



Article

Why Is Blood Glucose Control Important to Self-Care of Pregnant Women with Gestational Diabetes Mellitus?

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Abstract: This study aimed to investigate the change in self-care, self-efficacy, and health status of pregnant women with gestational diabetes mellitus (GDM), and to identify whether blood glucose control influences pregnancy outcomes. This study is experimental research using a one-group pretest-posttest design. The study subjects were 40 pregnant women diagnosed with GDM, and the data were collected in their 24th and 40th week of gestation and analyzed using SPSS 27.0. Paired samples *t*-test was used to compare the health status, self-care, and self-efficacy of subjects between antepartum and postpartum, and *t*-test and non-parametric test were used to evaluate the changes in self-care and self-efficacy according to the ability to control blood glucose. As a result of this study, maternal BMI, self-care, and self-efficacy after childbirth were significantly worse than before ($p < 0.001$). However, HbA1c did not deteriorate and remained at a similar level, which is possibly the effect of diabetes education ($p = 0.902$). Furthermore, it was found that HbA1c control has a significant effect on preventing a decrease in self-care. In conclusion, it is necessary to develop and apply various diabetes education programs to manage blood glucose levels in pregnant women with GDM as blood glucose control is effective for improving not only their health outcomes but also their cognitive status, such as self-care.

Keywords: pregnant women; gestational diabetes mellitus; self-care; hemoglobin A1c; education



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1. Introduction

In 2014, the prevalence of diabetes was 13.7% in South Korea, the highest record in history. It is projected that the number of diabetic patients will grow from 3.2 million in 2010 to approximately 6 million in 2050, which is an increase of 183% [1]. Gestational diabetes is a disease characterized by unstable glucose intolerance occurring first during pregnancy, which is reported as the prevalence of 7% in pregnant women worldwide [2]. Gynecology- or obstetrics-related national institutions, including the American College of Obstetricians and Gynecologists (ACOG), suggest the guidelines to screen all pregnant women at 24 to 28 weeks of gestation for the effective management of GDM. These guidelines also recommend the same criteria to diagnose GDM using a 75-g 2 h oral glucose tolerance test [3]. In South Korea, gestational diabetes occurs in 2–5% of pregnant women, and the prevalence tends to increase continuously [4,5].

In general, gestational diabetes may have adverse impacts on the health of a mother, fetus, and infant by increasing the risk of spontaneous abortion, fetal abnormalities, preeclampsia, stillbirth, macrosomia, neonatal hypoglycemia and hyperbilirubinemia, preterm labor, dystocia, perinatal injury, etc. Mothers may also increase the risk of obesity and type II diabetes mellitus after giving birth [6]. It has been reported that poorly managed gestational diabetes may progress to Type II diabetes mellitus [7]. Since most pregnant women with gestational diabetes mellitus have not experienced diabetes before, it has been reported that they have limited knowledge about the disease as well as the control of blood

glucose, dietary therapy, and breastfeeding [7]. In addition, pregnant women with GDM have difficulty identifying useful information as they have a relatively higher demand than typical pregnant women [8]. Thus, it is necessary to provide education for pregnant women with diabetes. In foreign studies with diabetic patients, intervention management brought about a decrease in HbA1c levels [9–12] and the promotion of self-care behavior [10,11].

Accordingly, the most important goal for the treatment of gestational diabetes is to maintain blood glucose at a normal level. There are several indices of blood glucose management, which are postprandial glucose, glycated hemoglobin and fasting glucose. For postprandial glucose, blood glucose level one or two hours after breakfast is commonly used, and the American Diabetes Association (ADA) suggests 120 mg/dL as the criterion for the goal of control [13]. Another index is glycated hemoglobin that should be maintained below 5.0% in the first trimester of pregnancy and below 6.0% in the third trimester [14]. Fasting blood glucose levels are known as important as the postprandial glucose level in pregnancy. Both have a significant association with maternal and fetal outcomes, such as hypertension and perinatal complications [15,16].

