Effectiveness of Self -Care Instructional Guideline on Maternal and Neonatal Outcomes Among Pregnant Women After Bariatric Surgery

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Abstract

Background: Maternity nurses had an important role in caring of post bariatric surgery pregnant women in order to reduce different maternal and neonatal risks including nutritional deficiency, anxiety and intrauterine growth retardation. **Aim** of the current study was to evaluate the effect of self-care instructional guideline on maternal and neonatal outcomes among pregnant women after bariatric surgery. **Design**: Pre-test post-test nonequivalent groups quasi-experimental design. **Setting:** The study was conducted in outpatient clinic affiliated at Obstetrics and Gynecological Department at Alnamas General Hospital affiliated at Alnamas city at Aseer Region in Kingdom of Saudi Arabia during the period from the beginning of December 2018 till the end of August 2019. **Subjects**: A purposive sample of total 120 of Primigravida women after bariatric surgery were recruited in the current study, they were allocated into two groups: control group included (60) Primigravida women they had ordinary nursing care. Study group included (60) Primigravida women they had self-care instructional guideline. **Tools:** four tools were used for data collection, General Characteristic Interviewing Questionnaire& Knowledge Tool, Pregnant Women Self-Care Practice Assessment Tool, Maternal Outcomes Measurements Tool and Neonatal Outcomes Measurements Tool **Results** of the study showed a highly statistically significant differences regarding knowledge and self-care practice between study and control groups regarding self-care of pregnancy after bariatric surgery (p<0.000) and there was a statistically difference between two groups regarding maternal and neonatal outcomes including anemia, antepartum hemorrhage, gestational diabetes, and postpartum hemorrhage among mother and between intrauterine growth retardation, low birth weight and the Apgar score at the 5th minute among neonates . **Conclusion**: self-care instructional guideline had a positive effect on maternal and neonatal outcomes measurements. **Recommendation:** self-care instructional guideline should be provided for all post bariatric pregnant women.

Keywords: Self -care instructional guideline, maternal outcomes, neonatal outcomes, bariatric surgery.

Introduction:

Obesity is highly associated with reduced fertility, primarily because of oligo-ovulation and an ovulation. In pregnant women, obesity confers increased risks of gestational diabetes mellitus, preeclampsia, cesarean delivery, and infectious morbidity. Operative morbidity is also increased, and obese women are less likely to have successful vaginal birth after a previous cesarean delivery. Weight loss is associated with improved fertility rates and pregnancy outcomes, with bariatric surgery (BS) having proven to be the most effective treatment **(Best etal.,2017),** . However, BS itself can be a risk factor for the development of adverse pregnancy outcomes and poses a challenge for obstetricians. (**Stephansson et al.,2018).**

Bariatric surgery is one option for loss weight among patients with a body mass index (BMI) of at least 40 kg / m2, or in those with a BMI of at least 35 kg / m2 who have comorbidities. There are two approaches to bariatric surgery: restrictive and restrictive/malabsorptive surgeries. The most common restrictive procedure is adjustable gastric banding, and the most common restrictive/malabsorptive procedure is the Roux-en-Y gastric bypass. Rapid

weight loss is typical after either procedure, resulting in improvement of different reproductive disorders as, polycystic ovary syndrome, anovulation, and irregular menses, that leading to higher fertility rates **(Best etal.,2017).**

Pregnancy after bariatric surgery appears to effectively reduce the risk of complications such as fetal macrosomia, gestational diabetes mellitus, and hypertensive disorders of pregnancy. However, women who become pregnant after bariatric surgery may constitute with an increased risk for preterm and small-for-gestational-age infants **(Akhter et al.,2019).**

Caring of women who become pregnant after bariatric surgery present unique challenges. Although outcomes are generally good, nutritional, and surgical complications can arise. The American College of Obstetricians and Gynecologists (ACOG) recently reviewed the available evidence on pregnancy outcomes after bariatric surgery. Caring of women who want to become pregnant after bariatric surgery should begin from preconception time, preconception counseling should be provided for all women of reproductive age who are undergoing bariatric surgery. Counseling on the use of contraceptives is especially important, after bariatric surgery, a woman should wait 12 to 24 months before conceiving so that the fetus is not affected by rapid maternal weight loss and so that the patient can achieve her weight-loss goals. If pregnancy occurs before this recommended time frame, closer surveillance of maternal weight and nutritional status may be beneficial, and serial ultrasound monitoring of fetal growth should be considered **(Narayanan & Syed.2016)**

During pregnancy, serum levels of many micronutrients and macronutrients will decrease as a result of the expanding maternal blood volume and increasing demands of the growing fetus. Therefore, it is recommended to check the following indices at least once per trimester and use pregnancy specific ranges: serum folate, serum vitamin B12, serum ferritin, iron studies including transferrin saturation and full blood count; serum vitamin D with calcium, phosphate, magnesium, and PTH ; serum vitamin A; prothrombin time, INR, and serum.

