Effect of Applying Prenatal Care Protocol for Pregnant Women with Placenta Accreta on Maternal and Neonatal Outcomes

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Abstract

Background: Placenta accreta is one of fatal obstetrics crisis. **Aim of study:** Was to study the effect of applying prenatal care protocol for pregnant women with placenta accrete on maternal and neonatal outcomes. **Design**: A quasi-experimental design was utilized to fulfill the aim of this study. **Setting:** This study was conducted at outpatient clinic, department and operating room of Obstetrics and Gynecology at Benha university hospital. **Sample**: A purposive sample was selected according to inclusion criteria. The sample consists of 55 women with suspected diagnosis with placenta accreta at their booking visit sample became 52 women as 3 women were diagnosed with placenta previa without accreta they were divided equally into two groups (study group comprised 26 women, control group comprised 26 women). **Tools of data collection:** Data collected through three main tools. I: A structured interviewing questionnaire, II: Maternal and neonatal outcomes sheet and III: Women follow up. **Results:** There was a highly statistically significant difference between study and control groups regarding attempted placental removal at third stage of labor, hysterectomy, intrapartum blood loss and neonates Apgar score at 1st minute& Apgar score at 5th minute. **Conclusion:** Application of prenatal care protocol has positive effect in improving maternal and neonatal outcomes in pregnant women with placenta accreta. **Recommendation:** Application of prenatal care protocol on wide range of women diagnosed with placenta accreta.

Key words: Prenatal care, Protocol, Pregnant women, Placenta Accreta, Maternal and neonatal outcomes.

Introduction

Placenta accreta defined as full range of abnormal placental attachment to the uterus or other structures. “accreta disorder” ranges from abnormally adherent placenta to deeply invasive placental tissue **(Van Beekhuizen et al., 2021).**Placenta accreta disorders are an emerging pathology, including various degrees of severity placenta accreta, placenta increta, placenta percreta **(Shainker et al., 2021).**

Pathophysiology of placenta accreta is a multifactorial process that encompasses a primary defect of the decidua, an abnormal maternal vascular remodeling, and an excessive extra-villous trophoblastic invasion. Mainly due to previous surgery **(Di Mascio et al., 2018).**

The etiology of placenta accreta remains controversial, with recent evidence suggestive of uterine dehiscence as the cause, rather than placental invasion **(Einerson et al., 2020).**

Risk factors of placenta accreta include any factor lead to endometrium damage and scaring. Previous cesarean delivery related to multiple uterine scars, prior dilation and curettage and myomectomies, spontaneous or induced abortion, previous pregnancy with abnormal placentation **(Da Cunha Castro et al., 2018).**

Diagnosis of placenta accreta can be detected by assessment of risk factors however, this is not always sufficient as sometimes cases are missed **(Imtiaz et al., 2020).**

Standardized ultrasound imaging and pathology protocols have been recently developed as protocol for the perinatal diagnosis of accreta **(Hussein et al., 2021).**

Morbidity relating to placenta accreta, especially during childbirth or caesarean section when trying to remove placenta from the uterus, bleeding that can be fatal. **(Escobar et al., 2020).**

Prenatal care protocol of placenta accreta consists of fixed and sequel steps from booking visit during pregnancy till postpartum period to enhance maternal and neonatal outcomes and decrease morbidity and mortality rate **(Crosland et al., 2021).**

Significance of the study

The incidence increased in recent years, largely driven by increasing rates of cesarean delivery **(Shainker et al., 2021).** Placenta accreta has prevalence of between 0.01 and 1.1% of all pregnancies **(Coutinho et al., 2021).**

In Egypt, the incidence according to Kasr Alainy Hospital. Among the 100 women with low-lying placenta directly implanted over uterine scar, there were 63% of cases diagnosed with placenta accreta **(Maged et al., 2018)**.

To the best of our knowledge studies proved that utilizing proper and comprehensive prenatal care will positively affect maternal and neonatal outcomes, and there was no previous studies in obstetric and women health nursing department about designed protocol of placenta accreta and how protocol of management enhance maternal and neonatal outcomes so, the researcher selected this study area to help in promoting prenatal care and decrease maternal morbidity and mortality for pregnant women with placenta accreta.

Aim of the study

The study aimed to study the effect of applying prenatal care protocol for pregnant women with placenta accrete on maternal and neonatal outcomes.

Research Hypothesis

Application of prenatal care protocol would have positive effect in improving maternal and neonatal outcomes in pregnant women with placenta accreta.

Subject and methods

Study design

A quasi-experimental design was utilized to fulfill the aim of this study.