Thus, for successful blood glucose maintenance, pregnant women with gestational diabetes need self-care in which they have accurate information about gestational diabetes to care for themselves thoroughly [17]. The probability of being diagnosed with gestational diabetes in their next pregnancy increases by 30–50% [18]. In a preceding study of pregnant women with gestational diabetes mellitus [19], a postpartum care program in pregnant women did not affect self-care and the control of blood glucose; however, it was found to be an effective intervention for the promotion of self-efficacy in mothers. Another study [20] assessed the change in self-care and blood glucose in pregnant women with GDM, but it did not investigate their self-efficacy. Therefore, this study would investigate the change in health status, self-care, and self-efficacy of pregnant women with GDM, and identify whether blood glucose control influences their pregnancy outcomes.

2. Methods

2.1. Theoretical Background

2.1.1. Self-Efficacy for Diabetes Mellitus

This study is based on Bandura's social cognitive theory for self-efficacy [21], by which patients with gestational diabetes can successfully perform self-care behaviors, utilizing four resources of self-efficacy, including enactive mastery experiences, vicarious experience, verbal persuasion and allied types of social influences, and physiological and affective states. Self-efficacy was measured by utilizing the instrument for measuring diabetic patients' self-efficacy developed in nine items by Gu [22]. The degree of self-efficacy was calculated by summing up the response to each item with a range of scores from 1 to 10 points. A higher score represents higher self-efficacy and the reliability of the instrument. Cronbach's α was 0.77 at the time of development and 0.86 in this study.

2.1.2. Self-Care for Diabetes Mellitus

We used the self-care measurement tool for diabetic patients developed and enhanced by Kim [23] with some modifications. Subjects were asked about their self-care management behaviors for the last two weeks in the survey. This tool consists of a total of 16 items, including five items on nutrition management, four items on self-measurement of blood sugar, three items on foot care, three items on medication management, and one item on exercise. Each item ranges from one point "never" to five points "always do", with a higher score indicating better self-care. In Kim's study [23], the reliability of the tool, Cronbach's α was 0.68, and Cronbach's α was 0.84 in this study.

2.1.3. Education Program for GDM

Subjects participated in an offline educational session twice, at 20 and 40 weeks of gestation. The contents of the first education included the definition and diagnosis of gestational diabetes, the risk of gestational diabetes, the necessity and measuring method

for blood glucose self-monitoring, dietary and exercise therapy, stress (sick day) management, and the duration of education was about one hour [19]. The contents of the second education consisted of feedback on the degree of practicing the contents of the first education and individual counseling on self-measured blood glucose levels, and the duration of education was about 30 min. In addition to offline education sessions, two times of telephone counseling were conducted at a two-week interval between 24 and 40 weeks of pregnancy, and each session took about 10 min.

2.1.4. Glycated Hemoglobin (HbA1c)

There are several studies showing that strict blood glucose control may decrease the risk of adverse pregnancy outcomes, and thus, good glycemic control is considered the first target of antepartum care for women with GDM [24–26]. Glycated hemoglobin represents the degree of regulating blood glucose for the past two to three months. HbA1c is the form of hemoglobin linked to glucose, measured in the blood and used as one alternate to the gold standard test, fasting plasma glucose, and 2 h plasma glucose levels [27]. The HbA1c level was measured both at the first visit and the last visit. The level of HbA1c is considered to be high when it is greater than 5% during the first trimester, and it should normally be below 6% during the third trimester [14].

2.1.5. Body Mass Index (BMI)

BMI is the value of one's weight (kg) divided by one's height squared (m), which is the obesity index most used since it can reflect the level of body fat relatively accurately. The classification of obesity relies on adult BMI standards. In accordance with WHO guidelines for the Asia-Pacific region, the Korean Society for the Study of Obesity has adopted the definition of obesity as greater than BMI 25 kg/m² [28]. BMI is an important indicator as a factor related to the risk of maternal diseases such as gestational diabetes mellitus and gestational hypertension.

2.2. Study Design

As shown in Table 1, this study is experimental study using a one-group pretest-posttest design.

Table 1. Study design.

Group	Pre-Test	Education	Post-Test
Subjects	Ye ₁ ¹	O ²	Ye ₂ ³

¹ Examination for BMI, HbA1c, self-efficacy at 24 weeks gestation (antepartum). ² Education program.