Self-care is a basic concept in nursing care and has desirable outcomes in maintenance and promotion of pregnant women health and plays a great role in the quality of care and health pregnancy outcomes. The concept of self-care described as engagement in activities to enhance wellness and health promotion. Self-care promotes health and encourages work-life balance, disease prevention and limitation **(Mcelligott, 2015).** Activities of self-care are divided into different types: regulatory self-care, such as eating and sleeping, preventive self-care such as exercising and dieting, reactive self-care such as responding to symptoms without a physician's intervention, restorative self-care such as behavior change and compliance with treatment regimens **(Bower et al, 2015).**

Maternity nurses have a pivotal role in caring pregnant women after bariatric surgery .nurse should educate pregnant women regarding essential knowledge and self-care management including the effect of such bariatric surgery on pregnancy and essential management measures in case of arising health hazards ,in addition the nurse should educated pregnant women with adequate knowledge regarding their nutritional health needs ,rest and sleep and importance of follow-up and treatment .So the aim of the current study was to evaluate the effect of self-care instructional guideline on knowledge and practices of self-care

after bariatric surgery in addition to on maternal and neonatal outcomes among pregnant women after bariatric surgery.

Significance of the study:

There is a dramatic increase in overweight and obesity worldwide. The WHO estimates that 39% of adults worldwide are overweight (BMI ≥ 25 kg/m2) and 13% are obese (BMI ≥30 kg/m2)(**WHO,2019**) .Obesity increases complications for both mother and offspring during pregnancy and childbirth (Marchi etal.,2015). Recently up to 80% of patients who undergo bariatric surgery are women of childbearing age. Pregnancy post bariatric surgery has become increasingly more common. Although numerous studies have evaluated associations of bariatric surgery with pregnancy outcomes, the effect of maternal nutritional status on maternal and perinatal outcomes is not well established. A lot of published articles evaluated the nutritional status after bariatric surgery and its association with maternal and perinatal outcomes, comprising 2056 women with pregnancies after bariatric surgery. Deficiencies were reported in maternal concentrations of vitamins A, B1, B6, B12, C, D, K, iron, calcium, selenium, and phosphorous. The only adverse events documented for these deficiencies encountered during pregnancy were anemia (vitamin B12, iron), night blindness (vitamin A), and urinary tract infections (vitamin A, D). (**Stephansson et al.,2018).** Added that these various micronutrient deficiencies may cause various types of pregnancy complication. cause various types of pregnancy complication.

Aim of study:

The aim of the present study was to evaluate the effect of self-care instructional guideline on knowledge and practices of self-care after bariatric surgery in addition to on maternal and neonatal outcomes among pregnant women after bariatric surgery.

Research Hypothesis:

Primigravida women after bariatric surgery who utilized self-care instructional guideline will have proper maternal and neonatal outcomes than those who had ordinary care.

Subjects and Methods

Research design

Pre-test post-test nonequivalent groups quasi-experiment design was utilized to conduct the current study.

Setting

The present study conducted in Obstetrics and Gynecological Department at Alnamas General Hospital affiliated in Alnamas city at Asser Region in Kingdom of Saudi Arabia.

Sample Type: A purposive sample of primigravida women after bariatric surgery.

Size: A total 120 of Primigravida women after bariatric surgery were recruited in the current study. They were allocated into two groups: control group included (60) Primigravida women they had ordinary nursing care. Study group included (60) Primigravida women they had self-care instructional guideline.

Criteria: Inclusion criteria: Primi gravida women after bariatric surgery were included after fulfillment of the following criteria: Women aged 18-40 years, women who had Roux-en-Y gastric bypass type of bariatric surgery, "free from medical disorders, women at the gestational period between 18-24 weeks.

Recruitment strategy: pregnant women after bariatric surgery and met the previous inclusion criteria were directly asked to participate in the study after explaining the purpose of the study.

Tools of data collection: Four tools were utilized for data collection as the next:

Tool I:

Structured Interviewing Questionnaire Sheet: it included (4) parts

Part 1: general characteristics data such as: age, educational level, residence height, weight and body mass index etc.

Part 2: Bariatric surgery history included times of surgery, type of surgery etc…

Part 3: Current obstetrical history including type of pregnancy, previous gynecological surgery, and gestational age.

Part 4: Pregnant women knowledge regarding self-care for pregnancy after bariatric surgery assessment tool; It was developed by the researchers after reviewing related literature **(Stephansson et al.,2018).** It was used to evaluate pregnant women knowledge regarding self-care for pregnancy after bariatric surgery.; it included (15) closed ended questions, concerning definition of bariatric surgery, effect of bariatric surgery on pregnancy, importance of self-care during pregnancy after bariatric surgery, types of food rich in iron, protein, vitamins, and calcium etc……Each question was scored as (0) for don't know, (1) for incomplete correct answer and (2) for complete correct answer.

Total knowledge score was calculated as the following:

Poor knowledge------------<60% of total knowledge score (0-17).

Fair knowledge -----------60%-75%of total knowledge score (18-22).

Good knowledge ------ >75% of total knowledge score (>22).

Tool II:

Pregnant women self-care practice assessment tool was developed by the researchers after reviewing related literatures **(Marchi etal.,2015),** and used to evaluate women self-care practice. It included three main health care practice domains including nutritional health care practice, rest and sleep health practice, treatment and follow up health practice. This tool included 14 health practice items, for each item three answer variable were given and scored as the following: usually done (2), sometimes done (1) and (0) for rarely done.

