

Effect of Tele-nursing Services on Healthy Lifestyle and Self-Efficacy among Gestational Diabetes Women

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Abstract: Gestational diabetes is a serious health problem. Applying tele-nursing in healthcare is increasingly prioritized to reduce maternal mortality, morbidity and improve newborns' survival especially in remote areas. **Aim of the study:** To examine the effect of tele-nursing services on healthy lifestyle and self-efficacy among gestational diabetes women. **Design** A quasi - experimental design was adopted. **Setting:** The study was conducted at the Maternal and Child Health Center in the Fayoum University Hospital. **Sample:** One hundred and one mothers with gestational diabetes were enrolled in the study and randomly divided into study and control groups. **Tools:** Four tools were used for data collection: I) A structured interviewing questionnaire, II) Health promotion lifestyle profile scale, III) Self-efficacy of health behaviors, and IV) Women satisfaction Likert scale. **Results:** There were statically significant differences between both groups regarding the health promotion lifestyle profile as well as self efficacy scores at 32 and 37 weeks of gestation. The mean level of fasting blood glucose was significantly lower in the study group than the control group at 37 weeks of gestation ($p < 0.05$). Meanwhile the mean level of postprandial blood glucose was significantly lower than the control group at 32 and 37 weeks of gestation ($p < 0.05$). As well as, the mothers who received the telephone support achieved increased numbers of attendances to the antenatal center for follow up. In addition, the satisfaction level was high among the mothers who received the telephone support than those in the control group. **Conclusion:** The findings of this study demonstrated that tele-nursing support could significantly enhance the health promotion lifestyle profile and self efficacy scores, as well as maintain blood glucose levels among mothers with gestational diabetes and also increase the adherence to antenatal visits.

Keywords: Gestational diabetes mellitus (GDM), health practice life style profile, self efficacy, tele-nursing.

1. INTRODUCTION

Gestational diabetes (GD) has been defined as onset of glucose intolerance during pregnancy (*Tieu et al., 2012*). This condition usually disappears during the puerperium. Gestational diabetes is a type of diabetes that is first seen in a pregnant woman who did not have diabetes before she was pregnant. Some women have more than one pregnancy affected by gestational diabetes. Gestational diabetes usually shows up in the middle of pregnancy. Doctors most often test for it between 24 and 28 weeks of pregnancy (*Jang, 2011*). Complications of untreated GD can be serious and include the development of preeclampsia in the mother and has been associated with macrosomia, birth trauma, shoulder dystocia and higher rates of cesarean section (*American Diabetes Association, 2013*).

Lifestyle generally means a pattern of individual practices and personal behavioral choices that are related to elevated or reduced health risk. Evidence shows that a standard approach to GD are dietary advice, self monitoring of blood glucose, regular physical activity and insulin therapy as needed reduces these adverse perinatal complications (*Nielsen et al.,*

2014). The role of the child health nurse is the prevention or reducing complications and its impacts on pregnant women and their infants through the intervention by the educational programs to help pregnant women comply with the treatment and with the diet regimen throughout their pregnancy period (Cheung, 2012).

Self-efficacy has been recognized as a critical determinant of health behavior change. The concept of self-efficacy is based on social cognitive theory, which describes the interaction between behavioral, personal, and environmental factors in health and chronic disease. The theory of self-efficacy proposes that patients' confidence in their ability to perform behaviors influences which behaviors they will engage in (Homko et al., 2012). When individuals are self assessed as having high self-efficacy, they will enthusiastically participate in health behaviors or lifestyles and thus improve their ability to have healthy behaviors (Kim et al., 2013). Among highly selected patients, self-efficacy has been shown to be important for appropriate self management for many health conditions as gestational diabetes and, the research demonstrates mixed results for interventions that attempt to improve self-management behavior through improved self-efficacy (Homko et al., 2012).

Telehealth and telemedicine-delivered care is fundamentally changing the way of healthcare delivery. The term covers both telemedicine, which includes remote patient monitoring, and non-clinical elements of the healthcare system, such as education. Tele is a prefix meaning "at a distance (Howe et al., 2015).

Today nursing services are affected by telehealth as well. Telenursing is considered as a subset of telehealth that focuses on the delivery, management, and coordination of care and services using telecommunications technology within the domain of nursing (Brownsell, 2012). The most common use of telenursing is to provide opportunities for patient education, nursing teleconsultations, examination of results of medical tests and examinations, and assistance to physicians in the implementation of medical treatment protocols (Mons et al., 2013).

Telephone support is one way of tele monitoring to give education related to disease and to support health consumers in self-management activities, such as medication adherence, physical exercise and diet which lead to reduce the adverse effect of the disease (Levin et al., 2013). Telephone monitoring saves time and cost of transportation for patients living in long distance from healthcare center (Thompson-Coon et al., 2013). Telephone is widely used in the world and can be easily used by all age groups (Howe, et al., (2015).