Setting

The study conducted in obstetrics and gynecological outpatient clinic, obstetrics and gynecological department and operating room of Obstetrics and Gynecology.Which provide official health services for all women suffering from obstetrics and gynecological disease.

Sampling

- **Sample type:** A Purposive sample.
- **Sample size:** The total sample was all pregnant women with highly suspected placenta accreta in a period of 6 months (started from 1 August 2020 to 31 January 2021). The 55 women divided into two groups (28 in study group & 27 in control group). After first examination at 24 weeks of gestation sample became

52 women (26 women in study group & 26 women in control group) .

Inclusion criteria

- Gestational age at the start of the study is more than 8 weeks and less than 16 weeks.
- Women must have at least one previous cesarean section; nulliparous women must have a uterine scar.
- Women with a previous uterine scar, and current placenta previa anterior.
- Women with highly suspected placenta accreta at their booking visits.
- Women medically diagnosed with placenta accreta.
- Read and write.
- Willing to participate in the study.

Exclusion criteria:

- Women with unscarred uterus.
- Women with normally situated placenta.
- Placenta previa posterior.
- Multiple pregnancy.
- Gynecological complications as preeclampsia, vasa-previa.
- Presence of major medical disorder e.g DM, cardiac lesion, coagulopathy, liver or kidney disease.

Tools of data collection

Three main tools were utilized for data collection:

I: A structured interviewing questionnaire:-

The researcher designed tool after reviewing a related literatures **(Mohamed and Ahmed, 2018, Nguyen-Lu et al., 2016 & Dayem, 2017).** Tool I was included the following four parts:

- **Part1: Demographic data** concerning (age, occupation, place of residence and anthropometrics measures).
- **Part 2: Obstetric history includes:**

I- General obstetric history concerning (previous D&C, causes and numbers of dilation and curretage).

II- Previous pregnancy history concerning (numbers of gravida, diagnosis with any placental abnormality before).

II- Previous labor and postpartum history concerning (number of para ,type of previous delivery)

- **Part 3: Current pregnancy profile** as (assisted conception, gestational age in weeks)
- **Part 4: Pregnancy follow-up sheet performed at 24 week, 28 week and 32 week of pregnancy** as (weight, vital signs, hemoglobin level)

II: Maternal and Neonatal outcomes sheet: The researcher designed tool II after reviewing a related literature **(Abd Elfatah et al ., 2017 & Maged et al ., 2018)** .This tool was included the following two parts:

Part 1 Maternal outcomes sheet included the following two parts:

- Current delivery profile such as:

Admission data, pre-delivery data, delivery data as (type of anesthesia, mode of delivery, FHR during delivery, attempt placental removal, hysterectomy, blood transfusion,and treatment modality)

-After delivery data such as:

(Immediate complications following delivery, ureteral/bladder injury, admission to ICU, re-surgical operation, causes of re-surgical operation, postoperative hospital length of stay and maternal outcomes following delivery).

Part 2: Neonatal outcomes sheet involved: (perinatal death, neonatal condition at birth, preterm birth gender, Apgar score at 1^{st} minute, Apgar score at 5^{th} minute, resuscitation)

III: Women follow up:

One month to two months following delivery concerning (success treatment modality, hospital readmission within 30 days).

Tools validity and reliability

The validity of questionnaire reviewed by three jury experts in the field of obstetrics & woman health nursing at Benha University to ascertain clarity, relevance, comprehensiveness, and applicability of tools. Reliability done by Cronbach's alpha coefficient to assess the reliability that indicated that each of the three tools which consisted of relatively homogenous items as indicated by the moderate to high reliability of each tool. The internal consistency of first tool was α=0.87, second tool = 0.83 and third tool =0.86.

Ethical considerations

Ethical aspects considered before implementation of the study as the following:-

- An official permission from the study setting was obtained for the fulfillment of the study.
- The aim of the study explained to each woman before applying the tools at the beginning of interview and throughout the study to gain their confidence and trust.
- The researcher obtains oral consent from each woman to participate in the study and withdraw when she needs without obligation.
- Self-esteem, dignity and Confidentiality of women was ensured throughout the study process, where personal data were not disclosed, and the women were assured that all data will used only for study purpose.
- The study causes no physical, social or psychological risk on the participants.

Pilot study

The pilot study was carried out before starting data collection (from 1 July 2020 to 21 July 2020) to estimate the time required for completing the sheets, to check the simplicity, clarity, applicability, and feasibility of the developed tools. The pilot study was conducted on 10 % of the total sample duration was about 3 weeks (consisted of 3 women). There were no modifications done. Thus, women in the pilot study were included in the study to support the present study sample size.

