including the pre-test, teaching sessions, observations of skills and post-test. The data collection instrument for this study included the questionnaire utilized for the pre and post test of the participants to assess their knowledge and skills before and after the teaching sessions. Moreover, the checklist used to assess the performance of the participants during practice sessions was also the instrument of data collection for this research.

The same questionnaire was utilized for pre and posttest in order to test the effectiveness of the intervention i.e. training and teaching sessions. The purpose of taking these tests was to assess and evaluate the skills and knowledge of the

participants regarding the dietary requirements of the pregnant women before the teaching sessions and training and then compare it with the knowledge and skills after attending the training program. It enabled the researcher to make a comparison and measure improvements.

After successful completion of the teaching sessions utilizing lectures, presentations and other teaching methods, the post test was conducted immediately in order to assess the effectiveness of teaching methods. The data collected in this way was useful in assessing the difference in knowledge before and after the intervention.

Another source of data was the observation of communication and counseling skills. The skill observations were also made twice, once before the intervention and second after the intervention. The comparison of these two data sets allowed the researcher to understand the difference in communication skills and competency of conducting dietary counseling sessions. The checklist for observing and evaluating practice counseling sessions is given (Appendix IV).

3.8 Data Analysis Methods

The data collected before and after the intervention was entered into the data editor of the SPSS (Statistical Package for Social Sciences) *version*21 and were analyzed for descriptive analysis. The detailed methods used for data analysis are discussed below.

3.8.1 Descriptive Statistics:

The data was subjected to descriptive analysis at first. The descriptive helped the researcher to understand and summarize the characteristics of data such as variation in responses. The variation between the scores before and after the intervention expected. The descriptive such as mean, standard deviation (SD) and

standard mean error (SE). The first section of the questionnaire was subjected to frequency analysis in addition to descriptive analysis.

The frequencies and descriptive of this section allowed the researcher to understand the demographics of the participants and look for any effects of demographics such as education and experience on the knowledge of participants regarding the nutritional requirements of pregnant women, nutritional complexities and issues caused by nutritional deficiency as explained in the next chapter. The results of frequency and descriptive analysis are presented in tabular and graphical form in the data analysis and results section.

3.8.2 Comparing Means

One of the fundamental aims of this study was to compare the effectiveness of intervention or training program involving training and teaching to community midwives regarding the nutritional requirements of a pregnant woman and skills required to impart knowledge during counseling sessions with pregnant women. Data for this purpose was collected by a pre and post test conducted before and after training and teaching programsby the researcher; it was based on the same questionnaire.

To compare the means of pre and post test scores, t statistics and McNemar Test were conducted. Moreover, the correlations between different demographics such as education, experience and pre and post test scores were estimated in order to estimate if education and experience affected the performance of the participants in the pre and post test scores. Since the pre and posttest involved the same sample, the non – parametric tests for related samples were conducted to evaluate if the means of pre and post test scores were significantly different.

Chapter – 4

Data Analysis and Results

4.1 Introduction

This chapter presents the results obtained from the analysis of data collected during this study. The results are presented in tabular and graphical form and interpreted. The chapter mainly consists of three sections. First section presents the results obtained from the analysis of demographic data of the participants and related questions. The second sections presents the results obtained from the analysis of questions regarding the nutritional requirements of pregnant women. It also illustrates the differences between the means of participants` scores in pre and posttests.

Third section of this chapter entails the analysis of data obtained from checklists before and after the training sessions, in order to show the comparison in the counseling skills of the community midwives to conduct counseling sessions with pregnant women.

4.2 Descriptive Statistics: Demographics

The first section of the questionnaire contained questions regarding the qualification and experience of the community midwives participating in this study. The data obtained were analyzed for frequency and descriptive statistics and results are illustrated below (Fig. 1 & 2). It was found from the analysis of data that most of the participants (i.e. 48%) had formal education up to intermediate level i.e. FA/FSc and while only 24% of the participants had formal education up to graduate level.

28% of the participants reported to have high school level of education with matriculation as their highest academic qualification. The data shows that 72% of the

participants had acquired college level education and were working as midwives in the community.

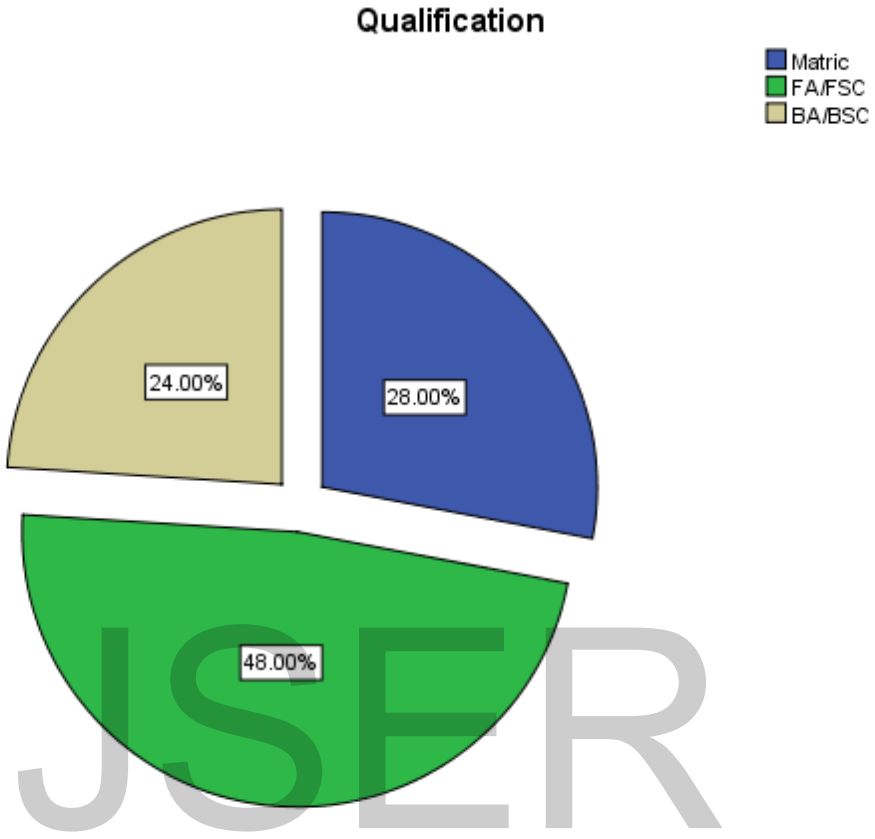

Figure 1: Qualification of the Participants

As far as the experience of field work of the participants as community midwives is concerned, it was revealed from the analysis of data that 64% of the participants were working in this field for 1-3 years, 28% had the experience of working for 4-5 years and 8% of the participants reported that they were working as community midwives for more than 5 years in the area (Fig. 2). Keeping in view the experience of the participants it can be assessed that these community midwives were counseling pregnant women in the area of District Multan for a considerable time.