³ Examination for BMI, HbA1c, and self-efficacy at 40 weeks gestation (postpartum).

2.3. Study Subjects

Our study subjects were 40 pregnant women diagnosed with GDM who visited a tertiary hospital as an outpatient between 24 May 2018 and 23 May 2020. They received a prescription for education on GDM from the doctor due to their abnormally increased glucose metabolism and glucose intolerance associated with physiological changes during pregnancy. The number of subjects for the effect size was estimated with G-power, using a paired samples *t*-test according to Cohen's analysis of power [29], with the estimation of a significance level $\alpha = 0.05$; the magnitude of effect $f = 0.5$; the statistical power ($1-\beta$) of 0.8; and the number of subjects with significance of 34 persons. Considering a drop-out rate of 20%, 40 women were selected as the final subjects.

The inclusion criteria of subjects were (1) adult over 20 years old, (2) person who has clear consciousness and can communicate, and (3) person who understands and agrees to the descriptions of the research, while the exclusion criteria of subjects include (1) pregnant woman with a history of diabetes before pregnancy and (2) pregnant woman with a history of mental or cognitive impairment in the medical record.

2.4. Data Collection and Analysis

For the ethical protection of the research subjects, this study was conducted after obtaining the approval of the K. General Hospital IRB. The researchers informed the research subjects of the purpose and method of the study, the guarantee of the anonymity of the personal information, and the possibility of voluntary participation, stopping or withdrawing participation. It was also informed to the subjects that all information drawn up or collected during the research would be processed with code numbers and initials so that no one could identify personal information, and the related documents were stored in a cabinet with a lock to provide the best privacy protection.

Data was collected through a pre-test during the first education session to manage GDM at 24 weeks of gestation and a post-test which was conducted in the second education session at 40 weeks of gestation after birth. The collected data were analyzed, using the SPSS 27.0 Statistics program (IBM Corp., Armonk, NY, USA). The general characteristics of the study subjects were analyzed using descriptive statistics. To compare the health status, self-care, and self-efficacy of subjects between antepartum and postpartum, paired samples *t*-test was used as the *p*-values of the Kolmogorov–Smirnov normality test were greater than 0.05. By the HbA1c, the difference in changes in antepartum and postpartum self-efficacy was analyzed, using an independent samples *t*-test as the *p*-value of normality test was greater than 0.05. However, Mann–Whitney U-test (non-parametric statistic) was used for self-care as the *p*-value of normality test was less than 0.05.

3. Results

In this study, the main research objectives are to evaluate the change in health status based on the week of gestation and identify the effect on the self-efficacy and self-care of pregnant women with GDM by blood glucose control.

3.1. General Characteristics of Subjects

Table 2 presents the characteristics of subjects, including their self-efficacy and self-care before childbirth. In this study, the mean score of self-efficacy was not high, with 60.1 points (SD = 12.26): 25.0% of the subjects had a low score (50 or less); only 12.5% had a good score (greater than 75); and 62.5% showed a fair score (between 51 and 75). The mean score for self-care was also moderate, with 46.28 points (SD = 10.39). Subjects evaluated the prenatal care quality, consisting of the all-encompassing management of subjects throughout their pregnancy period, on a scale of 1 to 10 points, which indicates a higher score is a higher level of quality care. Although many subjects were categorized into normal BMI (less than 25 kg/m²), 35.0% of subjects were either overweight or obese. Most subjects (70%) showed high HbA1c (greater than 5%), indicating impaired blood sugar management in the first trimester that leads to hyperglycemia.

Table 2. Characteristics of study subjects (*n* = 40).

Variable	<i>n</i> (%)	Mean ± SD
Age (years)		33.73 ± 4.15
<35	27 (67.5)	
≥35	13 (32.5)	
Occupation		
Unemployed	14 (35.0)	
Employed	26 (65.0)	
Parity		
Primipara	30 (75.0)	
Multipara	10 (25.0)	
Care level ¹		8.60 ± 1.57

Table 2. *Cont.*

Variable	n (%)	Mean \pm SD
BMI ²		23.16 \pm 4.00
<25	26 (65.0)	
\geq 25	14 (35.0)	
HbA1c ³		5.38 \pm 0.58
\leq 5	10 (25.0)	
>5	30 (75.0)	
Self-efficacy ⁴		60.10 \pm 12.26
Self-care ⁵		46.28 \pm 10.39

SD: standard deviation. ¹ Units expressed as point (1–10). ² Units expressed as kg/m². ³ Units expressed as percentage (%). ⁴ Units expressed as point (9–90). ⁵ Units expressed as point (16–80).

