

Healthy Lifestyle Behaviors and Self-Efficacy: The Effect of Education

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ABSTRACT The aim of study is to examine the effects of education based Social-Cognitive Theory (SCT) and Health Promotion Model (HPM) on health behaviors and self-efficacy levels in women with Gestational Diabetes Mellitus (GDM). The study was a quasi-experimental design and was conducted in the obstetrics service of a university hospital with sixty pregnant women as the sample population. The data was collected using the Health Promotion Lifestyle Profile II (HPLP II) Scale and Self-Efficacy Scale (SES) between 1st February and 15th October 2010. Chi-square and independent samples t-test were used for the data analysis. It was observed that there was a significant increase in the average scores of the HPLP II Scale for the intervention group between follow-ups. However, it was also noted that there was no significant difference in the average scores of the SES for groups between follow-ups. The results showed that education had a positive effect in terms of adopting healthy lifestyle behaviors by women with GDM.

INTRODUCTION

Gestational Diabetes Mellitus is the most frequent metabolic disorder during pregnancy. The American Diabetes Association (ADA) has reported that the prevalence of GDM is as high as 9.2 percent, according to a 2014 analysis (ADA 2014). The studies related to the prevalence of GDM in the country are bordered. But, it was reported that the prevalence of GDM in a few studies performed was between 4.2-11.4 percent (Duman 2015; Gürel et al. 2009; Özyurt et al. 2013; Turgut et al. 2011).

It has been said that GDM caused by fetal and neonatal has adverse outcomes as macrosomia, shoulder dystocia, neonatal hypoglycemia, brachial plexus injury, neonatal hyperbilirubinemia, respiratory distress syndrome and maternal outcomes such as frequent caesarean delivery and increased rates of labor induction (Luoto et al. 2011; Metzger et al. 2008). Also, it is emphasized that approximately fifty percent of women

with GDM will have type II DM in the next twenty years (Cunningham et al. 2010). It has been reported that ensuring the adaptation of healthy lifestyle changes by the women with GDM was the best strategy to decline development of DM in the future (Dasgupta et al. 2013). The nine lifestyle intervention studies to decline DM risk in women with prior GDM were investigated at a recent systematic review. In these studies, technology-based and individual training models were used. According to this systematic review, it is suggested that healthy lifestyle interventions can decline DM risk in the future (Chasan-Taber 2015). The study by Javid et al. (2015) was aimed to crosscheck lifestyles of women with GDM and healthy pregnant women attending the healthcare centers. According to the findings from the study, women with GDM were more inadequate on dietary style, physical activity, prenatal self-care, perceived social support, and perceived stress compared to healthy pregnant women. Therefore, considering the risks of pregnancy, the postpartum period and increase in DM risk in the future, there is a need for attention to these issues during pregnancy. It is emphasized that the incidence of gestational diabetes can be prevented through increased awareness and education of pregnant women with GDM about healthy lifestyles (Zang et al. 2014).

Understanding health-related behaviors is vital to inform development of effective preven-

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tive approaches in high-risk pregnancies (Harrison et al. 2012). There are obstacles to adopting lifestyle changes, although risk perceptions of women with GDM are high (Dasgupta et al. 2013). The individual's self-efficacy perception is important in overcoming these obstacles. In the study by Harrison et al. (2012), health behaviors were assessed, along with physical activity levels, weight gain and development of GDM in high-risk women. In the study, it was determined that in spite of reduced activity levels, increased weight gain and increased GDM incidences, many women did not accurately perceive GDM risk and were of low self-efficacy. For this reason, the care of women with GDM is very important to perform necessary programs in order to decrease or postpone type II DM development, making a change in lifestyle and decreasing the negative pregnancy results.

Conceptual Framework

This paper is based on Bandura's Social Cognitive Theory (SCT) and Pender's Health Promotion Model (HPM). The social-cognitive theory posits many facets causal structures in which self-efficacy beliefs operate in concert with recognized aims, outcome expectations, perceived environmental impediments and facilitators in the regulation of human impulse, action, and well-being (Bandura 2004). Health promotion is conducted at improvement on patient's level of well-being. The healthy lifestyle behaviors can be defined into six categories by Pender, namely exercise, nutrition, stress management, spiritual improvement, health responsibility and interpersonal relations (Pender et al. 2011). Determining all these behaviors helps self-efficacy perceptions gain much more importance during pregnancy and has a special significance in the life cycle of women (Walker and Hill-Polerecky 1996).