Field work

The researcher and participants attended the study setting 3 days/week from 9:00 am to 12:00 pm (from1 August 2020 to 30 November 2021). Fieldwork included the following phases:

Assessment phase: (visit 1-2)

- This phase encompassed interviewing pregnant women to collect baseline data at booking visits. The researcher introduced herself at beginning of the interview, greeted each woman, explained the aim of the study, schedule of visits, and frequency of guideline sessions to study group only to assure adherence to selected interventions. Oral consent was taken from women to participate in the study.
- The researcher started to fall out a structured interviewing questionnaire for each woman according to the woman's answer. A structured interviewing questionnaire involved socio-demographic characteristics, past obstetric history, current pregnancy profile sheet. At this point, all high-risk group women (for placenta accreta) revealed from this questionnaire recruited in the study. The sample was about 55 women (28 in study group and 27 in control group). The average time required for completion of the questionnaire was around (15-20 minutes) for each woman .
- The researcher filled out pregnancy follow-up sheet after the pregnant woman checkup by Obstetrics and Gynecological physician using ultrasound (first, second, and third examination) repeated at 24, 28

and 32 weeks of gestation respectively to confirm the diagnosis of placenta accreta , exclude non-accreta women, monitor maternal and fetal conditions. Women's weight, vital signs, Hb level, and monitoring of fetal wellbeing as FHR, fetal estimated weight, and fetal movement .

- The researcher took woman Hb level results from laboratory the researcher attended with women at the laboratory. The average time required for completion of the questionnaire was around (20-40 minutes), at this point after first examination completed at 24 weeks of gestation the sample became 52 women (26 in study group & 26 in control group.(
- At the planned time of cesarean section, the researcher attended delivery to fulfill the maternal and neonatal outcomes sheet. If not permitted the researcher fulfill sheets from women delivery and postpartum records. The average time required for completion of the questionnaire was around (15-20minutes) when it fulfilled from labor and postpartum records. If the researcher attended delivery, depend on delivery duration.
- The interviewing process was carried out 3 days/ week starting from 9 am to 12 pm. Women were interviewed individually. The numbers of interviewed women per week was 1-2 pregnant women with placenta accreta. The average time taken for completing each sheet was around 35-60 minutes depending on women's response. Each woman was reassured that obtained information will be confidential and used only for the study purpose.

Planning Phase

- The program was conducted to determine the effect of applying prenatal care protocol for pregnant women with placenta accreta on maternal and neonatal outcomes. Participants (study group 26 women) were classified into 7 groups according to women's gestational age (five groups consisted of 4women and two groups consisted of 3 women) to follow COVID 19 precautions. The duration of the instructional program lasted 3 weeks for each group (21 weeks for all groups). Program classified into 7 sessions each session was planned to provide specific information about placenta accreta (definition, signs and symptoms, risk factors, high-risk groups, diagnosis and treatment), prenatal care protocol steps, and health education for women with placenta accreta to improve and promote maternal &fetal wellbeing and prepare for delivery with less complications for maternal and neonatal as possible. The actual time of each session was 2.5 hours with a separated breaks time of 10- 15 minutes every 45 minutes. These sessions were applied in the waiting area of Obstetrics and Gynecological outpatient clinic at Benha University hospital .
- To keep in contact with women, telephone numbers and detailed addresses obtained from women to follow women between visits, and to avoid sample loss when women do not attend scheduled visits.

Implementation Phase (visits 3-9)

The researcher followed up women in study group and applied prenatal care protocol steps and placenta accreta guideline .

- Visit three: First session included information about present study, attendance days, duration, numbers and site of session, women contact information's for emergency .
- Visit four: Second session included information about placenta accreta

(definition, signs and symptoms , causes, predisposing factors ,diagnosis, complications).

- Visit five: Third session included information about steps of prenatal care protocol (protocol of antenatal management, protocol of expected time of delivery, protocol of day before delivery , protocol of cesarean section management
- Visit six: Fourth session included information about steps of applying prenatal care protocol (protocol of postpartum management, protocol of follow-up management.
- Visit seven: Fifth session included general information that women should follow to have a healthy pregnancy with concern on how to elevate blood values, especially Hb level.
- Visit eight: Sixth session information about fetal growth and development, educate women how to calculate fetal movement as part of monitoring fetal wellbeing, stress the importance, and value of corticosteroid administration on fetal lung growth.
- Visit nine: Seventh session counseling women about case severity, management option, preferred gestational age at delivery and possibility of blood transfusion, ICU admission, and incubator admission .