3.2. Comparison of Antepartum and Postpartum Health Status, Self-Care, and Self-Efficacy

Table 3 shows the study subjects' BMI, hemoglobin A1c, self-care, and self-efficacy in antepartum and postpartum. Hemoglobin A1c remained at a similar level. However, BMI significantly increased by 2.25 from antepartum to postpartum. The self-care and self-efficacy scores decreased after childbirth, which was also statistically significant.

Table 3. Comparison of antepartum and postpartum health status, self-care, and self-efficacy ($n = 40$).

Variable	Mean \pm SD		z, t	p-Value
	24 Weeks (Antepartum)	40 Weeks (Postpartum)		
BMI ¹	23.16 \pm 4.00	25.41 \pm 3.77	5.189	<0.001
HbA1c ²	5.38 \pm 0.58	5.37 \pm 0.42	0.124	0.902
Self-care ³	46.28 \pm 10.39	39.70 \pm 6.41	4.624	<0.001
Self-efficacy ⁴	60.10 \pm 12.26	47.53 \pm 12.48	6.048	<0.001

SD: standard deviation. ¹ Units expressed as kg/m². ² Units expressed as percentage (%). ³ Units expressed as point (9–90). ⁴ Units expressed as point (16–80).

3.3. Comparison of Changes in Antepartum and Postpartum Self-Care and Self-Efficacy by the Ability to Control Blood Glucose

To identify whether there were significant differences in changes in self-care, and self-efficacy between antepartum and postpartum according to the study subjects' initial ability to control blood glucose at 24 weeks of gestation, subjects were divided into two groups, a group of persons with HbA1c lower than 5% and a group of those higher than 5%. It was considered that HbA1c lower than 5% means good blood sugar control, and HbA1c higher than 5% indicates poor blood glucose control. It was found that there were differences in changes in self-care and self-efficacy between the two groups. Self-efficacy decreased by 3.16 points more in the poor blood sugar control group, which was not statistically significant. For self-care scores, the good blood sugar control group showed a relatively slight decrease of 1.90 points (SD 7.85), whereas the poor blood sugar control group decreased by 8.13 points (SD 8.92), which was statistically significant, as shown in Table 4.

Table 4. Comparison of changes in antepartum and postpartum self-care and self-efficacy by the ability to control blood glucose ($n = 40$).

Variable	Mean \pm SD		z, t	p-Value
	HbA1c < 5% (n = 10)	HbA1c \geq 5% (n = 30)		
Self-care Diff.	−1.90 \pm 7.85	−8.13 \pm 8.92	86.000	0.045
Self-efficacy Diff.	−10.20 \pm 16.38	−13.36 \pm 12.11	0.653	0.517

SD: standard deviation.

4. Discussion

There are several studies showing that self-care is associated with the diabetes patient's blood glucose and other physical or emotional health outcomes, and initial diabetes management status may affect the willingness to maintain self-care efforts to improve their health outcomes, such as self-efficacy [30,31]. From this point of view, our study shows that the self-care of pregnant women with GDM is significantly associated with the blood glucose management status or ability early in the diagnosis of GDM. This finding indicates that it is important to investigate and determine the person's blood glucose management status or ability before starting self-care. Moreover, it is necessary to select the appropriate self-care education program according to the person's initial ability to manage blood glucose in order to improve health outcomes in pregnant women with GDM. Compared with the previous study showing a significant increase in HbA1c [32], our study showed that glycated hemoglobin can be properly controlled without a significant increase, which is considered as the effect of the education program given to subjects. Accordingly, it was found that the ability to control blood glucose is significantly associated with the change of self-care in pregnant women with GDM.