However, there is not enough evidence to show the sustained effect of change in lifestyle and diabetes education postponing or precluding the development of GDM, the studies using counseling or education programs are available in literature (Korpi-Hyovalti et al. 2011). In the study by Mendelson et al. (2008), to evaluate the effect of the nurse attempt program on Mexican and American women with gestational diabetes, it was found that a significant difference was not for HPLP II scale mean scores between intervention and control groups. In Luoto et al.'s (2011) study, counseling on weight gain and physical activity was provided to pregnant wom-

en. It was found that women in the intervention group experienced a reduction in proportion of Large for Gestational Age (LGA) and in the incidence of GDM (Luoto et al. 2011). Kinnunen et al. (2014) examined the effects of dietary counseling on food habits and dietary intake of Finnish pregnant women at preventing GDM. In the same study, it was determined that dietary counseling was influential in developing food habits and the qualification of dietary fat and fiber intake among pregnant women with an increased risk for GDM. In Ko and Lee's (2014) study, it was found that the Coaching Program for the comprehensive healthy lifestyle modification was effective in improving self-care behavior and decreasing depression, raising blood sugar levels and HbA1C. Kim et al. (2008) examined the association between social support and self-efficacy for physical activity and dietary behaviors of women with histories of GDM in the study. It was reported that psychosocial factors, such as social support and self-efficacy were being connected with physical activity and dietary behaviors in the same study.

Some of the factors influencing the health status (demographic features, biological features, interpersonal interaction, conditional elements, and so on) also affect a person's health behaviors (Bandura 2004). Perceptions of self-efficacy and health status are important in dealing with illness control in women with gestational diabetes. Providing good metabolic control and preventing the formation of the complications of gestational diabetes can be accomplished by educating pregnant women (Harrison et al. 2012). It is important that training includes issues such as diet, exercise, stress management, self-efficacy, health responsibility, social support, communication, and self-regulation. However, many more studies are required on the subject.

The Aim of the Paper

This paper was conducted to investigate the effects of healthy lifestyle behaviors and self-efficacy levels of women with GDM with a training based on the Social-Cognitive Theory and Health Promotion Model.

Hypotheses

H1: HPLP II scale average scores of the intervention group were higher than those of the control group.

H2: SES average scores of the intervention group were higher than those of the control group.

METHODOLOGY

Sample and Setting

This paper study was planned as a quasi-experimental design. 200 pregnant women diagnosed with GDM whose admission to the obstetric service of a University Hospital in İzmir, Turkey formed the study's universal population. The sample of the paper consisted of sixty women who had GDM diagnosis and were hospitalized between 1 February 2010 and 15 October 2010 on obstetric service of a University Hospital in İzmir, Turkey. The inclusion criteria included the women who are primary school graduates, between 28-32 pregnancy weeks, have had a singular pregnancy, aged between 18-40 years, diagnosed with gestational diabetes and willing to collaborate in the study. The exclusion criteria for the study included those diagnosed with pregestational diabetes, have had multiple pregnancies, are being treated with steroids, and are having chronic hypertension during their pregnancy. The power analysis was used in the calculation of the sample size and performed the two-sided Mann-Whitney test. The parameters used were alpha (0.05) and power level (83%) (Özdamar 2004). Sixty pregnant women were taken into the study sample.

Instruments

A questionnaire, which was developed by the researchers and composed of questions on socio-demographic features, Healthy Lifestyle Behavior II Scale and Self-Efficacy Scale was used for data collection.