There is a large body of evidence supporting telenursing utility and benefits. As well as patient satisfaction with these methods tends to be high, and from the provider perspective, delivery savings in time and cost are achievable after initial set-up (Williams., 2012). Current evidence represents that; the nurse has important role in the prevention or reducing complications of the gestational diabetes on the pregnant woman and her infant through the educational programs and follow up *et al* by telephone (telenursing) to help pregnant women comply with health life style. Also, the roles include the collaboration with physician in the screening, diagnosis, and management of the health problem; to consume valid research findings in nursing practice, and to participate in research studies trying to decrease the problem of GDM in pregnancy (Ali-Akbari F, et al, 2011).

Significance of the study:

Gestational diabetes is a major cause of perinatal maternal morbidity and mortality. Pregnant women with gestational diabetes are presented with the potential for new life and the realization their health and their baby's health may be in jeopardy. The prevalence of GDM ranges from 1 to 14% worldwide (WHO, 2011). While in Egypt, it has been reported that 4.7% of pregnant women are affected (Upper Egypt Diabetes Association, UEDA, 2013). The main approaches in managing the gestational diabetes are lifestyle changes. as well as improve the woman's self efficacy through educational program and continuing follow up.

Upper Egypt cities as Al-Fayoum are historically deprived from health services. In addition to the finding report from the director of Fayoum University Hospital based on survey regarding factors affecting the utilization of antenatal services in the Fayoum hospital, 2014 are the following; the number of health care providers in the Antenatal Clinic is too limited not appropriate to the flow of the mothers, long waiting time in the clinic, time limit between the mother and the doctor, the distance between the home and hospital, unaware exactly with the importance of antenatal care and the consequences from the deficit of visits specially in the mothers who are at risk. Also, according to the survey, 53.3% of the mothers didn't complete their schedule visits.

International Journal of Novel Research in Healthcare and Nursing

Vol. 3, Issue 1, pp: (129-140), Month: January-April 2016, Available at: www.noveltyjournals.com

Many organizations now try to put strategies to meet the challenges of treating diabetes and improve the health status of pregnant women with gestational diabetes and achieve healthy outcomes of their pregnancy as Upper Egypt Diabetes Association (UEDA) and reproductive health centers at Upper Egypt Universities, Obstetric departments.

Tele-nursing, is one of the twelve common telehealth functions identified by the *World Health Organization (2011)*, as best evidence available at the time and overcome the reasons which barrier the utilization of antenatal services. Although the current evidence supports the tele-nursing in managing the high risk condition as well as the telephone support through pregnancy and after delivery is a common practice in many countries, but it is not used in health care system in Fayoum. In addition no randomized trial has been done to study the effect of tele-nursing support on gestational diabetes mother in Fayoum. So, the aim of this study was to examine the effect of tele-nursing services on healthy lifestyle profile and self-efficacy among gestational diabetes women.

Hypotheses:

1. Health promotion lifestyle profile and self efficacy scale average scores of the study group will be higher than those of the control group.
2. The women who receive tele-nursing support will have higher satisfaction than those who do not.

2. SUBJECTS AND METHODS

Design:

A quasi- experimental design was adopted in this study.

Sample:

One hundred twelve pregnant women with gestational diabetes were determined according to the following sample size equation:

$$\text{Sample size} = \frac{Z^2 * (p) * (1-p)}{c^2}$$

Where:

Z = value (1.96 for 95% confidence level)

p = percentage picking a choice, expressed as decimal (.5 used for sample size needed)

c = confidence interval, expressed as decimal.

The inclusion criteria were single pregnancy, gestational age between 24-28 weeks, and access to telephone, not using medications which increase blood glucose such as corticosteroids, no history of chronic diseases such as chronic hypertension and willing to participate in the study. Exclusion criteria were previous loss of pregnancy, premature delivery, and individuals without telephones, who didn't answer for five calls maximum. The pregnant women who agreed to that participate were randomly allocated into two groups using toss by the side of the coin (heads - control, tails - study group), 56 mothers in each (study group, adopted the routine care plus the tele-nursing program (telephone support) and control groups receive only the routine care from the clinic). So, the working sample size reached was 101 mothers as 11 mothers were dropped out throughout the study; the reason was for some of them not following the instructions for others not answering the calls.

Setting:

The study was conducted at the Maternal and Child Health Center in the Fayoum University Hospital affiliated to Fayoum University.

Tools for data collection.