Total practice score was calculated as the following:

Unsatisfactory practice-----------< 60% of total practice score.

Satisfactory ---------------60%-75% of total practice score.

High satisfactory --------------------- >75% of total practice score.

Tool III:

Maternal outcomes measurements tool was developed by the researchers to evaluate maternal outcomes including (antepartum outcomes, Intrapartum outcomes, and postpartum outcomes). For anxiety assessment level a visual analogue scale was used. Women were instructed to choose a number from 0 to 10 that best describes their current pain. 0 would mean 'No anxiety' and 10 would mean 'high anxiety. It was scored as no anxiety (0), low anxiety (1-3) =moderate anxiety (4-7), and high anxiety (8-10).

Tool IV:

Neonatal outcomes measurements tool was developed by the researchers to evaluate neonatal outcomes including

(gestational age, weight, Apgar score (at 1st and 5th minutes) and incidence of neonatal admission to the neonatal intensive care unit (NICU). Apgar score scoring system was identified as good (8-10 score), Moderate asphyxia (5-7), and finally sever asphyxia (0-4).

Content validity

The content tools validity was revised by three experts in woman's and Neonatal health Nursing to examine the content validity, the result of content validity index (CVI) delineated strongly accepting tools. For knowledge tool it measured (0.98), for self-practice it measured (0.97), for maternal outcomes measurements tool was (0.93), and (0.98) for the neonatal outcome's measurements tool. In addition, the content of self-care instruction guideline was reviewed by the panel of expertise and the guideline contents were reviewed critically and validated its contents.

Reliability of tools

The researchers have established the reliability of the tools of the current work via Alpha Cronbach technique which revealed that each of the four tools consisted of relatively consistent items as indicated by the moderate to high reliability of each tool, knowledge tool it measured (0.87), for self-practice it measured (0.89), for maternal outcomes measurements tool was (0.86), and (0.87) for the neonatal outcome's measurements tool.

Ethical Considerations

An official approval was granted from director of Annama's General Hospital, to facilitate data collection process. A consent was obtained from each woman fulfill the criteria of inclusion and were informed about the aim of this study, the researcher confirmed that the study poses no risks or hazards to their health and participations in

the current study are volunteers. They have to withdraw from the study without explanation if they feel the need to do that.

A Pilot Study:

The pilot study was conducted on 10.0% (12) women of the total sample to test the feasibility and the applicability of the tool, find out the possible obstacles and problems that might face the researcher and interfere with data collection, detect any problems peculiar to the statements as sequence of questions and clarity and estimate the time needed for data collection. The samples of women included in the pilot study were excluded from the main study sample.

Procedure:

Data were collected during the period of 9 months from the beginning of December 2018 till the end of August 2019. The previously mentioned setting was visited 3 days/week, from 9.00 am to 12.00 pm. To fulfill the aim of this research, the following phases were adopted, preparatory phase, interviewing and assessment phase, planning phase, implementation of the educational intervention phase and evaluation phase.

A-Preparatory phase: was conducted through reviewing relevant literature concerning the various aspects of the research problem. This phase revealed the importance of the problem, and the researchers is directed by sample information that helps to formulate adequately the required data collection tools.

B-Interviewing and assessment phase: for both study and control groups, this is the pretest phase in which women were interviewed to collect baseline data. At the start of the interview, the researchers acquainted women and informed women

about the aim of the study and familiarized them with all information about the research (purpose, duration, and activities) and obtained their consent for participation in the study. From 2 to 3 women were interviewed daily. The data collected during this phase were formed the base line for further comparison to evaluate the effect of the educational guideline.

C- Planning phase: Educational guideline was developed by the researchers based on the results of assessment phase, this guideline in a form of printed Arabic booklet to improve the studied women's deficit knowledge, and self-care practice regarding pregnancy after bariatric surgery. Different methods of teaching, and instructional media like video, was utilized to explain guideline to studied women.

Objectives of educational intervention were constructed and included the following:

General Objectives aimed to enable self-care management among pregnant women after bariatric surgery and evaluate the effect of such self-care management on maternal and neonatal outcomes.

Specific objectives aimed to familiarize the studied pregnant women with abundant knowledge and self-care practice during pregnancy after bariatric surgery.

D-Implementation of the educational intervention phase.

For the study group, the educational intervention was designed based on the initial needs analysis of the pre-test results and was implemented in the form of 2 theoretical sessions; the first was held for 45 minutes focusing on enhancing the studied women knowledge regarding self-care managements during pregnancy after bariatric surgery. The second session was held for 45 minutes focusing on self-care

managements practice during pregnancy after bariatric surgery. These sessions were provided to each studied woman. At the end of each session, women' questions were discussed to correct any misunderstanding. Total educational intervention time reached about 30 hours / 7 weeks, with (4.30 hours /week-1.30 hours /daily) for all women.

E- Evaluation phase: this phase was done for both study and control group.

This phase was firstly done after one month to evaluate studied women knowledge and practice regarding self-care management. While maternal and neonatal outcome measurements were evaluated after delivery for all women in study and control group.