The numbers of pregnant women encountered by the participants each month were also recorded in order to illustrate the significant contribution of this study to the community in the area of the study. The results obtained from the analysis of these data are discussed below.

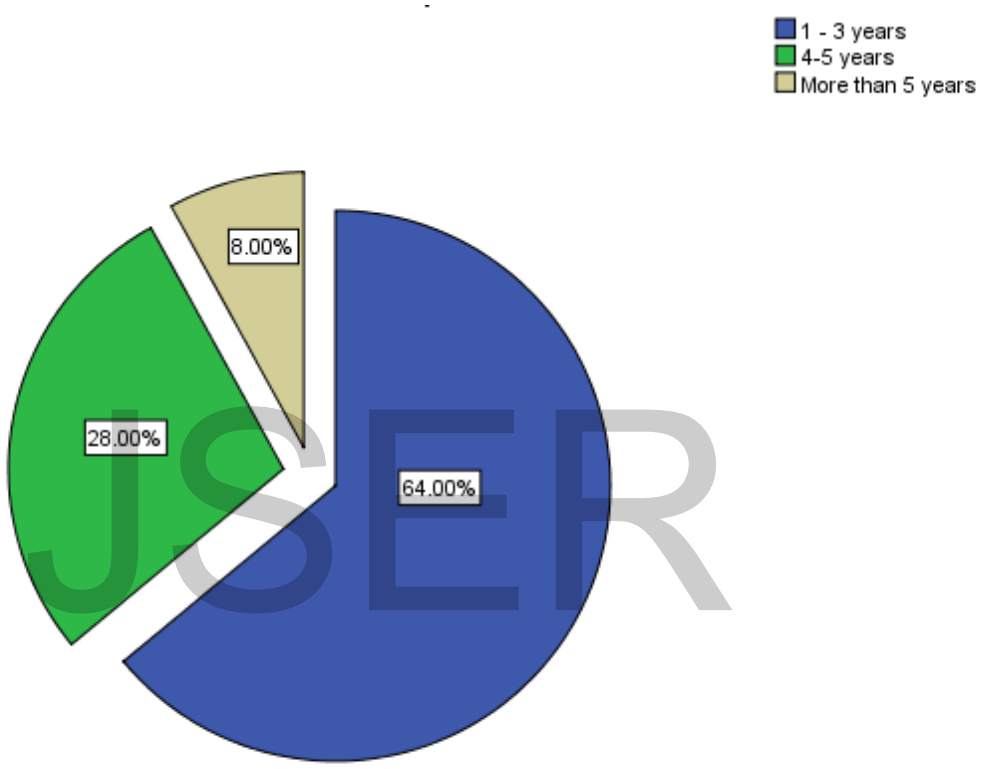

Figure 2: Experience of the Participants

Descriptive statistics for the qualification and experience of the participants of this study are presented in the following table (Table 1). It shows that the mean values for educational qualification and experience of the participants are 1.96 and 1.44 showing that most of the participants had educational qualification of FA/FSc and

experience of 1-3 years in the field. The measures of dispersion including standard deviation, and standard error of mean are also calculated.

The valuesof standard deviation and standard error of mean showed that the data were uniform and largely centered around means. The SE of mean for qualification is 0.14 and for experience of the participants it was only 0.13 as illustrated below. Standard deviation for qualification and experience of the participants was calculated to be ±0.73 and ±0.65 respectively.

Table 1: Descriptive statistics for qualification and Experienceof the participants

Character	Mean (Std.Dev)
Qualification (n=25)	1.96 (1.44)
Experience (n=25)	0.73 (0.65)

The participants were also asked about the average number of prenatal clients and postnatal clients attended by them in the time span of a month. The data were also collected about the average number of delivery cases attended by each participant per month. The data were analyzed for the descriptive and results are illustrated below (Table 2).

It was found that each participant of the study, on an average, attended to approximately 18 cases of pre natal clients each month, approximately 7 cases of deliveries and approximately six cases of postnatal clients were attended by each participant of this study. Standard error of mean for all these variables is relatively

small. However, the standard deviation of ±10 for average number of prenatal clients per month and ±5.36 for average number of postnatal clients per month indicates that the data were scattered and not concentrated around the mean.

Therefore, it can be concluded that the practice of the community midwives fluctuated largely i.e. a community midwife could encounter prenatal cases numbering as low as 8 and as high as 28 keeping view the SD of ±10. Similarly, the postnatal clients attended by each community midwife could vary from 0 to 11 considering the SD of ±5.36.

Table 2: Descriptive Statistics showing the years of practice of participants

Character	Mean (std. Dev)
Average prenatal Clients per month (n= 25)	18.20 (10.03)
Average deliveries per month (n= 25)	6.68 (3.22)
Average postnatal client per month (n= 25)	5.72 (5.35)

These findings are of significant importance as they help in estimating the number of pregnant women being attended by the community midwives practicing in the area. Imparting knowledge of nutritional requirement of the pregnant ladies to these participants could lead to welfare and appropriate nutritional plans for many pregnant women in the area.

In order to plan the intervention or training effectively, the participants were asked some questions about their knowledge and source of knowledge relevant to the nutritional requirements of the pregnant women. The data were collected and analyzed and results are depicted below (Table 3 & 4).