Three tools were utilized to collect the required data for this study:

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Vol. 3, Issue 1, pp: (129-140), Month: January-April 2016, Available at: www.noveltyjournals.com

- I. **A structured interviewing questionnaire.** It was designed by the researchers to collect data regarding personal and obstetric characteristic features of the studied groups as; age, education, occupation and gestational age.
- II. **Health Promotion Lifestyle Profile scale (HPLP);** Adopted from *Walker and Hill-Polerecky, (1996)*, it includes 52 items and six sub-scales as: nutrition, physical activity, health responsibility, spiritual growth, interpersonal support, and stress management. The HPLP was utilized beforehand in Arabic on a Jordanian group (*Al-Kandari et al., 2010; Ammouri et al., 2011; Haddad et al., 2015*). The Cronbach's alpha coefficients were between 0.70 and 0.88 for the subscales and 0.92 for the aggregate scale in this study. For the English version of the HPLP *Walker and Hill-Polerecky, (1996)* reported a Cronbach's alpha of 0.94 for the overall scale and an alpha ranging from 0.79–0.87 for the six subscales. The instrument was acquainted with the moms in Arabic dialect. This questionnaire asks the respondents to indicate how often they adopt specific health-promoting behaviors on a 4-point Likert scale, with the options of “never” (1), “sometimes” (2), “routinely” (3) and always (4). The highest score obtained from the scale was 208, and the lowest score was 52. The mothers answer this tool at the first day of the interview (baseline assessment), 32 and 37 weeks of gestation. The increase in the score taken from the scale shows that healthy lifestyle behaviors are at a much better.
- III. **Self-efficacy of health behaviors (SEHB);** Adopted from *Sherer et al. (1998)*, the 25-item scale measures the self-reported degree of confidence in doing health lifestyle behaviors over 4 subscales, “nutrition,” “exercise,” “psychological wellness,” and “health responsibility.” Each item is scored on a 4-point Likert scale, ranging from 1 (no confidence) to 4 (over 75% confidence). The SEHB scores range from 25 to 100; higher scores indicate better self efficacy of health behaviors. The mother answers this tool at the first day of the interview (baseline assessment), then at 32 and 37 weeks of gestation. Cronbach’s α for this study was 0.95 and that for each subscale ranged from 0.86 to 0.92.
- IV. **Women satisfaction likert scale regarding way of support for gestational diabetes mothers (tele-nursing and traditional):** This sheet designed by the researchers after reviewing of related literature. It consisted of 14 statements, three responses were offered for each statement, ranged from not at all satisfied to extremely satisfied. So, twenty eight scores represented somewhat satisfied, while more than twenty eight scores satisfied, and less than twenty eight scores not satisfied. The items were asked by the researchers after delivery. The reliability of the tool is 0.62.

Validity of the tool:

Tools content and face validity were established by a panel of experts composed of five, two professors in obstetric medicine from the Faculty of Medicine, Fayoum University, and three from Maternal and Newborn Health Nursing Department, Faculty of , Ain Shams University. Each of the experts was asked to examine the tools for content coverage, clarity, wording, length, format, and overall appearance.

Supportive material (Educational booklet):

A booklet was designed by the researchers after reviewing of related literature and using evidence-based data on nursing care for women with GDM, and guided by the World Health Organization (WHO), 2014. The booklet includes all the items regarding gestational diabetes as definition, risk factors, signs, symptoms, complications, managing stress and how to manage the disorder by adapted health life style in relation to (nutrition, exercise, medication, and follow up, and health responsibility.

Administrative design and ethical considerations:

An official approval was obtained from the Faculty of Nursing, Fayoum University Counsel. As well, a letter containing the title of the research was submitted to the Directed to the director of Fayoum University Hospital, to get approval for data collection. The aim of the study was explained to each woman before applying the tools to gain her confidence and trust. An oral consent was obtained from each woman who agreed to participate in the study, after ensuring her that data collected will be treated confidentially, and that the study maneuvers do not entail any harmful effects on participating pregnant women. Women were informed that they have the right to withdraw from the study at any time without giving any reason.

Pilot study:

The pilot study was carried out on 12 mothers (10% of the total sample) in the study setting. The pilot study was done to examine the relevance, clarity and content validity of the tools used for data collection, and to evaluate the time needed for women to fill in the tools of the study and find the possible obstacles and problems that might face the researchers and interfere data collection. Women who shared in the pilot study were included in the main study sample as there were no radical modifications on the tools.

Field work:

Recruitment and follow-up of participants were carried out from April, 2015 and was completed by January, 2016. The researchers attended the antenatal clinic three days per week starting at 9.00 a.m. to 2.00 p.m. Before conducting the study, permission was obtained from the Director of the Hospital in the previously mentioned setting, followed by obtaining oral acceptance from the women who agreed to participate in the study: Data collection was carried out through three phases:

1) Preparatory phase

In this phase, agreement to carry out the study was obtained and an educational booklet was developed after revising and reviewing related local and international literature. The developed educational booklet was distributed to experts from obstetric medicine, and maternal and neonatal nursing. They were asked to assess, evaluate, and validate the educational booklet. As well, the tools were developed and reviewed by experts. A pilot study was done on 10% of the pre-stated sample size.

