Introduction

Caesarean section is a common operation with no agreed standard on operative techniques and materials to use ***(Alderdice et al., 2003).***

Cesarean section rates have been increasing worldwide, and are a growing concern in many countries. Once limited to western countries, particularly the United States and United Kingdom, high rates of cesarean deliveries are now an international phenomenon, reflecting in part, increased hospital-based delivery and access to healthcare ***(Khawaja et al., 2004).***

Cesarean section rates show wide variation among countries in the world, ranging from 0.4 to 40 percent and a continuous rise in the trend has been observed in the past 30 years ***(Althable et al., 2006).***

The scar is the signature of the surgeon. The goal of any skin closure techniques is to produce appropriate skin approximation and adequate healing while minimizing pain, wound complication, cost, and scarring; the techniques should be quick, cost-effective, and simple, while maximizing wound cosmesis and patient satisfaction. It would also be inexpensive and require fewer health care resources by being fast and easy to apply, require minimal follow-up evaluation ***(The interest Journal of Surgery, 2011).***

Gestational diabetes mellitus (GDM), a condition characterized by glucose intolerance during pregnancy, is associated with a variety of adverse birth outcomes, including excessive fetal weight gain and related increases in the rate of cesarean delivery and perinatal injury. GDM increases the risk for a number of longer-term adverse outcomes, including progression to type 2 diabetes (T2D) in the mother as well as increased risk of obesity, diabetes, and possibly adult cardiovascular disease in the infant ***(AADE, 2013).***

Non-pharmacologic medical nutrition therapy, including dietary changes, meal planning, and increased physical activity, is recognized as the cornerstone of treatment for GDM. Insight about engaging in these self-care behaviors can be effectively delivered by diabetes educators, who play a critical and unique role in supporting the pregnant woman with GDM to facilitate optimal glycemic control ***(AADE, 2013).***

Synthetic sutures are chemical polymers absorbed by hydrolysis and cause a lesser degree of tissue reaction following placement. These sutures include Polyglactin910 (vicryl): Poliglecaprone 25(Monocryl): Polysorb and Polydioxanone ***(Kurdur et al., 2009).***

The first stage of absorption has a linear rate lasting for several days to weeks. The second stage is characterized by a loss of suture mass and the stage overlaps the first stage.

The loss of suture mass occurs as a result of leukocytic cellular responses that remove cellular debris and suture material from the line of tissue approximation. Chemical treatment such as chromic salts lengthens the absorption time. Accelerated absorption may occur in patients with fever, infection or protein deficiency and may lead to an excessively rapid decline in tensile strength. Accelerated absorption may also occur in a body cavity that is moist, filled with fluid or if the sutures become wet or moist during handling prior to implantation. Non absorbable suture are more commonly used in dermatology and dermato-surgery than absorbable suture. These sutures should be just tight enough to approximate, not strangulate tissue. Non absorbable suture may be used as deep suture to provide prolonged mechanical support ***(Spelzini et al., 2007).***

Non-absorbable sutures elicit a tissue reaction that results in encapsulation of the suture material by fibroblasts. Non absorbable sutures are natural (surgical silk) or synthetic (nylon, polypropylene-prolene). Prolene, a monofilament suture, is an isostatic crystalline stereoisomer of a linear propylene polymer; it permits little or no saturation.The material does not adhere to tissues and is useful as a pull-out suture (e.g., subcuticular closure).Polypropylene also holds knot better than other monofilament synthetic material.This material is biologically inert and elicits minimal tissue

reaction. Prolene is not subject to degradation or weakening and maintains tensile strength for up to 2 years. This material is useful in contaminated and infected wound, minimizing the chances of sinus formation and suture extrusion ***(Meinel et al., 2005).***

A surgical site infection is an infection that occurs after surgery in the part of the body where the surgery took place.SSI can sometimes be superficial infections involving the skin only. Other surgical site infections are more serious and can involve tissues under the skin, organs,or implanted material ***(CDC-HAI, 2008).***