The participants were asked if they had learnt that the pregnant women had special nutritional requirements. Regarding the nutritional requirements of pregnant ladies, 92% of the participants (Table 3) reported that they had learnt about the nutritional requirements of pregnant women and only 8% were to report that they had not learnt about these requirements. It means there were community midwives who were not providing any counseling regarding the nutrition to the pregnant women of the area. However, the number of the participants reporting to have not learnt about nutritional requirements was quite small.

To assess the level of knowledge the participants had about the nutritional requirements, they were asked if they were satisfied with the knowledge they had regarding the nutritional needs of pregnant ladies. The purpose of this question was to assess the level to which these community midwives could advise nutritional plans to the pregnant ladies they were attending.

The analysis of the data revealed that 88% (Table 4) of the community midwives participating in this study were satisfied with the level of knowledge they had about the nutritional needs of pregnant women. It means they were using this knowledge to address the nutritional concerns of the pregnant ladies in their respective areas.

Table 3: Have you learnt about the nutritional requirement of a pregnant lady?

learnt about the nutritional requirement of a pregnant lady	n (%)
Yes	23 (92.0)
No	2 (8.0)
Total	25 (100.0)

Table 4: Are you satisfied with the knowledge about nutritional requirement of a pregnant woman.

Satisfied with the knowledge about nutritional requirement	n (%)
Yes	22 (88.0)
No	3 (12.0)
Total	25 (100.0)

Only 12% of the participants reported that they were not satisfied with their current knowledge related to the nutritional requirements of the pregnant ladies. It can be concluded that only 12% of the participants of this study were conscious of the fact that there knowledge regarding the nutritional requirements of their clients was not satisfactory and they were willing to add to their knowledge in order to provide proper counseling to their clients.

The participants were also asked about the source of their knowledge relevant to the nutritional needs of their clients. Data collected in response to this question were analyzed and it was found that 84% of the participants acquired the knowledge regarding the nutritional needs of the pregnant ladies from books. 8% of the participants reported to acquire this knowledge from the dieticians and another 8% reported to had acquired this knowledge from the different sources of media like TV, Newspapers and Magazines as illustrated below (Fig. 3).

These results are indicative of the fact that there is a need to discuss the nutritional needs of pregnant women through media so that more and more pregnant women and the community midwives can learn and impart this knowledge to their clients. Books were reported to be the largest source of this information as most of the midwives would have learnt this knowledge from the books during their training and education of midwifery diploma or course.

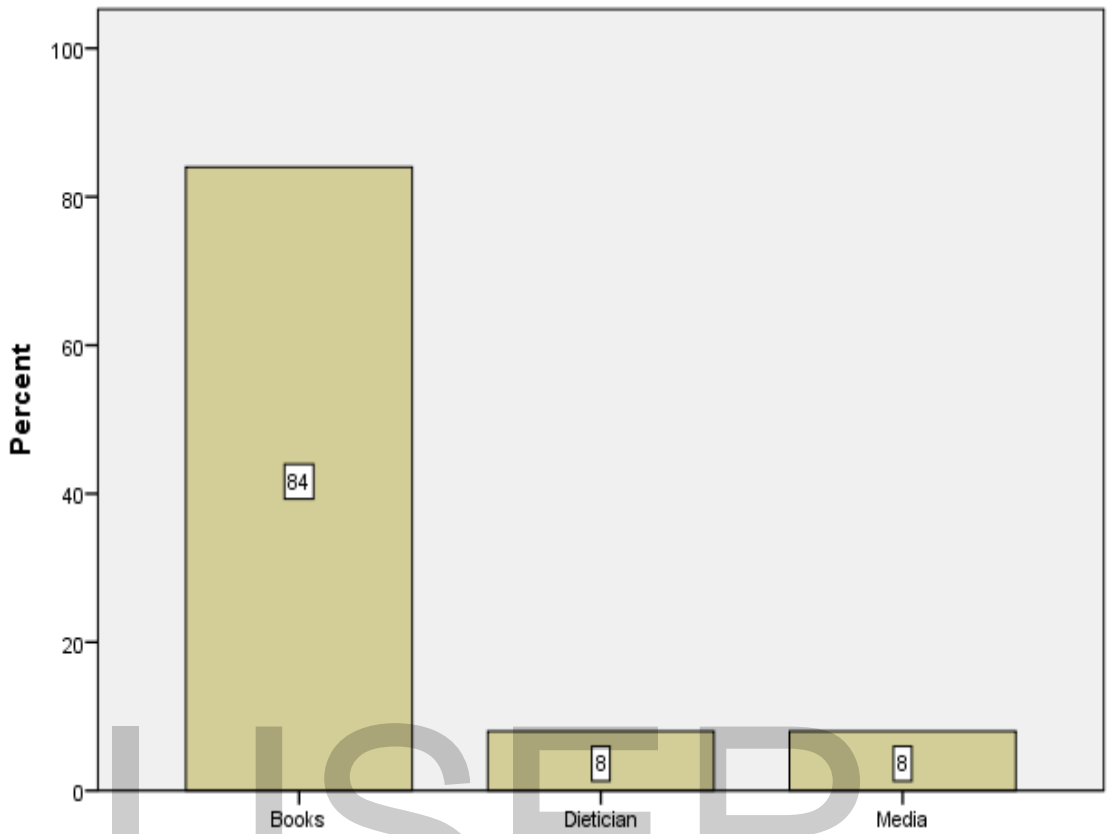

Figure 3: Participant's source of knowledge regarding the nutritional requirement of pregnant ladies

4.3 Comparing Means

One of the key objectives of this study was to evaluate and determine the existing knowledge of the community midwives about nutritional requirements during pregnancy.For this purpose, a pretest was conducted and data were collected. Another key objective was to conduct an intervention and evaluate if the impacts of the intervention on the knowledge of the participants relevant to nutritional requirements during pregnancy were significant. For this purpose, a post training test was conducted and data were collected. The data acquired through the pre and post tests were subjected to statistical analysis and the results of the data analysis are presented in this section.

First of all, the descriptive for the pre and post test scores are given below (Table 5). These descriptives provide the mean values of scores acquired by the participants in the pre and post intervention tests. The mean value for pre-test scores was calculated to be 5.92 while it was 12.52 and 13.88 for the post-tests. The standard deviations for pre and post scores are ±1.4, ±2.25 and ±1.39 respectively.