2) Implementation phase

The researchers selected the sample according to the inclusion and exclusion criteria. The sample was divided randomly into two groups. The women in both groups received routine antenatal care and education by the hospital personnel. The study group received telephone support (tele-nursing) provided by the researchers. The contents of the phone conversations were based on a support booklet. This booklet had been prepared by the researchers team based on the World Health Organization guideline regarding gestational diabetes, and some other scientific literature, and had been confirmed by experts. At each call, the mother was asked about her problems and the researcher guided the mothers. As well, the researcher asked the mother if she adapted the instruction that was given before. The other part of the conversation was about giving information to be followed leading to healthy life style behavior as; diet, exercise, adherence to medications, the importance of maintaining blood glucose levels within normal range, how to record blood glucose level and frequent self-monitoring of blood glucose levels, stress management and reminding the next visit. Before the termination of any telephone call, the mother was once again invited to ask her questions. Telephone follow-ups were performed once weekly. The total frequency of telephone counseling averaged 15 calls per subject. The average length of these contacts was 20 minutes per call. On the other hand, the control group did not receive any further intervention during the study period.

3) Evaluation phase

Data regarding HPLP scale, SEHB scale, number of antenatal visits, and blood sugar level were collected from both groups at three different points; baseline assessment (first interviewing with mothers after being diagnosed with GD between 24-26 weeks of gestation and before any intervention, then at 32 and 37 weeks of gestation. The satisfaction level regarding the method of support for gestational diabetes during antenatal period was measured for both groups after delivery.

Limitations of the Study:

1. Calls for the cases are expensive.
2. Some women didn't answer from first call and the researchers tried to call them again and all this was time consuming for the researchers because there was no a full team

Statistical analysis

Data entry was done using Epi-Info 6.04 computer software package, while statistical analysis was done using Statistical Packages for Social Science (SPSS), version 18.0. Quality control was done at the stages of coding and data entry. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations for quantitative variables. Qualitative variables were compared using Chi-square test. Statistical significance was considered at p-value <0.05 , while highly significant difference was at $P < 0.01$ and non significant difference was at $P > 0.05$.

3. RESULTS

The purpose of this study was to examine the effect of tele-nursing support on healthy lifestyle and self-efficacy among gestational diabetes women. Findings of this study were presented in four main parts: characteristic data of the study sample, health promotion lifestyle profile scores, self-efficacy of health behaviors and women satisfaction regarding method of support during the antenatal period.

Table (1): describes the characteristics of the studied groups. The mean age was 19.30 ± 1.37 and 18.99 ± 1.49 years among the study and control groups respectively. There were no statistically significant differences between the groups in relation to their mean age, education level, occupation as well as gestational age.

Table (2): represents the distribution of HPLP scores at baseline assessment (24-28 wks, first interview), 32 wks and 37 wks. of gestation. There was no statistically significant difference for the HPLP scale's average scores for between the study and control groups at baseline assessment in the first interview before any intervention ($p=0.842$). While there was a statistically significant difference in the HPLP scale's average scores between both groups in the second interview ($p=0.004$). In addition in the third interview, a significant increase on average scores of HPLP scale of the study group compared to the control group was determined ($p=0.000$).

Table (3) determines that there were no statistically significant differences regarding the self efficacy scale's average scores among the both groups at baseline assessment before the intervention ($p=0.731$). On the other hand, the second ($p=0.003$) and third ($p=0.001$) interviews, revealed statistically significant differences in terms of self efficacy average scores between the study and control groups.

The distribution of number of antenatal care visits (since beginning of the tele-nursing program), is distributed in **table (4)**, the study results revealed that 12.03 ± 1.03 and 8.23 ± 1.07 were the means and standard deviations of antenatal number of visits among the study and control groups respectively, which indicates a statistically significant difference between both groups regarding the number of visits, ($p=0.004$).

Table (5) shows the level of fasting blood glucose at baseline assessment before any intervention, and at 32 weeks of gestation, which reveal no statistically significant differences ($p=0.066$ & 0.077) between the study and control groups respectively, while there was statistically significant difference ($p=0.003$) between both groups regarding the level of fasting blood glucose at 37 weeks of gestation. According to the level of postprandial blood glucose level, the results revealed that, there was no statistically significant difference ($p=0.120$) between both groups at the baseline assessment, while there were statistically significant differences ($p=0.005$ & 0.004) between both groups at 32 and 37 weeks of gestation respectively after the intervention.

Figure (1) illustrates the gestational diabetes women's satisfaction regarding the method of receiving support care during antenatal period (routine only & telephone support), 96.1% and 18 % of women were extremely satisfied in the study and control groups respectively. In the same time, 36% of women in control group compared with no one in study group were not satisfied. Also the result revealed that, there was a statistically significant difference between both groups regarding to the satisfaction level ($P=0.003$).