Break phase:

- The researcher-contacted the study group women in between visits by phone to ensure that they followed the guideline and the provided health education effectively. The researcher helped women to solve any obstacles during break.
- Extra cessation applied at 30-32 weeks of gestation about the importance of hospital admission before delivery, psychological support to women by family as needed, counseling about need to preserve fertility especially for primipara and women who needs future pregnancy, also about possibility of hysterectomy and ICU admission.
- The researcher-contacted the control group women in between visits by phone to avoid their drop out from the study, but no care provided during break to prevent study bias. Also contact women to determine delivery date .

Evaluation Phase :(visit ten)

After women delivery and up to two weeks following delivery, the researcher collected maternal and neonatal outcomes sheet (appendix II) from study and control group women's labor and after delivery hospital sheets .

Follow up phase: (visit eleven)

The researcher and studied women attend antenatal clinic to monitor maternal condition by obstetrics and gynecological doctor also to fulfill follow up sheet from study and control groups. Finally, the researcher compared control and study group results to evaluate the effectiveness of applied prenatal care protocol on study group women that reflected on maternal and neonatal outcomes.

Statistical analysis

Data were verified prior to computerized entry. The Statistical Package for Social Sciences (SPSS version 26) was used followed by data tabulation and analysis. Descriptive statistics were applied (e.g., mean, standard deviation, frequency and percentages). In addition, test of significance and Pearson correlation coefficients were used. Data were summarized as Mean ± Standard deviation, percentage, Chi square was performed for comparison of qualitative

date. Cut off level: P≤ 0.05= Significant (S), P≤ 0.001= highly significant (HS).

Limitations of our study include:

1. Limited number of placenta accreta cases attending Benha University hospital at outpatient clinic.

Results

Table (1) shows that (32.1% &37%) of women in study and control groups respectively were in age group (30-34 years) with a mean age (28.39±6.32 years & 27.89±5.68 years) respectively . Additionally there was no statistically significant difference between study and control groups regarding personal characteristics (age, educational level, occupation and residence) (P>0.05).

Table (2) shows that, there were a highly statistical significant difference between study and control groups regarding admission data parameters (P <0.001).

Table (3) illustrates that, there was a highly statistical significant difference between study and control groups regarding (attempt of placental removal at third stage of labor, hysterectomy and intrapartum blood loss) (P < 0.001).

Figure (2) reveals blood transfusion among study and control groups.

Table (4) clears that, there were highly statistical significant differences between study and control groups

Table (5) verifies that, there were highly statistical significant differences between neonates in study and control groups regarding (Apgar score at 1st minute& Apgar score at 5th minute) (P ≤ 0.001).

Table 1: Distribution of personal characteristics of women in study and control groups (n. =55)

Personal characteristic	Study group n.=28		Control group n.=27		X2	P value
	No.	%	No.	%		
Age (years)						
<25	5	17.8%	6	22.2%		
25-29	5	17.8%	4	14.8%	3.39	>0.05
30-34	9	32.1%	10	37 %		
35-39	8	28.5%	5	18.5%		
≥40	1	3.5%	2	7.4%		
Mean ±SD	28.39±6.32		27.89±5.68			
Educational level						
Read and write	3	10.7%	4	14.8%	8.54	>0.05
Primary education	1	3.5%	5	18.5%		
Secondary education	10	35.7%	6	22.2%		
University education	12	42.8%	8	29.6%		
Postgraduate education	2	7.1%	4	14.8%		
Occupation						
House wife	14	50%	17	62.9%	0.991	>0.05
Employee	14	50%	10	37%		
Residence						
Urban	14	50%	15	55.5%	1.38	>0.05
Rural	14	50%	12	44.4%		

Table 2: Distribution of current labor profile (admission data) of women in study and control groups: (n.=52)

Parameters	Study group n.=26		Control group n.=26		X^2	P value
	No.	%	No.	%		
Admission to hospital before delivery						
Yes	22	84.6%	6	23 %	26.60	<0.001**
No	4	15.3%	20	76.9%		
Causes of admission						
vaginal bleeding	2	7.6%	1	3.8%	27.91	<0.001**
low Hb level	3	11.5%	4	15.3%		
hematuria	2	7.6%	1	3.8%		
Prepare for planned delivery	15	57.6%	0	0.00%		
Gestational age at admission(week)						
28-32	4	15.3%	2	7.6%	27.02	<0.001**
33-34	18	69.2%	4	15.3%		
Administration of corticosteroid before delivery						
Yes	26	100%	12	46.1%	13.43	<0.001**
No	0	0.0%	14	53.8%		