Therefore, it can be concluded that the data for pre and post test scores were approximately normally distributed. Standard error of means have small values showing that the data had no implying that there were no significant outliers.

Table 5: Descriptive Statistics: Pre and Post Test Scores

Characters	Mean (Std .Dev)
Pre- test Scores (n=25)	5.92 (1.38)
Post-test Scores after first day of intervention (n=25)	12.52 (2.25)
Post-test Scores after second day of intervention (n=25)	13.88 (1.394)

4.3.1 McNemar Test Results for Comparing Results of Pre and Post knowledge Test

In order to compare results of the pre and posttest, the McNemar test was conducted. The results are illustrated below (Table 6 & 7).The Crosstabs (Table 6) show the proportion of the participants who failed the pre-intervention test (i.e. the criteria to pass the pre-test was to obtain marks ≥ 50%) but passed post-intervention test. It is found that 20 participants failed the pre-intervention test but passed post-intervention test showing a sizeable effect of the intervention on the knowledge of the participants.

In order to find whether the proportion of students who passed pre-intervention test differed significantly from the number of participants who passed post-intervention test, one has to look at the t-statistics table of the McNemar test. It shows (Table 7) that there was a significant positive impact of the intervention on the results of the post with $p < 0.0001$.

Table 6: Crosstabs: Pre-Test Scores & Post-Test Scores

Pre-test Scores	Post-test Scores	
	Fail	Pass
Fail	1	20
Pass	0	4

Table 7: McNemar'sTest:TestStatistics[a]

Characters	Exact Sig. (2-tailed)
Pre-test Scores (n=25)	0.000[b]
Post-test Scores (n=25)	0.000[b]
a. McNemar's Test b. Binomial Distribution used	

4.3.2 ANOVA for Repeated Measures

The analysis of variance (ANOVA) with repeated measures is a statistical test that can be applied to compare at least three different group means when the participants are same in each group as is the case in this study. The same participants were subjected to the tests before and after the intervention program and their scores were calculated.

Thus, the same group of participants was measured three time: once before the intervention called pretest, second after conducting the presentations and teachings during the first day of intervention and lastly, the test was conducted after the end of the intervention on the second day: both of these tests were called post-tests. The data fulfilled the basic assumptions of the one way ANOVA with repeated measures. The data were subjected to ANOVA with repeated measures and the results are presented below.

First of all, the descriptive analysis table is obtained which has been presented and interpreted above. The second table obtained through ANOVA was the multivariate tests. As is illustrated below, the Wilks` Lambda shows p value is 0.000 or <0.001 indicating that the intervention had statistically significant impact on the test scores obtained by the participants of this study.

The other effects also show similar results and support the hypothesis that the intervention had statistically significant effect on the scores obtained by the participants. In other words, the intervention resulted in significant increase in the knowledge of the community midwives relevant to the nutritional needs during pregnancy

Another value of interest in the following table (Table 7) is the partial eta squared value which gives the effect size for the difference in means. This value is 0.95 indicating a very large effect study for the intervention and training.

Table 8:Multivariate Tests[a]

Time	Effects	Value	F	Sig.	Partial Eta Squared
	Wilks' Lambda	0.04	227.37[b]	0.00	0.95
a. Design: Intercept Within Subjects Design: Time b. Exact statistic					

The next table in the ANOVA with repeated measures is Tests of within-subjects effects (Table 8). It provides the F value for the time factor (before and after intervention) along with the p value and effect size in the form of partial eta squared. The data obtained during this study violates the assumption of sphericity. Therefore, the row of interest in this table is 'the Greenhouse – Geisser' row.

The ANOVA with repeated measures following Greenhouse – Geisser correction indicates that the mean scores obtained by the participants of this study in tests before, during and after the intervention were statistically different at F (1.371, 32.898) = 235.84 with p = 0.000 and a very large effect size of 0.90 (Table 8).

Table 9: Tests of Within-Subjects Effects

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time	Sphericity Assumed	906.427	2	453.213	235.844	.000	.908
	Greenhouse-Geisser	906.427	1.371	661.267	235.844	.000	.908
Error(Time)	Sphericity Assumed	92.240	48	1.922			
	Greenhouse-Geisser	92.240	32.898	2.804			

The above tables show that the group means were significantly different overall but it is not clear where the difference occurred. The ANOVA with repeated measures generates another table called Pair-wise comparisons (Table 9) which compare each pair of time and shows where the significant difference between means of the test scores occurred.

It is evident from the p values given in the significance column that the means of each pair were statistically and significantly different from other pairs. In other words, one can state that the mean scores of pretest were statistically different from the mean scores posttest after first day of intervention (i.e. during intervention) and after the completion of the intervention on the second day. The p values for all the mean differences are less than 0.05 which is the confidence interval used during this study. The p values for all the mean differences (I – J) values are 0.000 indicating the

significance in the mean differences of scores obtained by the participants at different times during this study.

Table 10: Pair-wise Comparisons

(I) Time	(J) Time	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
1	2	-6.600*	.493	.000	-7.870	-5.330
	3	-7.960*	.394	.000	-8.973	-6.947
2	1	6.600*	.493	.000	5.330	7.870
	3	-1.360*	.251	.000	-2.006	-.714
3	1	7.960*	.394	.000	6.947	8.973
	2	1.360*	.251	.000	.714	2.006

Based on estimated marginal means
*. The mean difference is significant at the .05 level.
b. Adjustment for multiple comparisons: Bonferroni.

The overall results obtained from the ANOVA with repeated measures can be stated as given here. A one way ANOVA with repeated measures was conducted to compare the mean scores of the participants in a test conducted before, during and after the intervention and training program especially designed to assess the existing knowledge of the community midwives regarding the nutritional needs of pregnant women and improve their knowledge, and to assess the improvements as the result of this intervention. The intervention had significant effect with time, Wilks` Lambda is 0.05, F (1.371, 32.898) = 235.84 with p = 0.000 and multivariate partial squared or effect size = 0.90. These results evidently suggest that the knowledge of the participants regarding the nutritional requirements of the pregnant women increased significantly with the passage of time in this interventional study.