In this study, the subjects' self-efficacy before giving birth was 60.10 out of a total score of 90. In a previous study on pregnant women with GDM [19], the level of self-efficacy before giving birth was 64.43 in the experimental group and 68.87 in the control group, which was similar to the result of this study. However, regarding the self-efficacy after applying the nursing intervention program to mothers with GDM, the self-efficacy of the experimental group increased from 0.12 to 64.55 in the study [19], whereas in this study, it decreased to 47.53 (SD 12.48), showing a different result from the previous study. Yet, it is not safe to simply compare two studies because of different aspects: study subjects, education programs, and study designs. This is probably because the education methods generally provided to mothers with gestational diabetes vary in each hospital, the education experience and skill of the nurses may be different, and the study period is different between the previous study and this study. The reason for the decrease in self-efficacy after giving birth in this study is that mothers' self-efficiency may have been negatively affected by other factors, such as anxiety and worry about childcare, since the birth is an important life event for women. Thus, it is necessary to develop an education program that can increase self-efficacy after giving birth.

In previous studies of pregnant women with gestational diabetes mellitus, the average age of the subjects was 35.8 years and 35.5 years [19,33]. The average age of the subjects in this study was 33.73 ± 4.15 years, which was slightly lower than in the previous studies. Pregnant women had a continuous weight loss for one year after giving birth, and the degree of weight loss became gradual three months after giving birth [33]. However, the postpartum body mass index increased slightly in this study, which is thought to be because there was not enough time to lose weight due to mothers' visiting a hospital within 4 weeks after giving birth to take a postpartum test. Therefore, pregnant women need to be aware of the importance of managing weight and health during pregnancy in consideration of health status after giving birth, and these contents should be reflected in establishing a diabetes education program for pregnant women with GDM.

This study has limitations despite the significance of the research. First, there may be a risk of bias due to the study design with random assignment and no control group. Second, the study used HbA1c as one of the parameters of the health outcome, but HbA1c fluctuates during pregnancy, hence, it would be better to have subjects with minimum 30 weeks of pregnancy if HbA1c is to be used, or oral glucose tolerance testing needs to be the parameter for the outcome of the diabetic health for the future study. Lastly, there is a limitation in generalizing the results to all institutions since the study was conducted at a single institution.

5. Conclusions

Self-care influences self-efficacy in pregnant women, and poor management of HbA1c in those with GDM is negatively associated with their self-efficacy. Accordingly, this study found the relationship between poor management of HbA1c in pregnant women with GDM and self-efficacy. Understanding people's blood sugar control ability may support providing more effective self-care education incorporated with the evaluation of the individual's clinical condition. This may also help improve self-care behaviors and glycemic control ability in pregnant women with GDM.

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Data Availability Statement: The data presented in this study are available on request from the corresponding author.