Table (1) Personal and obstetric characteristics of the studied groups

Items	Study group (n= 51) N (%)	Control group (n= 50) N (%)	P- value
Age (Mean age)	19.30±1.37	18.99±1.49	0.867
Education level			0.071
Can read & write	9(17.6)	13(26)	
Preliminary education	8(15.7)	7(14)	
Intermediate education	22(43.1)	20(40)	
High education	12(23.5)	10(20)	
Occupation			0.063
Worker	22(43.1)	19(38)	
Housewife	29(56.9)	31(62)	
GA (Mean of gestational age)	28.21±2.32	26.95±1.92	0.120

Table 2: Distribution of health promotion lifestyle profile scores during baseline (before any intervention), at second 32 wks of gestation and third (37 wks of gestation assessments).

Health Practice lifestyle scores	Study Group (n= 51)	Control Group (n= 50)	P-value
	Mean ±SD		
Baseline assessment (24-28 wks.)	111.24±10.02	109.23±11.12	0.842
Second assessment (32 wks.)	136.14±18.22	115.19±09.36	0.004
Third assessment (37 wks.)	144.37±21.25	118.22±12.41	0.000

Table 3: Distribution of self efficacy scores during baseline, second and third assessments.

Self Efficacy Scores	Study Group (n= 51)	Control Group (n= 50)	P-value
	Mean ±SD		
Baseline assessment (24-28 wks)	59.03±10.02	58.23±11.12	0.731
Second assessment (32 wks)	70.14±12.22	61.19±09.36	0.003
Third assessment (37wks)	73.37±21.25	62.12±12.41	0.001

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Vol. 3, Issue 1, pp: (129-140), Month: January-April 2016, Available at: www.noveltyjournals.com

Table 4: Distribution of number of antenatal care visits among the studied groups (since beginning of intervention).

Antenatal Care Visits	Study group (n=51)	Control Group (n=50)	P-value
Mean± SD	12.03±1.03	8.23±1.07	0.004

Table 5: Glucose levels at different points of assessment (baseline, 32 & 37 Weeks of gestation) in both groups.

Self Efficacy Scores	Study group (n=51)	Control Group (n=50)	P-value
	Mean ±SD		
Baseline assessment (24-28 wks.)			
Fasting	103.1±15.02	101.01±14.02	0.066
Postprandial	133.01±12.01	138.06±10.05	0.120
First assessment (32 wks.)			
Fasting	100.2±19.27	104±15.75	0.077
Postprandial	123.2±18.85	141.3±18.69	0.005
Second assessment (37wks.)			
Fasting	99.15±17.02	105.15±15.32	0.003
Postprandial	128.25±15.01	132.58±25.01	0.004

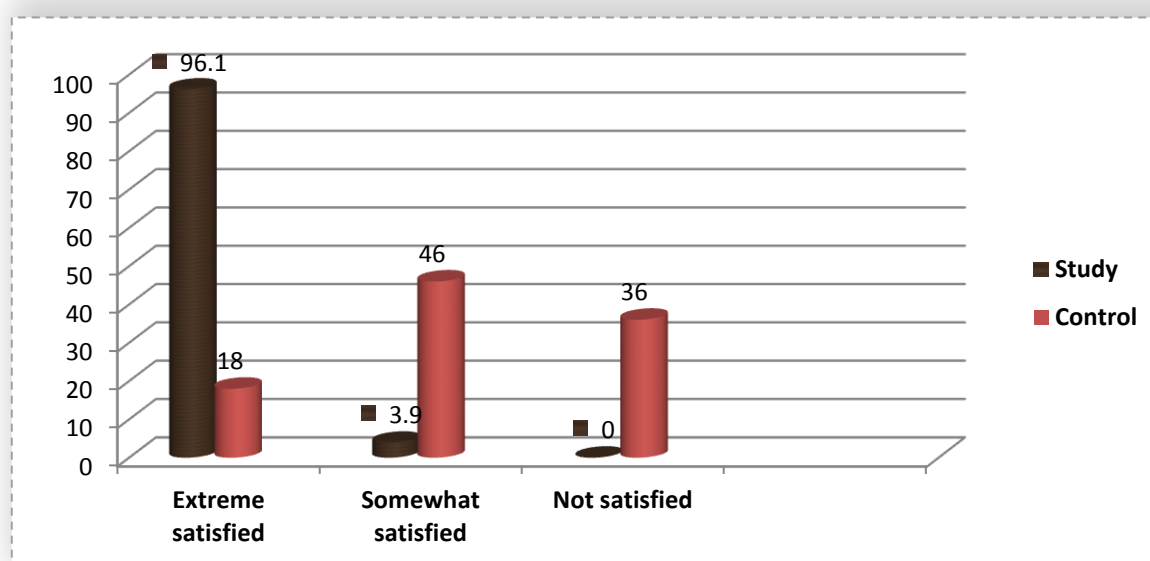


Fig 1: Women's satisfaction regarding to the method of receiving support care during antenatal period (routine only & tele-nursing support).