In order to gain convenient understanding of the results presented in tabulated form and interpreted above, the following graph (Fig. 5) also presents the difference between the mean scores of the participants obtained in the test conducted before, during and after the intervention program.

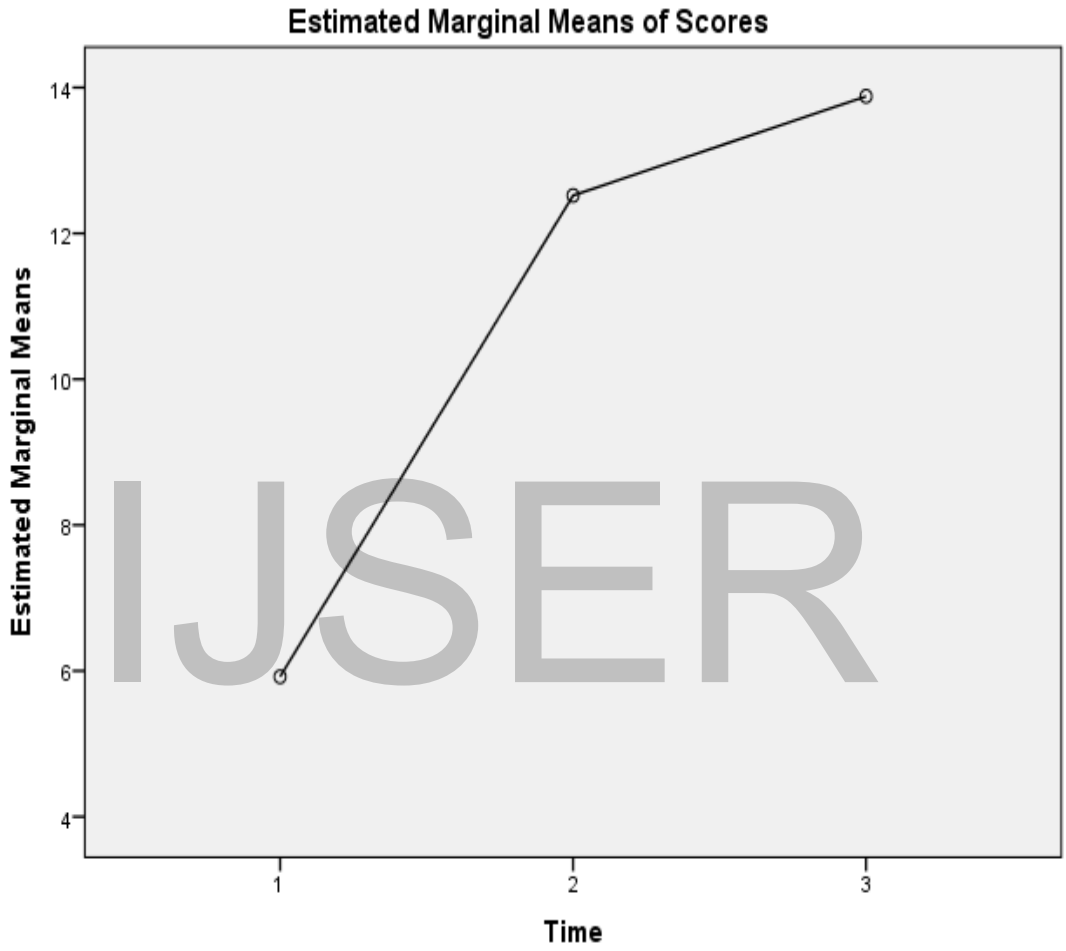

Figure 4: Estimated marginal means of scores obtained in the test by the participants

4.3.3 Correlation Analysis

The data regarding the qualification of the participants, their experience and the scores in pre and post tests were subjected to correlation analysis. The results obtained from this analysis are illustrated below (Table 10). Correlation analysis was conducted to assess the predictors of the post test scores other than the intervention or

training program. It helped the researcher to look into the mean differences in the scores of pre and posttests more closely and understand their significance.

The results of the correlation analysis revealed that the educational qualification of the participants of this study was positively correlated with the post test scores obtained by the community midwives participating in this interventional study. It is evident from the following table that the correlation between the qualification of the participants and their post test scores are significantly and positively correlated at $\alpha = 0.616$, $N = 25$ and $p < 0.001$.

Another interesting result obtained from the correlation analysis is that there is a negative correlation between the experience of the participants and their scores in the pre test. Statistically, the experience and pre test scores were negatively correlated at $\alpha = -0.562$, $N = 25$ and $p < 0.001$. From these statistics, it can be concluded that the community midwives with current diplomas and training of the midwifery had more knowledge about the nutritional requirements of the pregnant women as compared to those who were working as midwives for a longer period of time and obtained their diplomas or training relatively earlier.

Table 11: Correlations

		Qualification	Experience	Pre-Test Scores	Post-Test Scores
Qualification	Pearson Correlation (n=25)	1			
	Sig. (2-tailed)				
Experience	Pearson Correlation (n=25)	-.136	1		
	Sig. (2-tailed)	.517			
Pre-Test Scores	Pearson Correlation (n=25)	.243	-.562**	1	
	Sig. (2-tailed)	.242	.003		
Post-Test Scores	Pearson Correlation (n=25)	.616**	-.077	.147	1
	Sig. (2-tailed)	.001	.714	.482	
**. Correlation is significant at the 0.01 level (2-tailed).					

4.4 Comparing Results of Skill Tests

The data obtained from pre and post-intervention skill tests was analyzed to find out whether there was a significant difference between proportions of the participants who passed the skill-test before and after the intervention. The data was subjected to McNmar test and results are illustrated below (Table 11 & 12). The crosstabs table (Table 11) shows that 14 participants who failed the pre-intervention

test passed the test after going through the intervention. There was no negative impact of the intervention as no participant who passed the pre-intervention test failed after intervention. t-statistics ($p < 0.05$) show that there was a significant difference in proportions of participants who passed the test after intervention. It suggests that intervention had significant impact on the counseling skills of the community midwives who participated in this study.

Table 12: Crosstabs: Results of Pre-intervention Skill-test & Results of Post-intervention Skill-test

Results of Pre-intervention Skill-test	Results of Post-intervention Skill-test	
	Fail	Pass
Fail	6	14
Pass	0	5

Table 13: Test Statistics[a]

	Results of Pre-intervention & Post-intervention Skill-tests
Exact Sig. (2-tailed) (n=25)	.000[b]
a. McNemar Test b. Binomial distribution used.	