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References

1. Korean Diabetes Association. Diabetes Fact Sheet in Korea. 2016. Available online: <https://www.diabetes.or.kr/pro/news/index.php?code=board&mode=view&number=1332> (accessed on 4 March 2021).
2. Hunt, K.J.; Schuller, K.L. The Increasing Prevalence of Diabetes in Pregnancy. *Obstet. Gynecol. Clin. N. Am.* **2007**, *34*, 173–199. [CrossRef] [PubMed]
3. Tsakiridis, I.; Giouleka, S.; Mamopoulos, A.; Kourtis, A.; Athanasiadis, A.; Filopoulou, D.; Dagklis, T. Diagnosis and Management of Gestational Diabetes Mellitus: An Overview of National and International Guidelines. *Obstet. Gynecol. Surv.* **2021**, *76*, 367–381. [CrossRef] [PubMed]
4. Park, S.; Lee, J.H.; Kim, B.R.; Park, M.H.; Kim, Y.J. Comparison of Pregnancy Prognosis for Gestational Diabetes Diagnosed by the 1-Step and 2-Step Methods. *J. Korean Soc. Matern. Child Health* **2021**, *25*, 42–47. [CrossRef]
5. Metzger, B.E. Long-term Outcomes in Mothers Diagnosed with Gestational Diabetes Mellitus and Their Offspring. *Clin. Obstet. Gynecol.* **2007**, *50*, 972–979. [CrossRef] [PubMed]
6. Bellamy, L.; Casas, J.-P.; Hingorani, A.D.; Williams, D. Type 2 diabetes mellitus after gestational diabetes: A systematic review and meta-analysis. *Lancet* **2009**, *373*, 1773–1779. [CrossRef]
7. Choi, E.S.; Oh, J.A.; Hur, M.H.; Lee, I.S.; Choi, S.Y. The knowledge and learning needs about gestational diabetes in pregnant women. *Korean J. Women Health Nurs.* **2000**, *6*, 96–108. Available online: <https://kjwhn.org/journal/view.php?number=738> (accessed on 19 July 2022).
8. Hjelm, K.; Berntorp, K.; Frid, A.; Åberg, A.; Apelqvist, J. Beliefs about health and illness in women managed for gestational diabetes in two organisations. *Midwifery* **2008**, *24*, 168–182. [CrossRef] [PubMed]
9. Aubert, R.E.; Herman, W.H.; Waters, J.; Moore, W.; Sutton, D.; Peterson, B.L.; Bailey, C.M.; Koplan, J.P. Nurse Case Management To Improve Glycemic Control in Diabetic Patients in a Health Maintenance Organization. *Ann. Intern. Med.* **1998**, *129*, 605–612. [CrossRef] [PubMed]
10. Sadur, C.N.; Moline, N.; Costa, M.; Michalik, D.; Mendlowitz, D.; Roller, S.; Watson, R.; Swain, B.E.; Selby, J.V.; Javorski, W.C. Diabetes management in a health maintenance organization. Efficacy of care management using cluster visits. *Diabetes Care* **1999**, *22*, 2011–2017. [CrossRef]
11. Kostev, K.; Rockel, T.; Jacob, L. Impact of Disease Management Programs on HbA1c Values in Type 2 Diabetes Patients in Germany. *J. Diabetes Sci. Technol.* **2017**, *11*, 117–122. [CrossRef] [PubMed]
12. Taylor, C.B.; Miller, N.H.; Reilly, K.R.; Greenwald, G.; Cuning, D.; Deeter, A.; Abascal, L. Evaluation of a Nurse-Care Management System to Improve Outcomes in Patients with Complicated Diabetes. *Diabetes Care* **2003**, *26* (Suppl. 1), 1058–1063. [CrossRef] [PubMed]