III- Statistical Design: The data was statistically analysed via SPSS-22. The data were explored, descriptive statistics was used for continuous variables [mean and standard deviation (SD)] and frequency for categorical variables. Paired t test was used to compare mean scores between pretest, posttest (one month after intervention). chi squire test was used to compare qualitative variables between both study and control groups. The significance value was considered when p-value ≤ 0.05.

Result:

Table (1): indicates that there was no statistically significant difference between personnel characteristics of the studied women in both study and control groups. In addition, more than half of women in both groups age ranged from 30-43 years.

Table (2): reveals that more than half of studied women in study group had a bariatric surgery from (24-30) months ago, on the other hand nearly half of control group women had a bariatric surgery from more than 30 months. In addition, nearly

two third of studied women in both study and control group had a bariatric surgery for the purpose of fertilization. Moreover, nearly more than half were pregnant after (12-18) months after had a bariatric surgery.

Table (3): illustrates that 25.0% and 20.0% of the studied women in both study and control group respectively had a history of in vitro fertilization (IVF). In addition, more than half of women in both groups were in gestational age from 24-30 weeks. Moreover, nearly half of them had a history of polycystic ovary.

Table (4): shows that there was no statistically significant difference between studied women in both study and control group regarding their knowledge about self-care management for pregnancy after bariatric surgery at the pre-intervention phase. On the other hand, there was a highly statistically significant difference between self-care management for pregnancy after bariatric surgery knowledge at post-intervention phase, as the study group women had a high mean knowledge score than these in control group.

Figure (1): reveals that the majority of women in both study and control groups had a poor knowledge regarding self-care management during pregnancy after bariatric surgery at the pre-intervention phase, while at the post-intervention phase the vast majority of studied women in the study group had a good knowledge.

Table (5): shows that there was no statistically significant difference between studied women in both sturdy and control group regarding their healthy practice about self-care management for pregnancy after bariatric surgery at the pre-intervention phase. On the other hand, there was a highly statistically significant difference between self-care management for pregnancy after bariatric surgery practice at post-intervention phase, as the study group women had a high mean practice score than these in control group.

Figure (2): reveals that the majority of women in both study and control groups had unsatisfied regarding self-care practice during pregnancy after bariatric surgery at the pre-intervention phase, while at the post-intervention phase the vast majority of studied women in the study group were highly satisfied regarding self-care practice.

Table (6): indicates that there was a statistically significant difference between maternal outcomes measurements regarding anemia, antepartum hemorrhage, gestational diabetes and postpartum hemorrhage outcomes. Also, there was a highly statistically significant difference between levels of anxiety, as 70.0% of women in study group had a low level of anxiety, as compared with 33.3% of women in control group had a high level of anxiety. On the other hand, there was no statistically significant difference between study and control group regarding preterm labor, preeclampsia, and mode of delivery.

Table (7): illustrates that there was a statistically significant difference between neonatal outcomes measurements between newborn in both study and control groups regarding intrauterine growth retardation, low birth weight and the Apgar score at the 5th minute. On the other hand, there was no statistically significant difference between study and control group regarding Intrapartum fetal stress and admission to neonatal intensive care unit.

Table (1): Distribution of personnel characteristics of the studied women(n=120)

	Study group		Control group		Chi square test	P value
	No	**%**				
Age in years						
20-<30	22	36.7%	29	48.3%	1.67	>0.05
30-40	38	63.3%	31	51.7%		
Mean ±SD		28.56±5.83		27.86±6.37		
Educational level						
Read and write	7	11.7%	7	11.7%	1.24	>0.05
Secondary education	19	31.7%	22	36.7%		
Technical education	24	40.0%	25	41.6%		
University education	10	16.6%	6	10.0%		
Occupation						
Yes	36	60.0%	32	53.3%	0.543	>0.05
No	24	40.0%	28	46.7%		
Residence						
Rural	22	36.7%	29	48.3%	1.67	>0.05
Urban	38	63.3%	31	51.7%		

Table (2): History of bariatric surgery among studied women (n=120).

Item	Study group		Control group		Chi square test	P value
	No	**%**				
Time of bariatric surgery in months					**3.47**	>0.05
18-24 months	8	13.3%	12	20.0%		
24-30 months	31	51.7%	21	35.0%		
>30 months	21	35.0%	27	45.0%		
Reasons for bariatric surgery					**1.13**	>0.05
Body image	6	10.0%	3	5.0%		
Decrease obesity health problem	15	25.0%	17	28.3%		
Increase fertility chances	39	65.0%	40	66.7%		
Times of pregnancy after bariatric surgery					**1.26**	>0.05
12 -<18months	40	66.7%	34	56.7%		
18-<24	20	33.3%	26	43.3%		

Table (3): Distribution of obstetric history of the studied women (n=120).

	Study group		Control group		Chi square test	P value
	No	**%**				
History of in vitro fertilization					0.430	>0.05
Yes	15	25.0%	12	20.0%		
No	45	75.0%	48	80.0%		
Gestational age in weeks					0.137	>0.05
18-24	36	60.0%	34	56.7%		
24-30	24	40.0%	26	43.3%		
Gynecological surgery					1.38	>0.05
Yes	16	26.7%	22	36.7%		
No	44	73.3%	38	63.3%		
History of polycystic ovary					0.137	>0.05
Yes	24	40.0%	26	43.3%		
No	36	60.0%	34	56.7%		

Table (4): Distribution of studied women knowledge regarding self-care management during pregnancy after bariatric surgery at both pre-and post-intervention phases. (120).