4. DISCUSSION

The aim of the current study was to examine the effect of tele-nursing support on healthy lifestyle and self-efficacy among gestational diabetes women. In concern HPLP average scores between both groups, the results of the current study revealed that there was no a significant difference between both groups at the baseline assessment (first interview before intervention, 24-28 wks.) while there were a significant increases in HPLP average scores at second (32 wks) and third assessments (37) detected among the study group. This result may be due that the support and information given to the women was the same in both groups before any intervention, however, after intervention the women in study group had additional support and information through telephone (tele-nursing program), also this program increased the awareness towards the importance of their disorder, which lead them try to adopt appropriate healthy lifestyle to control their blood sugar and save their pregnancy.

In the literature, few studies support these findings. This result has been emphasized by *Abolfotouh et al., (2013)* study, which assessed the effect of telephone calling by a nurse (over 6 months) on medical and psycho-social outcomes in gestational diabetes women. The study group, in their study, demonstrated reduction in gestational diabetes complications; improvement in their quality of life and enhancing healthy life style profile after 2, 4 and 6 months of telephone follow up. The result of the present study confirmed the research hypothesis; in that health promotion lifestyle profile scale average scores of the study group will be higher than those in the control group.

A study carried out by *Abdul-Rahman et al. (2013)*, aiming to compare lifestyle of women with gestational diabetes who received telephone support with those who didn't, agreed with the current result. According to the findings from the study authors, women with gestational diabetes who received telephone support were more adequate on dietary style, physical activity, prenatal self-care, and managed stress compared with those who didn't. As well the authors emphasized on lifestyle intervention program by telephone which had been practiced by coaches, who are trained on diet, physical activity, social cognitive strategies, and motivational interviewing techniques. It is determined that this program was effective in promoting health life style profile.

Meanwhile, the current study results were incongruent with *Kim et al., (2013)* study, which evaluated the effect of telephone follow-up on adherence to treatment instructions in pregnant women with gestational diabetes. In their study, women were divided into two telephone and control group. One of the researchers conducted a telephone intervention which included a weekly call for continuing education, forced diet, exercise, regulation of medications and monitoring blood glucose level. Women showed no statistically significant difference between the study and the control groups regarding HPLP scale average scores.

In addition, the current study results determined that there was no statistically significant difference regarding the self efficacy scale's average scores between both groups at baseline assessment before any intervention; meanwhile, results revealed statistically significant differences at 32 and 37 weeks of gestation. This result may be due to the continues support system adopted by the researchers through tele-nursing which increased the mother's confidence regarding their ability to adhere to the program in order to promote the life style profile to safe their life and that of their fetal, in addition to the that women residing rural areas, respect to any person helping them for grant, so they were trying to follow the instruction from the advisors as it is.

The previous result was in agreement with that of the study done by *Dunbar et al. (2011)*, who investigated the impact of telephone follow up upon the self-efficacy, consistency in diet, and pregnancy outcomes in women with GDM. They found difference determined between the groups in terms of self-efficacy scale average scores. However, the previous results disagreed with *Homko et al. (2012)*, who studied the impact of self-monitoring of blood glucose on self-efficacy and pregnancy outcomes in women with diet-controlled gestational diabetes. There was no statistically significant difference between the study and the control groups regarding self efficacy score.

According to the distribution of number of antenatal care visits, since beginning of the intervention, the study result revealed that the mean and standard deviation of antenatal number of visits among the study group was higher than the control group, which indicates a statically significant difference between both groups ($p=0.004$). This may be attributed to the continuous reminders from the part of the researchers to the women with the time of visit adding to the increased

awareness due to instructions given regarding the importance of antenatal visit especially for women at risk, as well as following the women with care through continuous calling (tele-nursing), all that enhanced the mother awareness about the need for follow the time of visit.

This study result is in accordance with *Car et al. (2012)*, whose study finding showed that a simple telephone call for follow up intervention improved the adherence for antenatal care attendance. Women in the study group had more than double odds for attending four or more antenatal care visits as recommended than those in control group.

Regarding the levels of fasting blood glucose at baseline assessment (before intervention) and at 32 weeks of gestation, there were no statistically significant differences ($p= 0.066$ & 0.077) between the study and control groups respectively, while there was a statistically significant difference ($p= 0.003$) between the both groups regarding the level of fasting blood glucose at 37 weeks of pregnancy. According to the level of postprandial blood glucose, the results represented that, there was no statistically significant difference ($p=0.120$) between both groups at the baseline assessment, while there were statistically significant differences ($p: 0.005$ & 0.004) between both groups at 32 and 37 weeks of pregnancy respectively. The researchers postulated that returning to telephone follow up sessions which the study group received led to better adherence to diet, and drug therapy prescribed by the doctor, more adaption to physical activity, increased awareness and also changing their bad health behaviors.