Surgical site infection has a great on the economy and health care resources. Infection has always been a feature of modern surgery and continuous to be a significant problem for health care practitioners across the world ***(Gala and El-Hinhawy, 2011).***

Wound complications are a major source of morbidity after CS and contribute to prolonged hospital stay and rates of readmission. Age, BMI, length of incision, and timing of prophylactic antibiotic administration have all been associated with post cesarean surgical site infection (SSI) ***(Fleix et al., 2011).***

Aim of the Work

The aim of this study is to determine the surgical site infection rate and the patient's satisfaction for absorbable suture versus non-absorbable suture in skin closure at cesarean delivery in women with gestational diabetes.

Cesarean Section

History of cesarean section

During the 16th and 17th centuries, the management of 1abour and delivery continued in the traditional manner. The midwife, who was called at the onset, when faced with failure to de1iver, they would turn to a surgeon to save the mother. The vast majority of these emergency calls were made after serious difficulty had arisen and might be delayed for three to four days to be sure the fetus had died. During this period cesarean section to save the mother and the child was first proposed in discussions stimulated by anecdotal accounts. Francis Rousset is credited as the first writer, in 1581, to advocate the performance of caesarean section in living women ***(James Low, 2009).***

The surgical technique could have been used by Banyoro tribe surgeons for centuries: The patient was a healthy looking primipara (1st pregnancy) of about twenty years of age, and she lay on an inclined bed, the head of which rested against the side of the hut. She was half-intoxicated with banana wine, was quite naked and was tied down to the bed by hands of bark cloth over the thorax and thighs. Her ankles were held by a man while another man stood on her right steadying her abdomen, the surgeon was standing on her left side holding the knife aloft and muttering an incantation ***(Field, 1988).***

He then washed his hands and the patient's abdomen first with banana wine and then water. The surgeon made a quick cut upwards from just above the pubis to just below the umbilicus severing the whole abdominal wall and uterus so that amniotic fluid escaped. Some bleeding points in the abdominal wall were touched with red hot irons. The surgeon completed the uterine incision, the assistant helping by holding up the sides of the abdominal wall with his hand and hooking two fingers into the uterus. The child was removed, the cord cut, and the child was handed to an assistant. The report goes on to say that the surgeon squeezed the uterus until it contracted, dilated the cervix from inside with his fingers (to allow postpartum lochia to escape), removed clots and the placenta from the uterus, and then sparingly used red hot irons to seal the bleeding points. The peritoneum, the abdominal wall and the skin were approximated back together and secured with seven sharp spikes. A root past was applied over the wound and a bandage of cloth was tightly wrapped around it. Within 6 days, all the spikes were removed. Felkin observed the patient for 11 days, and when he left, mother and child were alive and well. The salient points of the caesarean technique of the Banyoro tribe surgeons are anesthesia (banana wine), antisepsis (banana wine), low midline abdominal incision, good homeostasis (red hot iron), blunt incision of the uterus (minimizing hemorrhage), non-suturing of the uterus with

manual massage and cautery of uterine incision bleeding points (minimizing hemorrhage), suture of abdominal wall, and wound care (root paste) ***(Field, 1988).***

On January 9, 1884, a Scottish final year medical student, ***Robert Felkin*** gave a lecture to the Edinburgh Obstetrical Society about his experience of observing cesarean section in Africa. The title of the lecture was "notes on labor in central Africa". He narrated how, while in Uganda in 1879, he had observed the Bagandas performing a successful emergency cesarean section using a large knife and alcohol as anesthetic, analgesic and antiseptic. This was probably the first record on cesarean section parformed in Africa under very meticulous conditions ***(Dunn, 1999; Lurie and Glezerman, 2003).***

The rate of Cesarean section:

Cesarean section rates have been increasing worldwide, and are a growing concern in many countries. Once limited to western countries, particularly the United States and United Kingdom, high rates of cesarean deliveries are now an international phenomenon, reflecting in part, increased hospital-based delivery and access to healthcare ***(Khawaja et al., 2004).***

There is enormous geographic variation in the use of cesarean delivery. High-use countries have rates that are

double those of low-use ones. Higher cesarean rates are only partially explained by patient characteristics but are greatly influenced by nonmedical factors such as provider density, the capacity of the local health care system, and 'malpractice pressure. Areas with higher usage rates perform the intervention in medically less appropriate populations that is relatively healthier births and do not see improvements in maternal or neonatal morbidity ***(Baicker et al., 2006).***

Cesarean section rates show wide variation among countries in the world, ranging from 0.4 to 40 percent and a continuous rise in the trend has been observed in the past 30 years ***(Althable et al., 2006).***

In the WHO global survey on maternal and prenatal health, which was conducted between 2004 and 2005 in 24 regions of eight countries in Latin America and which obtained data for all women admitted for delivery in 120 randomly selected institutions. The median rate of cesarean delivery was 33%. Rates of up to 51% were noted in private hospitals ***(Villar et al., 2006).*** Results also showed that increased cesarean section rates were associated with a higher risk of postpartum antibiotic treatment and severe maternal morbidity and mortality as well as an increase in fetal mortality rates, with a higher number of babies admitted to intensive care units for 7 days compared to babies born through vaginal deliveries ***(Villar et al., 2006).***

In a study done by ***Feng et al (2008),*** they confirmed that the proportion of births by caesarean section in China rose dramatically between 1988 and 2008. Although the procedure was more common among wealthy and well educated women, the rate increased alarmingly in all socioeconomic groups, including the poor, the uneducated and the rural population. In urban areas in 2008, the rate was over 40% even in poorly educated women. Only the poorest rural women and those living in the most remote and socioeconomically deprived rural type-IV region still had rates below 15%.

In another study, a substantial proportion of labour inductions were performed without medical indication or at the mother's request. Women with low-risk pregnancies who underwent elective induction of labour had an increased risk of adverse outcomes. In fact, we were surprised to find that in 30% of all cases of induced labour contained in the database, "elective" and "by request" were the terms used for the indication, even in some cases that were medically justified. The mean caesarean section rate in the elective inductions was 11.7%, well below the caesarean rate of 29.5% for the sum of all inductions in this same population ***(Guerra et al., 2011).***

In an Egyptian study, the rate of cesarean section was rising across 13 years follow up from 4.6% during the period from 1987 to 1992 to reach an estimate of 10.3% in the period 1995 to 2000 of all births. Comparing the rates within the same periods in hospital births, it was also found that it rised from 15.3% to 20.9% ***(Khawaja et al., 2004).***

In a more recent survey done by the WHO in regional health observatory, it was reported that the proportion of cesarean sections of all deliveries in Egypt was 27.6% in the years 2009 and 2010. This figure constitutes the highest rate among all Arab countries within the same period of time ***(WHO, 2011).***

Table (1): Proportion of caesarean sections of all deliveries

Locations	Time Period	Proportion of caesarean sections of all deliveries [i]
Afghanistan	2010	3.5
	2009	3.5
Bahrain	2010	12
	2009	5.4
Djibouti	2010	15
	2009	15
Egypt	2010	27.6
	2009	27.6
Iran (Islamic Republic of)	2010	40
	2009	40
Iraq	2010	25
	2009	18
Jordan	2010	19
	2009	19
Kuwait	2010	11.9
	2009	11.9
Lebanon	2010	23
	2009	23
Libya	2010	20.8