Health Promotion Lifestyle Profile II (HPLP II) Scale

The first version of the HPLP scale was developed by Walker et al. (1987). The scale was revised in 1996 and the new version was called HPLP II (Walker and Hill-Polerecky 1996). The revised scale comprises of 52 items and six factors. These include spiritual improvement, interpersonal relations, nutrition, exercise, health responsibility, and stress management. The reliability and validity of the Turkish form of the scale was proven by Bahar et al. (2008). The Cron-

bach's alpha reliability coefficient of the scale was detected to be 0.94 for the total scale and it varied between 0.79-0.87 for the six sub factors. The highest score obtained from the scale was 208, and the lowest score was 52. The increase in the score taken from the scale shows that healthy lifestyle behaviors are at a much better level (Bahar et al. 2008; Walker and Hill-Polerecky 1996).

Self-Efficacy Scale (SES)

The scale was developed by Sherer et al. (1982) and the reliability and validity of the Turkish form of the scale was done by Gözümlü and Aksayan in 1998. Coefficient of consistency was discovered to be 0.81, and test-retest reliability was found to be 0.92. The scale measures the general self-efficacy perception not belonging to any specific field. The lowest and highest scores from the five-point Likert Scale formed with twenty-three expressions were 23 and 115, respectively (Gözümlü and Aksayan 1998).

Education Booklet

This is a training book prepared by the researcher with reference to the literature. It includes the definition of diabetes mellitus and its types, definition of gestational diabetes, pathophysiology, risk factors, maternal risks, fetal-neonatal risks, antepartum, intrapartum and postpartum care of women with GDM, and healthy lifestyle behaviors (Bandura 2004; Olds et al. 2004; Sirin 2005; Ladewig et al. 2006; Özeren 2007; Çoban 2008; Pender et al. 2011). The content validity of the book was tested by applying the multiple peer-reviewed method. It was determined that expert opinions conformed to Kendall's coefficient of concordance ($p=0.253$).

Procedure

Data was collected thrice during the study. In the baseline assessment, HPLP II Scale and SES were performed on the intervention and control groups. Training (two hours per day for four days) was given immediately after the baseline assessment to the intervention group. Fifteen days later, the HPLP II scale and SES were performed in both groups (second assessment). Finally, HPLP II Scale and SES were performed again in both groups at birth (third assessment). After the final assessment, the education booklet was given to the control group (Table 1).

Table 1: Gestational diabetes education content

<i>Content</i>	<i>Social-cognitive Theory</i>	<i>Health Promotion Model</i>
<i>First Day (Morning)</i>	<i>Affected Fields</i>	<i>Affected Fields</i>
* Introducing yourself	- What is heard from others	- Perceived benefits
* Determining to what extent a pregnant woman is ready for giving birth and what her preferences, tendencies and emotional status are.	- Psychological factors	- Perceived barriers
* Questioning what the woman knows about GDM	- Symbolizing capacity	- Feelings about GDM
* Discussing perceived positive thoughts about gestational diabetes	- Self-judgment capacity	
* Discussing perceived negative thoughts about gestational diabetes	- Situation-outcome expectations (perception of risks)	
* Questioning whether the woman can cope with GDM (evaluation of self-efficacy)		
* Discussing her fears about her health and her baby's health		
* Discussing her opinions about whether she can adapt to treatment of GDM		
* Definition and types of diabetes mellitus		
* Definition of gestational diabetes		
* Risk factors* Maternal risks of diabetes in pregnancy		
* Effects of diabetes in pregnancy on fetuses and neonates		
<i>First Day (Afternoon)</i>		
- Screening and diagnosis criteria	- Discussing what is observed and heard from others through cases (learning through vicarious experiences)	- Interpersonal interactions (the trainer's offering information, peers' sharing information)
* Glucose tolerance tests		
* Other tests for glucose screening		
<i>Second Day (Morning)</i>		
* Antepartum management	- Expressing tips to follow in a healthy diet (learning through observations—recalling – verbal symbols)	- Interpersonal interactions (the trainer's offering information, peers' sharing information)
* Diet	- Believing that one can follow her diet (perceived self-efficacy)	- Sharing feelings about diet and insulin treatment
* Treatment with Insulin	- Discussing what is observed and hear from others through cases (learning through vicarious experiences)	- Using an insulin pen
	- Putting what is learned into practice (motivation)- learning how to use an insulin pen and demonstrating how it is used (learning through observations-paying attention)	
	- Displaying behaviour-recalling)	
	- Showing pictures and brochures about how to use an insulin pen (learning through observations)	
	- Recalling-visual symbols)	
	- Believing that one can use an insulin pen (perceived self-efficacy, self-judgment capacity)	
	- Implementation of what is learned (motivation)- Learning how to self-monitor blood glucose levels and demonstration of measurement of blood glucose	

Table 1: Contd...