	Pre-intervention				Post intervention			
	Study group	Control group	Independent t	P value	Study group	Control group	Independ	P value
	Mean ±SD	Mean ±SD	test		Mean ±SD	Mean ±SD	ent t test	
Definition of bariatric surgery	.8833±.55515	.9333±.51640	0.511	<0.001**	1.8833±.3237	.9833±.53652	11.12	<0.001**
Types of bariatric surgery	.5500±.50169	.6333±.48596	0.924	<0.001**	1.9167±.2787	.7833±.49030	15.56	<0.001**
Effect of bariatric surgery on pregnancy	.9000±.68147	.9667±.63691	0.554	<0.001**	1.7500±.4366	1.0167±.5963	7.68	<0.001**
Importance of self-care for pregnancy after bariatric surgery	.7667±.64746	.8333±.58705	0.591	<0.001**	1.6500±.4809	.9000±.54306	8.00	<0.001**
Nutritional requirements during pregnancy after bariatric	.7500±.43667	.6833±.46910	0.806	<0.001**	1.8167±.3902	.8500±.44436	12.66	<0.001**
Contraindicated foods during pregnancy after bariatric	.9833±.65073	.8333±.64221	1.27	<0.001**	1.9500±.2197	.9333±.63424	11.73	<0.001**
Sources of food rich in protein	.7167±.64022	.6000±.61617	1.01	<0.001**	1.8333±.3758	.7333±.63424	11.55	<0.001**
Sources of food rich in vitamins (A,D,E,K and B)	.4833±.50394	.5167±.50394	0.362	<0.001**	1.8000±.4033	.6667±.54202	12.99	<0.001**
Sources of food rich in protein	.5833±.49717	.6500±.48099	0.746	<0.001**	1.8833±.3237	.8000±.48011	14.49	<0.001**
Foods rich in iron	.6000±.49403	.6500±.51503	0.543	<0.001**	1.8000±.4033	.9333±.60693	9.21	<0.001**
Foods rich in calcium	.5667±.49972	.6667±.60132	0.991	<0.001**	1.8333±.3758	.8833±.71525	9.10	<0.001**
Times of antenatal visits and follow up	.5167±.50394	.5667±.49972	0.546	<0.001**	1.7333±.4459	.8000±.68396	8.85	<0.001**
Types of regular required tests	.5500±.50169	.4833±.50394	0.726	<0.001**	1.6667±.4753	.8833±.78312	6.62	<0.001**
Dangerous signs of pregnancy	.5333±.50310	.4833±.50394	0.544	<0.001**	1.7500±.4366	.9167±.74314	7.48	<0.001**
Hazards that affect pregnant women after bariatric surgery	.5500±.50169	.6833±.46910	1.50	<0.001**	1.6833±.4691	1.1833±.7008	4.59	<0.001**
Total knowledge score	9.9333±2.67991	10.1000±2.4749	0.354	<0.001**	26.9500±2.47	13.2667±4.10	22.10	<0.001**

*independent t test (1) difference of mean score between study and control groups at pre-intervention & independent t test (2) difference of mean score between study and control groups at post-intervention

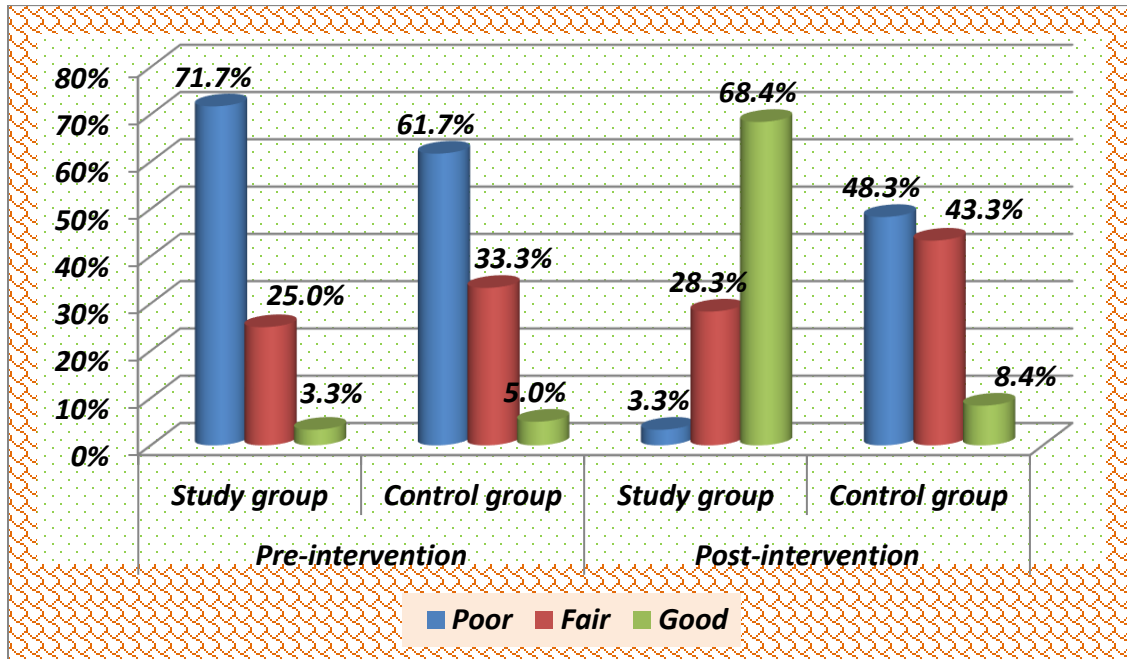** Highly statistically significant difference.