**** Highly statistical significant difference (p= <0.001**)**

Table 3: Distribution of current labor profile (delivery data) of women in study and control groups: (n.=52)

Parameters	Study group		Control group		X^2	P value
	No.	%	No.	%		
Type of anaesthesia						
General	18	69.2%	10	38.4%	6.47	<0.05*
Spinal	8	30.7%	13	50.0%		
Epidural	0	0.0%	2	7.6%		
Regional converted to general	0	0.0%	1	3.8%		
Mode of delivery						
Vaginal delivery	0	0.0%	3	11.5%	6.36	<0.05*
Cesarean delivery	26	100.0%	23	88.4%		
FHR during delivery						
120-139	11	42.3%	16	61.5%	3.12	<0.05*
140-160	15	57.6%	10	38.4%		
Attempt of placental removal at third stage of labor						
Yes	3	11.5%	24	92.3%	33.97	<0.001**
No	23	88.4%	2	7.6%		
Performed hysterectomy surgery						
Yes	6	23%	18	69.2%	11.14	<0.001**
No	20	76.9%	8	30.7%		
Time of hysterectomy						
During delivery	4	15.4%	8	30.7%	11.81	<0.05*
Immediately after delivery	2	7.7%	10	38.4%		
Type of hysterectomy						
Total hysterectomy	5	19.2%	13	50%	9.63	<0.05*
Supra-cervical	1	3.8%	5	19.2%		
Intrapartum blood loss						
Less than 2000cc	9	34.6%	3	11..5%	40.81	<0.001**
2000-2999 cc	11	42.3%	6	23 %		
3000-3999cc	6	23 %	4	15.4%		
4000 ≥ 5000cc	0	0.0%	13	50.0%		
Blood transfusion						
Yes	24	92.3%	26	100.0%	4.16	<0.05*
No	2	7.7%	0	0.0%		
Treatment modality						
Hysterectomy with other procedure	4	15.3%	11	42.3%	8.70	<0.05*
Hysterectomy without other procedure	2	7.6%	7	26.9%		
Other procedure without Hysterectomy	17	65.3%	8	30.7%		
No hysterectomy no other procedure	3	11.5%	0	0.0%		

*** Statistical significant difference (p= <0.05*) ** Highly statistical significant difference (p= <0.001**)**

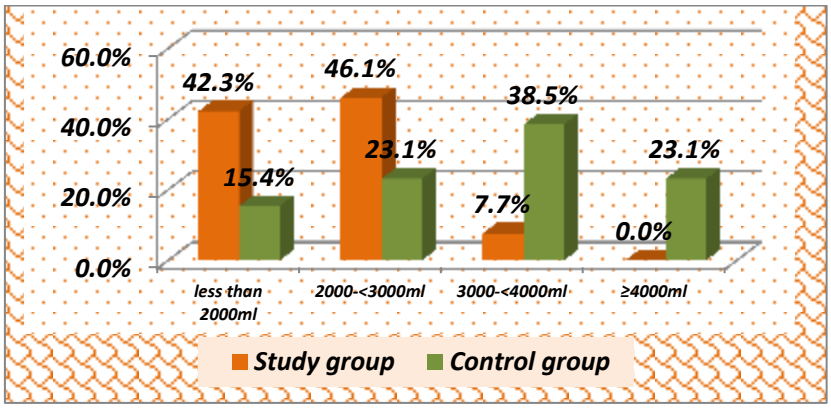

Fig1: Distribution of study and control groups regarding amount of blood transfusion (P =<0.001)

Table 4: Distribution of maternal outcomes (after delivery data) in study and control groups following delivery: (n. =52)

Parameters	Study group n.=26		Control group n.=26		X^2	P value
	No.	%	No.	%		
Early complications						
Yes	3	11.5%	20	76.9%	10.05	<0.001**
No	23	88.4%	6	23 %		
Ureteral/ Bladder injury						
Yes	6	23.1%	19	73.1%	7.73	<0.05*
No	20	76.9%	7	26.9%		
Post-operative hospital length of stay						
1-4 days	14	53.8%	6	23 %	6.40	<0.05*
5-8 days	8	30.8%	6	23 %		
≥9 days	4	15.3%	14	53.8%		
Admission to intensive care unit						
Yes	10	38.4%	22	84.6%	22.11	<0.001**
No	16	61.5%	4	15.3%		
Re-surgical technique						
Yes	9	34.6%	12	46.1%	0.843	>0.05
No	17	65.4%	14	53.8%		
Causes of re-surgical technique						
No	17	65.3%	14	53.8%		
Just uterine exploration	1	3.8%	2	7.6%	6.47	>0.05
Transverse B-lunch	2	7.6%	2	7.6%		
Intra uterine ballon	2	7.6%	2	7.6%		
Internal iliac embolization &hysterectomy	4	15.3%	6	23%		
Maternal outcomes 24 hours following delivery						
Atonic postpartum hemorrhage	8	30.8%	6	23 %	10.22	<0.05*
DIC	6	23.1%	10	38.5%		
Intrauterine adhesion	10	38.5%	6	23 %		
Maternal death	2	7.7%	4	15.3%		