	2009	20.8
Morocco	2010	5.4
	2009	5.4
Occupied Palestinian territory	2010	18.3
	2009	16.8
Oman	2010	17.3
	2009	14.9
Qatar	2010	20.4
	2009	20.4
Saudi Arabia	2010	20.7
	2009	20.7
Somalia	2010	0.5
	2009	0.5
Sudan	2010	4.5
	2009	4.5
Syrian Arab Republic	2010	20.6
	2009	15
Tunisia	2010	24.8
	2009	24.8
United Arab Emirates	2010	15.6
	2009	7.5
Yemen	2010	1
	2009	1

(WHO, 2011)

Types of cesarean section:

Based on the timing of CS at the time of decision making, the types of cesarean section (CS) are grouped under one of four:

1. **Emergency CS:** ideally the CS should be done within the next 30 minutes. Some examples are: abruption, cord prolapse, scar rupture, scalp ph<7.2 and prolonged FHR deceleration< 80 bpm.
2. **Urgent CS:** the delivery should be completed within 60-75 minutes and cases with FHR abnormalities are those of concern.
3. **Scheduled CS:** continuation of pregnancy is Likely to affect the mother or fetus in hours or days. Some plan should be in place to deliver before further deterioration occurs. It may be a case of failure to progress where the CS is planned within next hour or two or it may be a case of growth-restricted fetus in the pre-term period with absent end diastolic flow but a normal CTG or a case with preeclampsia where the liver or renal function tests are gradually deteriorating where the CS is planned for within hours to days.
4. **Elective CS:** the main principle being to carry out CS as late as possible in gestation without compromising the maternal or fetal health. It is generally done around 39 weeks as the incidence of tachypnea of the newborn is much less after this gestation. These are cases where there is an indication for CS but there is no urgency and

examples include: placenta previa with no active bleeding, malpresentation, history of previous hysterotomy or vertical incision CS, past history of repair of vesico-vaginal or recto-vagina fistulae or stress incontinence, and HIV infection (***Keith et al., 2009).***

Indications of CS:

Causes of cesarean section; elective or emergency as mentioned at cocharan review; "techniques for caesarean "section" are summarized at table (2) ***(Hofmeyr et al., 2008).***

Table (2): The common indication of cesarean section elective or emergency ***(Hofmeyr et al., 2008):***

Common indication of caesarean section elective or emergency include: 1. Failure to progress in labor. 2. Suspected fetal distress. 3. Previous uterine surgery. 4. Very low birth weight. 5. Fetal malpresenlation (e.g. breech, transverse lie). 6. Placenta praevia. 7. Placental abruption.. 8. Multiple pregnancies. 9. Suspected ietopelvic disproportion. 10. Cord prolapse. 11. Severe preeclampsia, HELLP syndrome or eclampsia. 12. Maternal infections (e.g. HIV, active Herpes simplex). 13. Mothers choice.
Less common indications include 1. Fetal coagulation defects. 2. Some fetal anomalies.

Postoperative care:

Postoperative care includes regular checking of vital signs and urine output, and for signs of uterine relaxation or hemorrhage. Restricting oral intake has not been found to be of benefit ***(Mangesi and Hofmeyr,2002).*** Analgesia is provided as a 'Single dose oral ibuprofen and diclofenac for postoperative pain ***(Collins et al., I999);*** Single dose oxycodone and oxycodone plus paracetamol (acetaminophen) for acute postoperative pain ***(Edwards et al., 2000);*** with or without codeine, for postoperative pain' ***(Moore et al., 1998).***

Early mobility, skin-to-skin contact with the baby and breastfeeding are encouraged ***(Moore et al., 2007).***

It is the surgeon's responsibility to ensure that the post-operative precautions such as antibiotics and anti-thrombotic measures are undertaken. Clear post-operative instructions should include a note on suture removal (or not) and, if there are any specific instructions, these must be clearly recorded and communicated to the midwife caring for the women ***(David and Philip, 2010).***

Maternal short-term risks and complications of CS:

1. Postpartum hemorrhage:

Blood loss in a healthy pregnant woman is frequently 500m1 after vagina1 delivery and 1000ml after cesarean