<i>Content</i>	<i>Social-Cognitive Theory</i>	<i>Health Promotion Model</i>
<i>Second Day (Afternoon)</i> * Self-monitoring glucose levels * Exercise * Antepartum fetal screening (Evaluation of daily maternal fetal activities based on Ultrasound and Nonstress Test (NST))	(Learning through observations paying attention-displaying behaviour) - Learning how to follow fetal movements daily and demonstration of what is learned (learning through observations-paying attention -Displaying behaviour) -Believing that one can measure blood glucose, use an insulin pen, follow her diet, and follow fetal movements daily by herself at home (perceived self-efficacy)	
<i>Third Day (Morning)</i> * Healthy life style behaviour * Stress management * Spiritual development	sharing feelings about GDM (self-efficacy-psychological status) - Capacity for self-arrangement - Supporting a pregnant woman through positive words by her family (self-efficacy-verbal persuasion) - Interventions directed towards enhancement of positive psychological status (self-efficacy-verbal persuasion)	- Interpersonal interaction (sharing experiences with a breastfeeding mother) -Taking responsibility and making plans (creating a breastfeeding plan)
<i>Third Day (Afternoon)</i> * Interpersonal relationships * Responsibility for health	-Sharing feelings about GDM (self-efficacy-psychological status) - Capacity for self-arrangement	
<i>Fourth Day (Morning)</i> * Physical activity * Nutrition- Evaluation of education given and administration of Knowledge Evaluation Form about gestational diabetes after education	- The pregnant woman's commenting on whether she will implement interventions for treatment of GDM (capacity for self-judgment)	

Ethical Considerations

Ethical approval was received from the Scientific Ethics Committee of the Ege University Faculty of Nursing (no: 2009-85). The written informed consent was received from the women who participated in the paper.

Data Analysis

The data for the paper was recorded and analyzed using Statistical Package for the Social Sciences Version 11.5. The descriptive statistics, chi-square test and t-test were used in data analysis. The Chi-square analysis was performed to

determine whether or not the difference in socio-demographic characteristics exist between the intervention and control groups. The values obtained from HPLP II and SES scales were analyzed using the independent samples t-test to define differences during three follow-ups for each group. With $p < 0.05$, it was considered significant (Özdamar 2004).

RESULTS

In this paper, demographic characteristics of women were demonstrated in Table 2. The average age of the participants was 32.33 ± 4.22 years in the intervention group and 32.96 ± 4.38 years

Table 2: Distribution of the socio-demographic characteristics (n = 60)

	<i>Intervention group</i> (n = 30) n (%)	<i>Control group</i> (n = 30) n (%)	χ^2	<i>p-value</i>
<i>Age Group</i>				
25-29 years	8 (26.7)	8 (26.7)	0.101	0.951
30-34 years	15 (50.0)	14 (46.6)		
35 years and over	7 (23.3)	8 (26.7)		
<i>Educational Status</i>				
Primary education	5 (16.7)	6 (20.0)	2.432	0.488
Secondary education	5 (16.7)	2 (6.6)		
High school	7 (23.3)	11 (36.7)		
University	13 (43.3)	11 (36.7)		
<i>Working Status</i>				
Working	9 (30.0)	9 (30.0)	0.000	0.001*
Not working	21 (70.0)	21 (70.0)		
<i>Income Level</i>				
Less than expenses	6 (20.0)	7 (23.3)	0.504	0.777
Equal to expenses	18 (60.0)	19 (63.3)		
Higher than expenses	6 (20.0)	4 (13.4)		
<i>Year of the Marriage</i>				
1-5 years	15 (50.0)	14 (46.7)	24.800	0.099
6-10 years	7 (23.3)	7 (23.3)		
11-15 years	5 (16.7)	6 (20.0)		
16 years and over	3 (10.0)	3 (10.0)		
Total	30 (100.0)	30 (100.0)		

*P < 0.05

in the control group. As a result of the chi-square test that was applied in order to examine the homogeneity of the groups, a statistically significant difference was found between both groups in terms of the working status ($p < 0.05$) (Table 2).