*** Statistical significant difference (p= <0.05*)** **** Highly statistical significant difference (p= <0.001**)**

Table 5: Distribution of neonatal outcomes (immediate baby care data) in study and control groups. (n.=48)

Group	Study group n.=25		Control group n.=23		X2	P value
Parameters	**No.**	**%**	**No.**	**%**		
Apgar score at 1st minute						
<7	4	16%	15	65.2%	33.87	<0.001**
7-10	21	84%	8	34.8%		
Apgar score at 5th minute						
<7	2	8%	10	43.5%	36.07	<0.001**
7-10	23	92%	13	56.5%		
Resuscitation						
Yes	3	12%	13	56.5%	8.01	<0.05*
No	22	88%	10	43.5%		
birth weight in k.g						
2 <2.5	4	16%	15	65.2%	6.66	<0.05*
2.5-3	21	84%	8	34.8%		
low birth weight						
Yes	4	16%	15	65.2%	6.66	<0.05*
No	21	84%	8	34.8%		
Small for gestational age						
No	18	72%	10	43.5%	4.95	<0.05*
Yes	7	28%	13	56.5%		
Admission to NICU						
Yes	4	16%	18	78.2%	3.99	<0.05*
No	21	84%	5	21.8%		

*** Statistical significant difference (p= <0.05*)**

**** Highly statistical significant difference (p= <0.001**)**

Discussion

The present study aimed to study the effect of applying prenatal care protocol for pregnant women with placenta accreta on maternal and neonatal outcomes. The findings of this study supported the research hypothesis which was application of prenatal care protocol would have a positive effect in improving maternal and neonatal outcomes in pregnant women with placenta accreta.

As regard personal characteristics of the studied groups, the results of the present study showed no statistically significant differences between study and control groups regarding their personal characteristics (age, educational level, occupation, and residence). This reflected group homogeneity, as the sample of two groups taken from the same population with the same inclusion and exclusion criteria.

The result of current study is supported by **Jauniaux et al.,(2020)** who studied " A new methodologic approach for clinico-pathologic correlations in invasive placenta previa accreta London, UK " and found no statistically significant differences between study and control groups respectively regarding their personal characteristics.

As regards studied women age, present study showed that mean age were (28.39±6.32 & 27.89±5.68) of study and control groups respectively, less than one third and less than two fifths of women respectively aged (30-34 years).

Current study nearly similar to **Asghar, and Naz, (2020)** who studied "Diagnostic Accuracy of Doppler Ultrasound for Antenatal Detection of Placenta Accreta Spectrum (PAS) Disorders, Cross sectional validation survey " and cleared that patients were between 20 - 40 years of age with mean age 28.23±4.31 years.

Concerning gestational age at admission more than two thirds and less than fifth of women in study and control group respectively admitted at 33-34 week. As showed present study results reflected present protocol aims and steps, that support the study discussion and hypothesis achievement.

Regarding corticosteroid administration before delivery all women in study group while more than two fifths of control group taken corticosteroid before delivery. Corticosteroid administration were one of main parts of prenatal care protocol and the researcher stress on its importance at prenatal guideline sessions, so all women in study group take corticosteroid.

Regarding pre-delivery data present study cleared a highly statistical significant difference between study and control groups regarding (gestational age at birth and indications of delivery) as, study group follow prenatal care protocol of management. There were no statistically significant differences related to (Preoperative ureteric stent placement and Pre delivery FHR).

Current study supported by **Happe et al.,(2020)** who studied" Predicting Placenta Accreta Spectrum: Validation of the Placenta Accreta Index: retrospective cohort study, Texas, USA" and cleared that there were a highly statistical significant differences between no hysterectomy and hysterectomy groups respectively related to gestational age at delivery.