Figure (1): Percentage distribution of total knowledge score regarding self-care management of pregnancy after bariatric surgery among studied women at both study and control groups at pre- and post-intervention phases.

Table (5): Distribution of studied women practice regarding self-care management during pregnancy after bariatric surgery at both pre-and post-intervention phases. (n=120).

Heath practice	Pre-intervention				Post intervention			
	Study group Mean ±SD	Control group Mean ±SD	Independent t test	P value	Study group Mean ±SD	Control group Mean ±SD	Independent t test	P value
Nutritional health practice								
Intake of food rich in protein	1.1333±.59565	1.2500±.65419	1.02	<0.001**	1.9500±.219	1.2833±.640	7.62	<0.001**
Intake of food rich in vitamin A, E,D,K and B	.9667±.73569	1.0167±.70089	0.381	<0.001**	1.9333±.251	1.1500±.732	7.83	<0.001**
Intake of food rich in iron	1.3500±.68458	1.4667±.70028	0.923	<0.001**	1.8167±.390	1.4667±.700	3.38	<0.001**
Intake of food rich in calcium	1.1833±.79173	1.2667±.70990	0.607	<0.001**	1.7500±.436	1.3667±.735	3.47	<0.001**
Intake of adequate flood	1.2333±.67313	1.4000±.55845	1.47	<0.001**	1.8500±.360	1.5167±.567	3.84	<0.001**
Intake of small frequent diet	1.1167±.73857	1.2500±.70410	1.01	<0.001**	1.9667±.181	1.5833±.530	5.30	<0.001**
Avoid intake of spicy, chocolate and coffin	1.0167±.91117	1.1333±.85304	0.724	<0.001**	1.9000±.302	1.3500±.777	5.10	<0.001**
Rest and sleep health practice								
Avoid excessive activity	.9000±.85767	1.0000±.82339	0.652	<0.001**	1.8500±.360	1.2333±.810	5.38	<0.001**
Have adequate rest	1.0000±.75913	1.1333±.74712	0.970	<0.001**	1.9333±.251	1.5833±.645	3.9*1	<0.001**
Avoid stressful situations	1.0500±.62232	1.1667±.69298	0.970	<0.001**	1.8167±.390	1.3167±.724	4.70	<0.001**
Have adequate sleep hours	.9000±.65613	1.0000±.73646	0.785	<0.001**	1.8833±.323	1.3000±.696	5.88	<0.001**
Follow up and treatment								
Attendance of regular antenatal visits	.7833±.76117	.8500±.73242	0.489	<0.001**	1.7500±.436	1.0667±.799	5.80	<0.001**
Intake of prescribed supplementation	.9333±.88042	1.0833±.84956	0.950	<0.001**	1.7667±.452	1.3500±.798	3.56	<0.001**
Seeking medical care when having any risk during pregnancy	1.1333±.70028	1.3000±.76579	1.24	<0.001**	1.8167±.390	1.5833±.645	2.39	<0.001**
Total self-care practice score	14.7000±6.09890	16.3167±6.2720	1.43	>0.05	25.9833±1.8	19.1500±4.8	10.25	<0.001**

independent t test (1) difference of mean score between study and control groups at pre-intervention & independent t test (2) difference of mean score between study and control groups at post-intervention
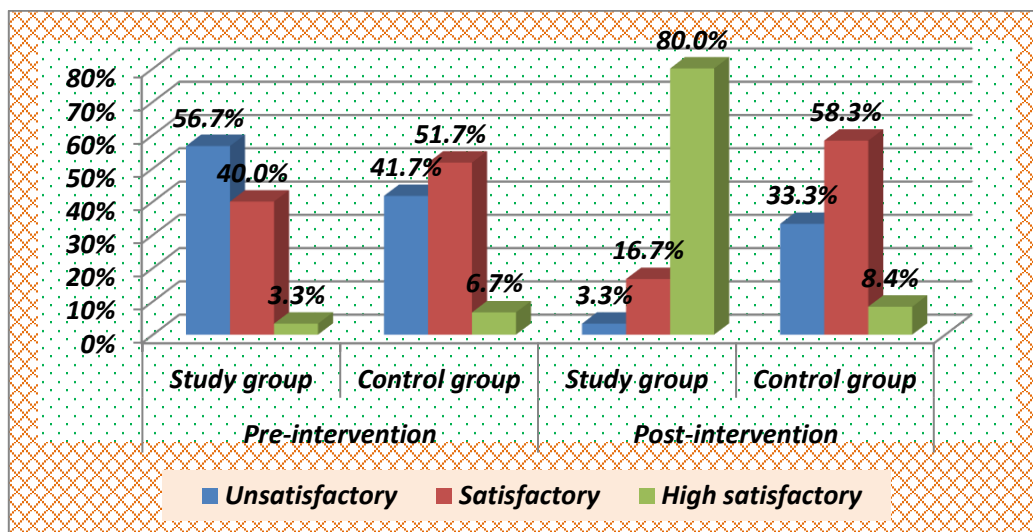*** Highly statistically significant difference.*

Figure (2): Percentage distribution of total self-care practice regarding self-care management of pregnancy after bariatric surgery among studied women at both study and control groups at pre- and post-intervention phases.