This chapter has presented the results obtained from the analysis of data that were collected during this study. The next chapter presents the discussion of the results in light of the existing literature and the findings of this study.

Chapter – 5

Results Discussion

This chapter presents discussion of results obtained from the analysis of data and presented in the previous chapter. The results discussion is based on the findings of this study and the findings reported by the emerging literature relevant to the nutritional requirements of the pregnant women and the role of community midwives in disseminating knowledge and educating pregnant women regarding their additional nutritional requirements during pregnancy.

The study found that most of the participants claimed to have learnt regarding the nutritional requirements of a woman during pregnancy. However, only a few were not satisfied with their existing knowledge and realized the importance to gain knowledge relevant to nutrition. Szwajcer et al. (2005) presented the same results by emphasizing the need for the knowledge of the nutritional requirements of mothers and pregnant women.

Pregnant women do ask the community midwives about their nutrition management during different phases of pregnancy and changes expected in the body as stated by Wilkinson &Tolcher, 2010). Therefore, there is a need to educate the community midwives with the nutritional requirements of women in different phases of their pregnancy. The same need was identified by the current study when a pretest, conducted in order to assess the existing knowledge of practicing community midwives in the locality regarding the nutritional requirements, showed a huge gap in the knowledge of the community midwives participating in this study.

Out of sixteen questions regarding the nutritional needs of pregnant women and the complications caused by deficiency of certain nutrients such as iron, iodine,

zinc and folic acid, the average score for the pretest was approximately six. It clearly indicated the lack of relevant knowledge on the part of the participants in particular and the entire population of the community midwives in general. Thus, the study found that most of the community midwives satisfied with their present knowledge but were unable to give appropriate nutritional advice to the pregnant women. This finding is in line with the one reported by Begley (2002) who reported that pregnant women often lack the adequate nutritional advice.

The study found that a large majority (i.e. 84%) of the community midwives obtained information and knowledge relevant to nutritional requirements from books. Books have been the major source of this kind of information for the midwives and pregnant ladies according to Sinikovic et al. (2009). Therefore, this finding is also in line with the emerging literature relevant to topic of this study.

The study emphasized the role of community midwives in educating the pregnant women of the locality regarding the importance of appropriate nutrition during pregnancy. Appropriate nutritional advice can help in improved mother and child health and save them from different diseases or anomalies caused by nutritional deficiency. Therefore, the teaching sessions during the intervention imparted knowledge about the nutritional requirements during different trimesters of pregnancy, importance of certain nutrients and diseases caused by the deficiency of certain elements.

The approach of involving community midwives in an interventional program to enhance their knowledge about the nutritional needs of pregnant women is also in line with the findings of the emerging literature. For instance, Kennedy et al., (2010) confirmed the role of community midwives in imparting primary knowledge of

nutrition to the expecting women. The significance of involving community midwives in this interventional study is supported by the findings of Biro (2011) who reported that community health was elevated by the community midwives.

The study found that there was a huge gap in the existing knowledge of the community midwives relevant to nutritional requirements and the up-to-date knowledge they must possess. The good and up-to-date knowledge should be possessed by the community midwives so that they can educate pregnant women about their future health and the health of their child. This is in line with the findings of Elias & Green (2007).

Community Midwives are the key source of information for the pregnant women in the developing countries such as Pakistan. Therefore, the community midwives should have the necessary knowledge and skills to provide nutritional advice to such women. The study found that all the participants had very little knowledge about the nutrition,but were satisfied. It shows that they were unaware about the significance of nutrition for mother and childduring pregnancy.

The interventions were conducted and evaluated through the posttest during and after the interventional programs. The comparison of the mean scores obtained by the participants before and after the intervention confirmed that the intervention had significant impact on the knowledge of the participants regarding the nutritional needs of pregnant ladies. The mean scores for the tests conducted before,after the first day of the intervention programs and after the completion of the two different non-parametric tests and analysis of variance with repeated measures.

The existing literature also supports the value and advantage of the interventional studies in clinical trials and creating awareness. Therefore, this

interventional study design helped the researcher to impart knowledge and certain skills to conduct the counseling sessions with the pregnant women regarding nutrition. As a result of the intervention, the knowledge and skill of the participants improved to a large extent and the participants were in a better position to assess the nutritional needs of their prenatal and postnatal clients. The study not only provided an insight into the current ability of the community midwives to conduct counseling sessions with the pregnant women but also provided an effective way to impart knowledge and skills necessary for the community midwives.

The results of the study also showed that the experience and qualification of the participants were correlated with the pre and post test scores of the participants. The qualification of the participants and their post test scores were positively and significantly correlated while a negative correlation was observed in pretest scores and experience of the participants.Therefore, the intervention was not the only predictor of the difference in mean scores of the participants in posttests but the results were also affected by qualification and experience of the participants to some extent.

This study has found that the intervention had significant impact on the knowledge and skills of the community midwives regarding the nutritional needs of pregnant ladies. There is a need to investigate the extent to which the difference of means was predicted by the intervention program.

Another notable finding of this study is a very large effect size for the intervention program. According to the results, the effect size for the interventional program was quite high i.e. 0.95. It is indicative of the fact that the presentations and

teaching followed by practice sessions could prove valuable to improve the knowledge and skills of the community midwives.

It must be noted that the sample size was only 25 and that might be the cause for an extraordinarily large successof the intervention program. However, the study can be repeated with relatively larger sample size to get a more precise effect size for the interventional program conducted by the researcher during this study. The results, especially the comparison of means, show that the intervention programs brought statistically significant improvement in the knowledge of the community midwives regarding the nutritional needs of the pregnant women.

In order to test the effect size obtained during this study, the study may be repeated with independent samples where one group would be subjected to the intervention and the other would not be exposed to intervention programs. In the end, it can be summarized that the knowledge of the community midwives regarding the nutritional needs during pregnancy was significantly improved due to the intervention programs conducted for two days.