Results showed that slightly more than tenth and most of women in study and control groups respectively had attempted placental removal with high statistically significant difference between study and control groups respectively, revealed that study group women had only minimal percentage of attempt removal as they follow protocol of management that recommended avoid placental removal. At this point present study had achieved prenatal care protocol of reduce attempts to remove placenta.

Current result comes in same line with **Schwickert et al., (2021)** who studied" Association of peripartum management and high maternal blood loss at cesarean delivery for placenta accreta spectrum (PAS): a multinational database study" and confided that less than fifth of studied group had manual removal of placenta, this can be explained from researcher view point as manual removal of placenta in accreta cases, not recommended by other researchers that considered a strong point to support present prenatal care protocol.

Related to hysterectomy current study showed that less than quarter and more than two thirds among study and control groups respectively had hysterectomy, with high statistically significant difference between two groups, hysterectomy in control group nearly three times of study group due to effect of conservative management (part of prenatal care protocol) applied for study group women that showed enhance maternal outcomes **(hypothesis achievement).**

Current study agrees with **Palacios-Jaraquemada et al., (2020)** who studied " Placenta accreta spectrum: a hysterectomy can be prevented in almost 80% of cases

using a respective -reconstructive technique" and connived that less than third ,less than fifth ,half ,more than three quarters and all of women respectively among total , T1 , T2 , T3 and T4 groups had hysterectomy ,with highly statistical significant difference, reflected homogeneity between two studies.

Concerning amount of blood transfusion among women in study and control groups respectively current study revealed that more than two fifths and less than fifth of women respectively need less than 1999 cc of blood transfusion , increasingly no woman and less than one quarter of women respectively need from 4000 to more than or equal 5000 cc of blood transfusion , this can be explained from researcher view point as following prenatal care protocol of management, decrease need for blood transfusion that achieved by good antenatal care and effective labor management .

The result of current study nearly similar to **Thurn et al., (2017)** who studied "Abnormally Invasive Placenta—Prevalence, Risk Factors and Antenatal Suspicion: Results From a Large Population-based Pregnancy Cohort Study in the Nordic Countries" showed that respectively antenatal suspicion group and non- antenatal suspicion group needed blood transfusion of more than or equal 6 liters. This discussed as placenta accreta women who not follow planned care need more blood transfusion to overcome blood loss, that similar to study group in present study.

Related to maternal outcome within 24 hours following delivery current study clarified that less than one quarter and less than two fifths of women in study and control groups respectively suffered from DIC , slightly less than one third and less than one quarter of women respectively suffered from atonic PPH, and less one fifth of control group women died, compared with less than tenth of study group women died, all those results reflected statistically significant differences between study and control groups ,so present prenatal care protocol had appositive effect on study group maternal outcome so, present hypothesis had been achieved.(first section of hypothesis had been accepted).

Current study supported by **Chaudhari et al., (2017)** found that according to maternal morbidity and mortality one fifth and less than one fifth of women respectively complicated with DIC and atonic postpartum hemorrhage.

Related to maternal mortality current study agrees with **Jaiswal et al., (2020)** who studied "Outcomes of pregnancies with a morbid adherent placenta from a tertiary referral Centre in North India" and revealed that less than fifth of studied women died, and women stayed in hospital more than ten days were one third ,fifth and less than tenth of women respectively. Additionally **Memon et al.,(2017)** who studied " Maternal Outcome in Morbidly Adherent Placenta in Obstetrics Patients: " and cleared that maternal mortality was observed in less than one fifth of patients

Related to immediate baby care data present study verified a highly statistical significant differences between neonates in study and control groups regarding (Apgar score at 1st minute& Apgar score at 5th minute) a statistically significant differences regarding (resuscitation, birth weight in k.g, small for gestational age and admission to NICU) ,no statistically significant difference related to (congenital anomaly) , and no statistically significant difference related to (congenital anomaly).

As regard Apgar score at 1st minute less than one fifth and almost two thirds of neonates in study and control group respectively had Apgar score less than 7, with highly statistical significant difference between study and control group.

Present study supported by **Markley et al., (2018)** who studied " Neuraxial anesthesia during cesarean delivery for placenta previa with suspected morbidly adherent placenta: a retrospective analysis" revealed that less than three fifths and one fifth of neonates in primary GA and primary NA group respectively, there Apgar score were less than 7 at 1st minute, increasingly less than third and minimal percentage of neonates respectively had Apgar score less than 7 at 5th minute.

Related to neonatal birth weight current study showed that most neonates in study group were 2.5 to 3 k.g while almost two third of neonates in control group were 2 to less than 2.5 k.g with a statistically significant difference.