Table (6): Distribution of maternal outcomes measurements among the studied women (n=120).

Outcomes		Study group		Control group		Chi square test	P value
		No	%	No	%		
Antepartum outcomes measurements							
Anemia	Yes	15	25.0%	26	43.3%	4.48	<0.05*
	No	45	75.0%	34	56.7%		
Antepartum bleeding	Yes	5	8.3%	15	25.0%	6.00	<0.05*
	No	55	91.7%	45	75.0%		
Preterm labor	Yes	2	3.3%	4	6.7%	0.702	>0.05
	No	58	96.7%	56	93.3%		
Gestational diabetes	Yes	3	5.0%	10	16.7%	4.22	<0.05*
	No	57	95.0%	50	83.3%		
Preeclampsia	Yes	2	3.3%	6	10.0%	2.14	>0.05
	No	58	96.7%	54	90.0%		
Anxiety and stress	Low	42	70.0%	7	11.7%	43.34	<0.001**
	Moderate	14	23.3%	33	55.0%		
	High	4	6.7%	20	33.3%		
Intrapartum measurements							
Mode of delivery	Vaginal delivery	18	30.0%	13	21.7%	1.08	>0.05
	Cesarean section	42	70.0%	47	78.3%		
Postpartum measurements							
Postpartum hemorrhage	Yes	4	6.7%	11	18.3%	3.73	<0.05*
	No	56	93.3%	49	81.7%		

Table (7): Distribution of neonatal outcomes measurements among the studied women (n=120).

Variable		Study group N = 58		control group N= 56		Chi square test	P value
		No	**%**	**No**	**%**		
Intrauterine growth retardation	Yes	5	8.6%	12	21.4%	3.68	<0.05*
	No	53	91.4%	44	78.6%		
Intrapartum fetal stress	Yes	7	12.1%	9	16.1%	0.378	>0.05
	No	51	87.9%	47	83.9%		
Low birth weight	Yes	6	10.3%	15	26.8%	5.12	<0.05*
	No	52	89.7%	41	73.2%		
Neonatal sex	Male	25	43.1%	33	58.9%	2.85	>0.05
	Female	33	56.9%	23	41.1%		
Apgar score at 1 minute	Good (8-10)	40	69.0%	29	51.8%	4.46	>0.05
	Moderate asphyxia (5-7)	15	25.9%	19	33.9%		
	Sever asphyxia (≤4)	3	5.2%	8	14.3%		
Apgar score at 5th minute	Good (8-10)	51	87.9%	39	69.6%	5.76	<0.05*
	Moderate asphyxia (5-7)	6	10.3%	14	25.0%		
	Sever asphyxia (≤4)	1	1.7%	3	5.4%		
Admission to neonatal intensive care	Yes	4	6.9%	7	12.5%	1.02	>0.05
	No	54	93.1%	49	87.5%		

Discussion

Although bariatric surgery mediated weight loss has a positive effect on pregnancy outcome, the procedures might be associated with adverse outcomes as well, for example micronutrient deficiencies, iron or B12 deficiency anemia, dumping syndrome, surgical complications such as internal hernias, and small for gestational age (SGA) offspring, possibly due to maternal malnutrition. Maternity nurses have a critical role in improving women's knowledge and practice toward healthy nutritional practice and help women to avoid risks of malnutrition and complication associated with pregnancy after bariatric surgery. The result of the present study supported the stated hypothesis that improving self-care management among pregnant women after bariatric surgery utilizing self-care instructional guideline improves maternal and neonatal outcomes.

As regarding personnel characteristics of the studied women, the present study finding indicated that there was no statistically significant difference between personnel characteristics of the studied women in both study and control groups. In addition, more than half of women in both groups age ranged from 30-40 years. These findings are in accordance with **Soliman et al., (2019)**, who indicated that the age of studied pregnant women was ranged from 18-35 years old, in the study to "the effect of the nutritional health education program on changing knowledge and attitude towards nutrition of mothers during pregnancy and to identify its role on gaining optimal weight."

Concerning obstetric history of the studied women in both study and control group, the present study revealed that more than 40.0% of women had a history of polycystic ovary, and had a bariatric surgery had a role in reducing this type of obstetric complication and women post bariatric surgery can conceive pregnancy, these finding supported **Balen et al., (2016),** who indicated that bariatric surgery increases fertility chance among women with poly cystic ovary.

The present study findings also added that all of the studied women in both study and control groups conceive pregnancy after a period from 18-24 months. These findings were supported by **ACOG, (2009**), who recommended for women wishing to conceive after bariatric surgery is to delay pregnancy after 1 to 1.5 years after surgery. These findings may be due to that during the first post-surgical year a rapid weight loss is to be expected and becoming pregnant at this catabolic time frame could increase risk for altered nutritional supply and subsequently affect fetal growth and increased risk also for fetal intrauterine growth retardation.