Health Promotion Lifestyle Profile II (HPLP II) Scale

According to the major findings from this paper, the results of the independent samples t-test revealed no statistically significant difference for the HPLP II Scale's average scores for the intervention and control groups at baseline ($p = 0.974$). It was found that there was a statisti-

cally significant difference in the HPLP II Scale average scores between both groups in the second interview ($p = 0.004$). In the final interview, a significant increase on average scores of HPLP II Scale of the intervention group compared control group was determined ($p = 0.000$) (Table 3).

Self-Efficacy Scale (SES)

According to other major findings obtained from this paper, it was determined that there was no statistically significant difference for the SES scale's average scores for both groups at baseline ($p = 0.600$). In the second ($p = 0.868$) and third ($p = 0.646$) interviews, it was found that there was

Table 3: Distribution of HPLP II Scale average scores during first, second and third interview

<i>Scores</i>	<i>Intervention group</i> (n=30) mean±SD	<i>Control group</i> (n=30) mean±SD	<i>t</i>	<i>p-value</i>
<i>HPLP II Scale</i>				
First interview	126.86± 18.87	126.70± 20.75	-0.033	0.974
Second interview	138.23± 20.64	121.66± 22.21	-2.992	0.004
Third interview	145.36± 20.57	117.70± 23.11	-4.783	0.000*

*P < 0.05.

** SD: standard deviation

*** HPLP II Scale: Healthy Life Style Behaviour II Scale

no statistically significant difference in terms of SES average scores between the intervention and control groups (Table 4).

DISCUSSION

The aim of the paper was to investigate the effect of education on healthy lifestyle behaviors and self-efficacy levels in women with GDM. The results from the paper indicated that the intervention group compared to the control group experienced a significant increase in the HPLP II Scale average scores between baseline, second and final interviews. In the literature, there are a few studies that support these findings. A randomized control trial conducted by Korpi-Hyovalti et al. (2011) using dietary controls and exercises found no significant differences between intervention and control groups with regards to maternal outcomes. Another study reported that healthy lifestyles among pregnant women with GDM could be progressed by training activities (Mendelson et al. 2008). The review conducted to evaluate the influences of combined diet and exercise interventions on avoiding GDM by Bain et al. (2015) had been examined using 13 randomized controlled trials. It was found that a number of trials showed benefits in diet and physical activity related to lifestyle behaviors for women receiving the combined diet and exercise intervention, compared to women receiving no intervention. In Ko and Lee's (2014) study, it was found that the Coaching Program for the comprehensive healthy lifestyle modification was effective in improving self-care behavior and decreasing depression, fasting blood sugar and HbA1C. Ferrara et al. (2014) investigated the effectiveness of diabetes prevention strategies planned for pregnant or postpartum women with GDM. The lifestyle intervention program by mail or telephone 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 behavior changes.

The study by Javid et al. (2015) was aimed to compare lifestyles of women with gestational diabetes and healthy pregnant women attending the health centers. According to the findings from the study, women with GDM were more inadequate on dietary style, physical activity, prenatal self-care, perceived social support, and perceived stress compared with healthy pregnant women. The paper results of the researchers and other recent study results showed that training or counseling is needed in order to implement specific interventions in maternity care units. Above all, interventions based on various social-cognitive and behavioral strategies could potentially be influential for increasing healthy lifestyle behaviors among women with GDM. There are multiple effects upon behavior, comprising both cognitive and social elements with respect to SCT (Bandura 2004). Behavioral strategies based on SCT include increasing self-efficacy, providing social support (especially support from family and friends), and outcome expectancies, which refer to the degree to which a person believes that behaviors will give rise to a specific outcome. In the Morrison et al. (2014) study, it was reported that the shock, fear, anxiety and lack of control defined by many women with respect to the diagnosis and subsequent management of GDM is significant that the training given to women with GDM should be designed taking into account the social-cognitive and behavioral strategies.