13. American Diabetes Association Gestational Diabetes Mellitus. *Diabetes Care* **2003**, *26*, s103–s105. [CrossRef] [PubMed]
14. Radder, J.K.; van Roosmalen, J. HbA1c in healthy, pregnant women. *Neth. J. Med.* **2005**, *63*, 256–259. Available online: <https://www.njmonline.nl/getpdf.php?id=339> (accessed on 7 May 2021). [PubMed]
15. Ryan, E.A.; Savu, A.; Yeung, R.O.; Moore, L.E.; Bowker, S.L.; Kaul, P. Elevated fasting vs post-load glucose levels and pregnancy outcomes in gestational diabetes: A population-based study. *Diabet. Med.* **2020**, *37*, 114–122. [CrossRef] [PubMed]
16. Ozgu-Erdinc, A.S.; Iskender, C.; Uygur, D.; Öksüzoglu, A.; Seckin, K.D.; Yeral, M.I.; Kalaylıoğlu, Z.I.; Yücel, A.; Danisman, A.N.; Kalaylıoğlu, Z.I. One-hour versus two-hour postprandial blood glucose measurement in women with gestational diabetes mellitus: Which is more predictive? *Endocrine* **2016**, *52*, 561–570. [CrossRef]
17. Day, J.L. Diabetic patient education: Determinants of success. *Diabetes/Metab. Res. Rev.* **2000**, *16* (Suppl. 1), S70–S74. [CrossRef]
18. Shah, B.; Lipscombe, L.; Feig, D.; Lowe, J. Missed opportunities for type 2 diabetes testing following gestational diabetes: A population-based cohort study. *BJOG Int. J. Obstet. Gynaecol.* **2011**, *118*, 1484–1490. [CrossRef]
19. Jeon, Y.K.; Kim, H.J.; Yang, M.Y.; Jung, D.Y.; Yoon, K.Y.; Noh, G.O. Effects of a Postnatal Care Program on Self-efficacy, Self-management, and Glycemic Control in Women with Gestational Diabetes Mellitus. *Korean J. Women Health Nurs.* **2018**, *24*, 367–378. [CrossRef]
20. Kim, H.; Kim, S. Effects of an Integrated Self-Management Program on Self-Management, Glycemic Control, and Maternal Identity in Women with Gestational Diabetes Mellitus. *J. Korean Acad. Nurs.* **2013**, *43*, 69–80. [CrossRef]
21. Bandura, A. Self-efficacy: Toward a unifying theory of behavioral change. *Psychol. Rev.* **1977**, *84*, 191–215. [CrossRef] [PubMed]
22. Gu, M.O. A Study of the Relationship among Self Efficacy, Self Regulation, Situational Barriers and Self Care Behavior in Patients with Diabetes Mellitus. *J. Nurses Acad. Soc.* **1994**, *24*, 635–651. [CrossRef]
23. Kim, S.-Y.; Cho, B.-H.; Nam, H.-S. Effect of Case Management Program on Self-Efficacy, Self-Care Behaviors and Glycometabolic Control in Patient with Diabetes. *J. Agric. Med. Community Health* **2008**, *33*, 232–242. [CrossRef]
24. Nathan, D.M. The diabetes control and complications trial/epidemiology of diabetes interventions and complications study at 30 years: Overview. *Diabetes Care* **2014**, *37*, 9–16. [CrossRef] [PubMed]
25. Willhoite, M.B.; Bennert, H.W., Jr.; Palomaki, G.E.; Zaremba, M.M.; Herman, W.H.; Williams, J.R.; Spear, N.H. The Impact of Preconception Counseling on Pregnancy Outcomes: The experience of the Maine Diabetes in Pregnancy Program. *Diabetes Care* **1993**, *16*, 450–455. [CrossRef] [PubMed]
26. American Diabetes, A. 13. Management of Diabetes in Pregnancy. *Diabetes Care* **2017**, *40* (Suppl. 1), S114–S119. [CrossRef]
27. Korean Diabetes Association. 2015 Treatment Guidelines for Diabetes, 5th ed. Available online: https://www.diabetes.or.kr/bbs/?code=eng_treatment&mode=view&number=590&page=1&code=eng_treatment (accessed on 25 June 2021).
28. Kim, S.Y. The Definition of Obesity. *Korean J. Fam. Med.* **2016**, *37*, 309. [CrossRef] [PubMed]
29. Cohen, J. *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed.; Lawrence Erlbaum Associates: Hillsdale, NJ, USA, 1988.
30. Niknami, S.; Haidarnia, A.; Rakhshani, F.; Zareban, I.; Karimy, M. The effect of self-care education program on reducing HbA1c levels in patients with type 2 diabetes. *J. Educ. Health Promot.* **2014**, *3*, 123. [CrossRef] [PubMed]
31. Beard, E.; Clark, M.; Hurel, S.; Cooke, D. Do people with diabetes understand their clinical marker of long-term glycemic control (HbA1c levels) and does this predict diabetes self-care behaviours and HbA1c? *Patient Educ. Couns.* **2010**, *80*, 227–232. [CrossRef] [PubMed]
32. Edelson, P.K.; James, K.E.; Leong, A.; Arenas, J.; Cayford, M.; Callahan, M.J.; Bernstein, S.N.; Tangren, J.S.; Hivert, M.-F.; Higgins, J.M.; et al. Longitudinal Changes in the Relationship Between Hemoglobin A1c and Glucose Tolerance Across Pregnancy and Postpartum. *J. Clin. Endocrinol. Metab.* **2020**, *105*, e1999–e2007. [CrossRef]
33. Chung, C.W.; Kim, H.; Kim, H. Body Weight Changes and Lifestyle in Women within 1 year after Childbirth. *Perspect. Nurs. Sci.* **2016**, *13*, 88–95. [CrossRef]