Chapter – 6

Conclusion

This chapter presents the conclusion of the study conducted to assess and improve the knowledge of community midwives regarding the nutritional needs of the women during pregnancy. It discusses the aim and objectives of the study and the way this study successfully achieved these goals.

The main aim of the research was to evaluate the current knowledge and skill levels of community midwives regarding nutrition during different phases of pregnancy and to improve this knowledge through the intervention or training program.

The first and foremost objective was to determine the present knowledge of the participants about nutrition during pregnancy. This objective was achieved by constructing a questionnaire and conducting a test involving all the participants. They were asked to answer questions regarding the nutritional requirements during pregnancy.

The results of the tests showed that, on an average, the participants scored 5 to 6 marks out of 16. Thus, it was found that there existed a gap in the knowledge of the community midwives regarding nutritional needs during pregnancy. Thus, the first objective of the study was successfully achieved by recruiting the community midwives as the participants of the study and conducting a pre intervention test.

The second objective of the study was to assess the gap in the knowledge possessed by the community midwives and the up-to-date information or knowledge with that they must be equipped with. After the pre-test, it was easy to assess the gap

in the knowledge of the participants. This assessment was of great help in preparing the training program and designing the intervention in such a way that the maximum knowledge can be imparted to the participants of the intervention program. Moreover, it was also found that most of the community midwives were satisfied with their existing knowledge despite the need to improve and gain maximum and current knowledge. Thus, the second objective of the study was also achieved successfully.

The next objective of the study was to conduct interventions involving the subjects or participants in order to fill the gaps in knowledge and skills of the participants. The intervention was designed in such a way that comprehensive and current knowledge could be imparted to the participants. Keeping in view the scores of the pretest, the intervention focused on the energy requirements during different phases of pregnancy, major nutrients required, the diseased and complexities caused due to deficiency of certain nutrients such as iodine, zinc, iron etc, and the vitamin and follate requirements of a pregnant women. They were also taught how to conduct counseling sessions with their clients and assess their nutritional needs by asking certain questions and their health history.

Another objective of the study was to evaluate the results of the intervention in study subjects or the participants of the training program. This was done by conducting post training tests at the end of the first day of the interventional program and the completion of the intervention program after two days. The scores obtained during the posts tests were compared with the scores in the pretest in order to evaluate the effect of the intervention.

Through comparing mean scores in the pre and posttests, it was concluded that there was statistically significant difference between the mean scores of the pre

intervention test and the post intervention tests. Thus, it was confirmed that the intervention had significantly improved the knowledge of the study subjects regarding nutritional requirements during pregnancy.

From the findings of this study, it can be concluded that the community midwives of the area lacked the knowledge relevant to nutritional needs during pregnancy and they could not provide appropriate nutritional advice to the pregnant women and mothers feeding their babies. Moreover, it was found that the community midwives were willing to learn if they were given the opportunity to enhance their knowledge and skills. This is because the researcher did not find it difficult to randomly selecttwenty-five participants for this research and these participants belonged to different age groups, different educational background with different experience.

6.1 Recommendations

The last objective of the study was to forward the results of this research and recommend appropriate actions on this issue. The following recommendations are made based on the findings of this research.

- ✓ There is an urgent need to educate the community midwives regarding the nutritional requirements during pregnancy. Therefore, the government should take actions and conduct training programs to impart up-to-date knowledge to the community midwives relevant to nutritional issues.
- ✓ The community midwives are ready to learn new knowledge and skills and willing to impart the acquired knowledge and skills. Therefore, it is recommended that the relevant authorities take advantage of their willingness

to learn and take steps to improve the health of pregnant women as well as the new born babies.

- ✓ The study found that information regarding the nutritional requirements during pregnancy was mostly obtained from books. It is recommended that this issue should be discussed in the electronic and print media so that more and more midwives and women can get information regarding the nutritional needs during pregnancy.
- ✓ The results of this research revealed a very high effect size of the intervention achieved by the researcher. It is recommended that such interventional and training programs should be encouraged and organized in order to get maximum positive results.
- ✓ Most of the pregnant ladies are not aware of the increased nutritional needs and the problems or complexities caused due to deficiency of certain nutrients. Therefore, it is recommended to educate the women regarding the harms of nutrient deficiencies for them as well as the health of their children.
- ✓ It is suggested that the syllabus may be revised to address the deficient knowledge of trainee community midwives regarding nutritional need in pregnancy and for practicing midwives the refresher courses may be arranged.

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Appendix 1

Demographic Form

Name of Participant ……..

Age (in years) ……

City of residence…….

District……..

General qualification Matric ☐ FA/FSc ☐ BA/BSc ☐

Name of Midwifery School (optional)…… ……

Year of completion of midwifery training……

Any other training……

Are you currently working? .....

Are you working with private practitioner……

Are you working as an independent practitioner?……

Period of working with private practitioner in year months days

Period of working as an independent practitioner year months days

Average number prenatal Clients per month……

Average number of deliveries per month……

Average number of postnatal client per month……

Appendix II

Knowledge & Skills of Community Midwives about the nutritional requirement during pregnancy

Participants Consent Form

Dear Participant I Shahnaz Akhtar Qayyum a MSN nursing students of Texila American University, Georgetown, Guyana, South America. I am interested in conducting a research on "Knowledge & skills of Community Midwives about Nutritional requirement during pregnancy".

Objectives of Study:

1. To determine the present knowledge & skills of community midwives about nutrition during pregnancy.
2. Knowledge & skills gap of community midwives about nutrition during pregnancy and lactation
3. To intervene the study subjects for gaps in knowledge and skills
4. To evaluate the results of intervention in study subject
5. To forward the result of the study and recommend to the authorities to take action on this issue.

Process:

If you agree to participate in this research I will ask you to sign a consent form and then there will be a pretest having questionnaire for knowledge and skill assessment.

Methodology:

This study will utilize descriptive quantitative approach.

Autonomy:

Participation in this study is voluntary. Your decision to participate or refuse to participate shall not affect your job.

Anonymity and Confidentiality:

In pretest questionnaire you will write your name after that instead of your name a numerical code such as 1, 2 will be used for each individual in the study.