Also, this paper's results indicate no statistically important difference between the intervention and the control groups for SES average scores. Similar to this research, a study by Hom-

Table 4: Distribution of SES average scores during first, second and third interview

Scores	Intervention group (n=30) mean ± SD	Control group (n=30) mean ± SD	t	p-value
<i>SES Scale</i>				
First interview	62.03±10.88	61.33± 6.14	-0.307	0.6000
Second interview	61.90± 9.95	61.38± 6.68	-0.167	0.868
Third interview	61.43± 9.09	62.43± 7.58	0.462	0.646

*P < 0.05.

** SD: standard deviation

*** SES: Self-Efficacy Scale

ko et al. (2002) investigated the impacts of self-diabetes follow-up upon the self-efficacy, consistency in diet, and pregnancy outcomes in women with GDM treated with diet therapy. It was found that no difference was determined between the groups in terms of self-efficacy scale average scores. Self-efficacy in the health promoting behaviors of adults is important for the individual's motivation, realizing himself/herself, establishing positive correlations, expressing positive health behaviors and providing control over his/her own health. According to his/her self-efficacy levels, an individual paints pessimistic or optimistic pictures before beginning an action, and those having a higher self-efficacy perception expend much more effort than those having a lower self-efficacy level (Bandura 2004).

The problems such as the loss of control, diagnosed with high-risk pregnancy, fear of losing the fetus, lifestyle changes, treatment procedures, blood glucose monitoring increases the importance of care given to women with GDM. During this period, it is essential to protect, maintain and increase the health of the pregnant woman and the fetus (Homko et al. 2002). Therefore, to gain the necessary knowledge and skills for better management of GDM during antenatal care to the women with GDM is an important issue (Luoto et al. 2011). According to findings obtained from the study, it can be said that the training given based on Social-Cognitive Theory and Health Promotion Model to women with GDM might be effective for behavior change in the women to develop positive health behaviors and control gestational diabetes.

CONCLUSION

In this paper, the researchers investigated the effect of education based on Social-Cognitive Theory and Health Promotion Model on healthy lifestyle behaviors and self-efficacy levels of women with GDM. The present study showed that education based on Social-Cognitive Theory and Health Promotion Model had a positive effect in terms of gaining healthy lifestyle behaviors for women with GDM. However, it was concluded that no difference was determined between the groups for self-efficacy levels. It is stated that the perception of self-efficacy develops in a longer period of time in the literature. Therefore, designing of studies, which are of longer training and observation periods for women with GDM, is encouraged.

IMPLICATIONS FOR PRACTICE

The study, which highlighted obstetrics nurses and midwives, will be effective in promoting and encouraging healthy lifestyle behaviors associated with GDM management. Such education is expected to provide more comprehensive care opportunities for women with GDM, especially obstetric nurses and midwives. The women with GDM will be more motivated to make changes in their lifestyles. It is believed that the adaptation of the pregnant women will be increased on issues such as diet, exercise, coping with stress, self-regulation, and more use of social support. Through this care, it can prevent or reduce developing complications in pregnancy and the postpartum period. Also, this training might be effective in reducing the risk of type II diabetes development in the future in women with GDM.

RECOMMENDATIONS

Many women are not aware of the maternal and fetal-neonatal complications of GDM and type II DM risk in the future. It is believed that giving this training to women with GDM will create awareness related to GDM management, be useful in the early detection of GDM, and ensure that mother and fetus are less affected by the complications of GDM. The obstetric nurses and midwives play a key role in raising awareness related to GDM management. The nurses and midwives in obstetrics clinics can provide better quality care to women with GDM by training and consulting, which prepares them with using this training model or different educational models. Also, when the impact on behavioral change of self-efficacy perception is considered, it is suggested that longer studies relating to improving of perception of self-efficacy should be designed.

LIMITATIONS OF THE STUDY

The limitation of this study is that it was not randomized. Thus, the study sample might not have represented a varied study population.

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