These results were in agreement with *Franc (2010)*, who studied the use of phone follow up intervention and reported that change in postprandial blood sugar was remarkable, which significantly decreased the level of HbA1c, as well as changes in diet, physical activity, adherence to medication, healthy lifestyle, and self-efficacy.

However, these results disagreed with *Wendland et al., (2012)*, who reported that telephone intervention hadn't any effect in lowering fasting blood glucose level in the intervention group comparing to the control group. With respect to the satisfaction level, the present study revealed that gestational diabetes women who received the additional telephone follow up had significantly higher levels of satisfaction in the antenatal period ($p = 0.004$). This may be due to, that mothers feeling that there's a person to provide them help continuously without any boredom and guided them in many times. These results agreed with *Abdul-Rahman et al. (2013)* and *Elshair (2013)*, who found that the telephone follow up program have an effect concerning women satisfaction level regarding method of receiving support care during antenatal period.

5. CONCLUSION

The study demonstrated statistically significant changes in enhancing health lifestyle profile average scores and providing data showing that telephone support (telenursing program) is effective in improving self efficacy, lowering the blood glucose especially postprandial and increasing the adherence for antenatal visits among the study group. In addition the mothers in study group achieved high level of satisfaction than those in the control group. Since the effect of tele-nursing support (telephone program) was positive, this study concludes that; controlling the gestational diabetes can be achieved only by individual learning in clinical setting especially in underserved areas not only due to very limited time and crowded places but also the need for a supportive strategy as tele-nursing support.

6. RECOMMENDATIONS

In the light of the study findings, the following recommendations are suggested:

- To disseminate the results of this study to the decision makers in governmental and non-governmental organizations to be adopted and put in their priorities to improve the quality of services provided to pregnant women, especially those who are at risk and to include the telephone follow up within the context of MCH services provided in the health sector of Fayoum University Hospital.
- Further researches are required to study:
 - The effect of tele-nursing support on the pregnancy outcome.
 - The factors affecting implementation and utilization of tele-nursing services.

REFERENCES

- [1] Abdul-Rahman, A.K., Whear, R., Bethel, A., Vaidya, B., & Gericke, C.A. (2013). Telephone consultations in place of face to face outpatient consultations for patients discharged from hospital following surgery: A systematic review. *BioMed Central*; 13(128): 2-9.
- [2] Abolfotouh, M.A., Bassiouni, F.A., Mounir, G.M., & Fayyad, R.Ch. (2013). Health related lifestyles and risk behaviors among gestational diabetes mothers in Alexandria University. *Eastern Mediterranean Health Journal*; 13(2), 376–391.
- [3] Ali-Akbari, F., Khalifehzadeh, A., & Parvin, N. (2011). The effect of short time telephone follow-up on physical conditions and quality of life in patients after pacemaker implantation. *Journal Sharekord University of Medical Sciences*; 11(3): 23-8. (Persian).
- [4] Al-Kandari, F., Vidal, V., & Thomas, D. (2010). Health-promoting lifestyle and body mass index among College of Nursing students in Kuwait: A correlational study. *Nursing and Health Sciences*; 10, 43–50.
- [5] American Diabetes Association (2013). Diagnosis and classification of diabetes mellitus. *Diabetes Care*; 29(1):S43-8.
- [6] Ammouri, A., Neuberger, G., Nashwan, A., & Al-Haj, A. (2011). Determinants of self-reported physical activity among Jordanian adults. *Journal of Nursing Scholarship*; 39, 342– 348.
- [7] Brownsell, S. (2012). Measuring the ‘success’ of telehealth interventions. *Journal of Assistive Technologies*; 3 (4). 12-20.
- [8] Car, J., Gurol-Urganci, I., De, J.T., Vodopivec-Jamsek, V., & Atun, R. (2012). Telephone follows up reminders for attendance at healthcare appointments. *Cochrane Database Syst Rev*, 7:CD007458.
- [9] Cheung, N.W. (2012). The management of gestational diabetes. *Vasc Health Risk Manag*; 5(1):53-164.
- [10] Dunbar, J.A., Davis-Lameloise, N., Philpot, B., Reddy, P., Bunker, S., & Heistaro, S. (2011). Sustained gains from a diabetes prevention program and the role of telephone support. *International Journal of Diabetes Mellitus*; 2 (2):95-100.
- [11] Elshair, R.A., (2013). Effect of health technology on health lifestyle profile and self efficacy among gestational diabetes women in unserved Arabian area. 5,254-256.
- [12] Franc, S., Dardari, D., Boucherie, B., Daoudi, A., & Charpentier, G. (2010). Telemedicine in gestational diabetes: Current results and perspectives. *Medecine des Maladies Metaboliques*; 4, 274–286.
- [13] Haddad, L., Kane, D., Rajacich, D., Cameron, S., & Al-Ma’aitah, R. (2015). A comparison of health practices of Canadian and Jordanian nursing students. *Public Health Nursing*; 21(1), 85–90.
- [14] Homko, J.C., Sivan, E., & Reece, E.A. (2012). The impact of self-monitoring of blood glucose on self-efficacy and pregnancy outcomes in women with diet-controlled gestational diabetes. *The Diabetes Educator*, 28: 435- 443.
- [15] Howe, C.J., Jawad, A.F., Tuttle, A.K., Moser, J.T., Preis, C., Buzby, M. (2015). Education and telephone case management for gestational diabetes: A randomized controlled trial. *Journal of Obstetric and Gynecological Nursing*; 20 (2):83-95.
- [16] Jang, H.C. (2011). Gestational diabetes in Korea: Incidence and risk factors of diabetes in women with previous gestational diabetes. *Diabetes and Metabolism Journal* 2011; 35: (1-7): 6079- 6087.
- [17] Kim, C., McEwen, L.N., Kieffer, E.C., Herman, W.H., & Piette J.D. (2013). Self-efficacy, social support, and associations with physical activity and body mass index among women with histories of gestational diabetes mellitus. *Diabetes Educ*, 34: 719-728.
- [18] Levin, K., Madsen, J. R., Petersen, I., Wanscher, C. E., & Hangaard, J. (2013). Telemedicine diabetes consultations are cost-effective, and effects on essential diabetes treatment parameters are similar to conventional treatment: 7-year results from the Svendborg, Telemedicine Diabetes Project 2013; 7(3): 587-595.