Pregnancies after bariatric surgery especially malabsorptive procedures are characterized by nutritional deficiencies as anemia, low protein and vitamins level **Via,(2017).**Regarding the effect of self-instructional guideline on studied women knowledge about food rich in iron, vitamins A,B,D,E, and K, the present study findings revealed that there was highly improvement in knowledge level of studied group as compared with control group.(p <0.001**). These findings are in accordance with **Adham et al., (2018**), who indicated that there was a significant difference between the he case and control groups regarding their nutritional knowledge during pregnancy and educational intervention had positively improved pregnant women knowledge among case group as compared with women in control group.

Concerning nutritional health practice among the studied women in both study and control groups the present study revealed that , studied women had unsatisfactory nutritional heath practice at pre-intervention phase ,while there was highly statistical significant difference between nutritional practice between women in study and control group p(<0.001).these finding are in accordance with **Wijaya et al., (2014);** who added that pregnant women in the education group had a high nutritional health practice score and

showed evidence of improving the mothers' breast feeding (BF) intentions, some reported BF practices, and delivery care practices.

Regarding maternal and neonatal outcomes of pregnant women post bariatric surgery, the present study findings revealed that there was a significant difference between both studied and control group regarding hemoglobin level (p<0.05), as hemoglobin was high among women in study group as compared to control group. These findings may be due to that educational self-instructional guideline had a positive effect on increasing awareness of studied women in study group regarding food rich in iron intake, that help to preserve level of hemoglobin. These findings are agreed with **Alwan,(2015);** who indicated that pregnant women need to mobilize additional iron to meet the requirements of the growing fetoplacental unit. Also, the present study findings added that there was a significant difference between women in control and study groups regarding percentage of antepartum hemorrhage, as women in control group had a high percent of antepartum hemorrhage as compared with women in study group. These findings may be due to that mal-nutrition and iron deficiency anemia may cause antepartum hemorrhage among women in control group.

Concerning gestational diabetes as one of a maternal outcome among the studied women, the present study findings revealed that there was a significant difference between studied women in both study and control group (p<0.05), as percentage of gestational diabetes was higher among women in control group than women in study group. These findings may be due to that self-instructional guideline help women in study group to manage dietary intake and avoid excessive intake of carbohydrates.

In relation to pre-eclampsia as one of maternal outcomes among studied women, the present study findings showed that there was no significant difference between both study and control, groups. only few percentage of women in both study and control groups had a pre-eclampsia. These finding agreed with **Yi, etal. (2015)**, who added that women who conceive after bariatric surgery have a lower risk for developing hypertension disorders.

As regarding level of anxiety among studied women in both study and control group, the present study findings revealed that there was a highly statistically significant difference (p<0.001), as vast majority of women in control group had a moderate to high level of anxiety. These findings are agreed with **Jans et al., (2018);** who concluded that Pregnancy following bariatric surgery induces high levels of anxiety , as women may be anxious about the fetus ,delivery and about the effect of pregnancy on bariatric surgery .On the other hand the vast majority of women in study group had a low level of anxiety .These findings may be due to the effect of self-instructional guideline on reducing level of anxiety level , as help it enable self-care practice that subsequently reduce anxiety and mange any upgrading health hazards and help women to enable to make decision regarding delivery.

Concerning mode of delivery of delivery in both study and control group, the present study findings revealed that there was no statistically significant difference (p >0.05), as vast majority of women in control and study groups had a cesarean delivery. These findings are in accordance with **Galazis etal., (2014)** who added that the rate of cesarean section did not differ from controls but remained high in women who had bariatric surgery.

In relation to postpartum hemorrhage, the present study findings reported that it is occurred higher among women in control group. these findings may be due to that women in control had a history of anemia and antepartum hemorrhage during pregnancy, which increased risk to have postpartum hemorrhage.

As regarding neonatal outcomes among the studied women in both study and control groups, the present study findings revealed that There was no significant difference between the two groups for any of neonatal characteristics studied (Table 7) except for intrauterine growth retardation, birth weight, and Apgar score at the 5th minute which was significantly lower in the study group than in controls. These findings are in accordance with **Chevrot et al., (2014),** who illustrated that there was a significant difference between study and control groups regarding neonatal birth weight and Apgar score at the 5th minute. these findings revealed that self-instructional guideline improved studied women knowledge and practice toward care during pregnancy post bariatric surgery, that subsequently improve neonatal.

Conclusion:

The present study concluded that self-instructional guideline improves self-care among post bariatric surgery pregnant women. In addition, improving self-care among women utilizing self-care instructional guideline is high positively affect both maternal and neonatal among women is study group than compared these outcomes among control group.

Recommendation:

Based on the findings of the current study, it is recommended that :

1-Self-care instructional guideline should be provided for all post bariatric surgery pregnant women.

2. The nurses should be familiar with self-care instructions for post bariatric surgery pregnant women.

3. Further study for improving awareness of pregnant women of bariatric surgery regarding breast feeding and family planning.

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