Moreover, except me no one will identify these codes. All the raw data will be kept in a secure place; only I and my supervisor will have access to the raw data. However, collective findings ofthis research will be widely disseminated without revealing your name or other identifying information.

Risks/Benefits for institutions:

This study is purely for academic purposes. This will give you an exposure to contribute to this study by sharing your experiences about midwifery practices. Moreover it's a comparative study (pre &post test). The finding will help to predict the level of knowledge and skill in the community midwives before and after the training. The successful completion of the study will help to prevent the nutritional deficiencies and imbalances among the pregnant women in Pakistan by training the Midwives. This will be a milestone in decreasing problematic pregnancies due to the nutritional hurdles. The overall health of pregnant women and the infants will substantially increase and the percentage of malnourished and low birth weight infants will decrease.

In order to gather accurate data, your participation in this study will be of great significance in assisting and developing closer link among policy makers and implementers.

The results of study may be published for scientific purposes but will not give your name, or include any identifiable references to you.

Thanks

Shahnaz Qayyum

Vice Principal

College of Nursing,

Nishtar Hospital & Medical College,

Multan

Name of the Participant

Random Selection You have been randomly selected to be a part of this research project and that's why I would like administer a questionnaire to you.

Confidentiality The information you provide is totally confidential and will not be disclosed to anyone. It will only be used for research purpose. Your name will not be required for this project.

Voluntary Your participation is voluntary and you can withdraw from the survey after

Participation Having agreed to participate. You are free to refuse to answer any question that is asked in the questionnaire. If you have any question about this project you may ask me or contact (Shahnaz Akhtar, Vice Principal, College of Nursing ,N.M.C&H, M. Cell No: 03457256862)

Consent to Participate Signing this consent form indicates that you understand what will be expected of you and are willing to participate in this research project.

I read this from and agreed to take part in research project on "knowledge of community midwives about nutritional requirement in pregnancy in district, Multan.

Signature of participant

Appendix III

Questionnaire

Name: . . . . . .

1. Do you have learned about the nutritional requirement of a pregnant lady?

   Yes No

2. Are you satisfied with the knowledge about nutritional requirement of pregnant lady that you learned during your training period?

   Yes No

3. I got the Knowledge about nutritional requirement of pregnant lady from:
   A. Books B. Dietician C. Media D. Other

4. Weight gain during pregnancy is:
   A. Normal B. Not normal C. Don't Know

5. Daily nutritional requirement of a female is:
   A. 2000kcal B.2400kcal C.2800kcal D.3000kcal

6. Nutritional counseling of women should be started:
   A. **Before pregnancy** B. Soon after becoming pregnant
   B. In the mid of pregnancy D. At full term of pregnancy

7. The average weight gain during pregnancy in lbs is:
   A. 15-25 B. **25-35** C.35-45D. 45-55

8. Increase in Energy requirement during 1st trimester of pregnancy
   +0 kcal/day +50 kcal/day + 100 kcal/day + 150kcal/day

9. Per day Increase in Energy requirement of pregnant lady in 2nd trimester
   A. +220 kcal B. +270 Kcal **C. +340Kcal** D. +370Kcal

10. Per day energy requirement of pregnant lady in 3rd trimester
    A. +370 kcal B. + 400Kcal **C. +450Kcal** D. +500Kcal

11. Required daily allowance of iron during pregnancy is:
    A. 15 milligrams B. 22 milligrams C.**27 milligrams**

12. Required daily allowance of folate during pregnancy is:
    A. 200microgram/day B. 400 microgram/day
    C. 600 microgram/day D. 800 microgram/day

13. Required daily allowance of protein during pregnancy is:
A. +15 g **B.+ 25g** C. +35g D. +45g

14. Required daily allowance of Zinc for pregnant 19-50 years is:
A. 11 milligrams B. 13 milligrams
C.15 milligrams D. 15 milligrams

15. Required daily allowance of B12 during pregnancy is:
A 1.6 microgram **B. 2.6 microgram**
C. 3.6 microgram D. 4.6 microgram

16 Required daily allowance of iodine during pregnancy is:
A. 250-300 mg B. 300-350 mg
C. 350-400 mg D. 400-450 mg

17. Poor nutrition during pregnancy poses problem for:
A. Mother B. Growing fetus
C. **Both mother and growing fetus** D.I don't know

18. Deficiency of folate during pregnancy increase the chances of fetal defect like:
A. Cleft palate B. Micro cephalic
C**. Neural tube defect** D. Club foot

19 Which of the following micronutrient deficiency may effects cognitive functioning of developing fetus?
A. Iodine B. Iron C. Zinc **D. All of above**

Appendix IV

Skills training: checklist for health education steps

Name of midwife:

		1	2	3
1	Greeting and introduction			
2	Assessment of the existing knowledge of mothers regarding nutrition			
3	Identify current diet schedules followed by mothers			
4	Inquire about the health history of the mothers with regard t any allergies or special food requirements			
5	Identify and inquire regarding any health related problems that's mothers are currently facing			
6	Identify gaps in the mothers knowledge and practices			
7	List down the problems identified			
8	Give health education for each problem			
9	Explain to the mothers the importance of taking each nutrient/vitamin and why their previous diet habits were not sufficient			
10	Give awareness to the mothers regarding possible hazards and complications that might arise due to their			

	previous habits			
11	Constantly ask for feedback and satisfaction level of the mothers during the interview			
12	Ask mothers to repeat what they have understood			
13	Ask mothers if they have any questions regarding the health information imparted.			
14	Documentation			

1= not done

2=incomplete/inappropriate

3= appropriately done

Appendix V

Permission letter for conducting research on CMWs

From

Office of District Health Officer.

Multan

To

Shahnaz Akhtar
Vice Principal,
College of Nursing,
Nishtar Medical College & Hospital
Multan

SUBJECT: PERMISSION TO CARRYOUT RESEARCH

Sir

Reference to your letter dated 15/7/15 on subject grant of permission by ethical review committee on "knowledge of Community Midwife about Nutrition in Pregnancy ". It is to inform you that undersigned is pleased to accord permission to carryout study on community midwives of district, Multan.

The ethical review committee of this office has approved the research proposal submitted by you in its meeting held on dated 21/7/15 under my chairmanship.

District Health officer
Multan