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Vol. 3, Issue 1, pp: (129-140), Month: January-April 2016, Available at: www.noveltyjournals.com

- [19] Mons, U., Raum, E., Kramer, U.H., Buter, G., Rothenbacher, D., Rosemann, T. (2013). Effectiveness of a supportive telephone counseling intervention in type 2 diabetes patients: Randomized Controlled Study; 8(10): 77954.
- [20] Nielsen, K.K, Kapur, A., Damm, P., De Courten, M., Bygbjerg (2014). From screening to postpartum follow-up-the determinants and barriers for gestational diabetes mellitus (GDM) services, A systematic review. *BMC Pregnancy and Childbirth*; 14(41): 2-8.
- [21] Kim, H.S., Oh, J.A., Yoon, K.H., & Choi, E.S(2013). A telephone-delivered intervention to improve health life style in type gestational diabetic patients. *Medical Journal* 2013; 44 (1):1-8.
- [22] Sherer, M., Maddux, J., & Mercandante S., Prentice-Dunn, S., Jacobs, B. , & Rogers, R. (1998). The self-efficacy scale: Construction and validation. *Psychological Reports*; 51: 663-671.
- [23] Survey regarding factors affecting the utilization of antenatal services in the Fayoum hospital, (2014).
- [24] Thompson-Coon, J., Abdul-Rahman, A.K., Whear, R., Bethel, A., Vaidya, B., Gericke, C.A.(2013) . Telephone consultations for patients discharged from hospital following surgery: A systematic review. *BioMed Central* 2013; 13(128): 2-9.
- [25] Tieu, J., Middleton, P., McPhee, A.J.,& Crowther, C.A.(2012). Screening and subsequent management for gestational diabetes for improving maternal and infant health. *Cochrane Database Syst Rev* 2012 Jul 7;(7): CD007222.
- [26] Upper Egypt Diabetes Association (UEDA),(2013). Report of gestational diabetes and strategies to manage this disorder.
- [27] Walker, S.N., Hill-Polerecky, D.M (1996). Psychometric evaluation of the health promoting lifestyle Profile II. Unpublished manuscript. USA: University of Nebraska Medical Center.
- [28] Wendland, E.M, Torloni, M.R., Falavigna, M., Trujillo, J., Dode, M.A.,& Campos, M.A, (2012). Gestational diabetes and pregnancy outcomes-a systematic review of the World Health Organization (WHO) and the International Association of Diabetes in Pregnancy Study Groups (IADPSG) diagnostic criteria. *BMC Pregnancy and Childbirth* 12 (1):23.
- [29] Williams, D. E., Bird, D., Forbes, A.W., Russell A, Ash, S, Friedman, R.,(2012). Randomized controlled trial of an automated, interactive telephone intervention (TLC Diabetes) to improve type 2 diabetes management: Baseline findings and six month outcome. *BMC Public Health*; 12(602): 2-11.
- [30] World Health Organization, WHO, (2011). Definition, diagnosis and classification of diabetes mellitus, incidence and its complications. Part 1: Diagnosis and Classification of Gestational Diabetes. WHO/NCD/NCS/99.2 ed. Geneva: World Health Organization; p. 201.
- [31] World Health Organization, WHO, (2014). Dudline related to managmentof gestational diabetes. WHO/NCD/NCS/ 99.2 ed. Geneva: World Health Organization; p. 253-281.