Result come in same line with **Liu et al ., (2019)** who studied" Comparison of the efficacy of prophylactic balloon occlusion of the abdominal aorta at or below the level of the renal artery in women with placenta accreta undergoing cesarean section, a retrospective study" and revealed that mean birth weight 2626.33±338.89 g.m & 2602.02±273.48 0.293 0.770 g.m of women in PBOA-ARA group & PBOA-BRA group respectively with statistically significant differences between two groups.

Success treatment modality of studied women clarified that most and more than one third of women in study and control group respectively had success treatment modality that reflect effective management of placenta accreta in study group women as a result of good planning and preparation for management by a good experienced team. That can be explained from researcher view as good planning for delivery and effective management according to situation reflected as most women in study group had a successful treatment modality. guideline had positive effect on accreta management.

Current result nearly similar to **Sentilhes et al., (2018)** who studied " FIGO consensus guidelines on placenta accreta spectrum disorders: conservative management" and cleared that more than three quarters of studied women reported success conservative treatment modality.

Current study supported by **Grover et al., (2020)** who studied " Patient-reported health outcomes and quality of life after peripartum hysterectomy for placenta accreta spectrum: prospective cohort study" and revealed that only one fifth of accreta women readmitted to hospital after discharge.

Conclusion

The application of prenatal care protocol has a positive effect in improving maternal and neonatal outcomes in pregnant women with placenta accreta. As there were highly statistically significant differences between study and control groups regarding admission to hospital before delivery, there were highly statistically significant differences between neonatal outcomes in study and control groups as regarding (preterm birth, Apgar score at 1st minute, and Apgar score at 5th minute) (P≤ 0.001). Therefore, the study hypothesis was supported and approved with the aim of the present study.

Recommendation:

1. Use guidelines and posters as methods to increase pregnant women's awareness regarding placenta accreta.

2. Women with placenta previa or low lying placenta overlying a uterine scar early in pregnancy should be reexamined in the third trimester with attention to the potential presence of placenta accreta.

Further studies:

1. Further prospective research concerning nurses application of prenatal care protocol for placenta accreta women is needed.

2. A wide spectrum study about placenta accreta is needed for better identification of the incidence, risk factors, and management outcomes of according to different strategies, neonatal outcomes, and fertility expectations concerning the type of conservative surgery.

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تأثير تطبيق بروتوكول الرعاية على السيدات الحوامل المصابات بالانغماس المعيب للمشيمة علي الامهات والأطفال حديثي الولادة

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المشيمة الملتصقة هي حالة تنمو فيها المشيمة بعمق شديد داخل جدار الرحم ولا تنفصل بسهولة بعد الولادة ، ويمكن أن تؤدي المشيمة الملتصقة إلى نزيف شديد يهدد حياة الامهات وتؤثر المشيمة الملتصقة بالسلب علي صحة الاجنه لذلك هدفت الدراسة الى دراسة تأثير تطبيق بروتوكول الرعاية على السيدات الحوامل المصابات بالانغماس المعيب للمشيمة علي الامهات والأطفال حديثي الولادة . وقد اجريت الدراسة في العيادة الخارجية لامراض النساء والتوليد وقسم النساء والتوليد وعمليات قسم النساء والتوليد بمستشفي بنها الجامعى علي عدد (٥٢) حالة من السيدات الحوامل اللاتى تعانى من المشيمة الملتصقة. وقد كشفت النتائج ان لتطبيق بروتوكول الرعاية تأثير إيجابي في تحسين نتائج الامهات والأطفال حديثى الولادة لدى السيدات المصابات بالمشيمة الملتصقة حيث أظهرت النتائج فروق ذات دلالة إحصائية عالية بين مجموعة الدراسة والمجموعة الضابطة فيما يتعلق بمحاولة إزالة المشيمة في المرحلة الثالثة من الولادة ،استئصال الرحم وفقدان الدم أثناء الولادة المضاعفات المبكرة بعد الولادة مباشرة ، الدخول الى وحدة العناية المركزة($P<0.001$). وكذلك أظهرت النتائج فروق ذات دلالة إحصائية عالية بين الأطفال حديثي الولادة في مجموعة الدراسة والمجموعة الضابطة بخصوص (الولادة المبكرة درجة أبجر في الدقيقة الأولى ودرجة أبجر في الدقيقة الخامسة ($P<0.001$). كما أوصت الدراسة بتكرار بروتوكول الرعاية قبل الولادة على مجموعة واسعة من السيدات المصابات بالمشيمة الملتصقة.