Introduction

Cesarean section (CS) is the commonest major operations performed on women in the world. ***(Elizabeth and Simon, 2004)*** Approximately one in 4 women in the United States is delivered by cesarean section, and it is well established that operative abdominal delivery is associated with a significant risk of infection compared with vaginal delivery. These risks are increased with preexisting operative site infection, breaks in sterile technique, prolonged preoperative admissions that may result in colonization with resistant microbes, prolonged operative duration, use of electrocautery, obesity, advanced age, inadequate host immunocompetence ***(Van et al.,1994).***

Obese women may have increased susceptibility to infections because of the effects of obesity on the immune system, skin barriers, wound healing, mobility, and coexisting chronic diseases including diabetes, which could increase infection risk by itself. Cohort studies have shown that women with a body mass index (BMI) >30kg/m2 have a two- to threefold increased risk of post cesarean infections, such as wound infection, urinary tract infection (UTI), endometritis, or pneumonia, compared with non-obese women. Other studies found that obesity doubled the risk specifically for post-cesarean wound infection ***(Rita et al., 2011).***

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health. Body mass index (BMI) defined as a person's weight in kilograms divided by the square of his height in meters (kg/m^2). It is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. The WHO (world health organization) definition is: BMI greater than or equal to 25 is overweight and BMI greater than or equal to 30 is obesity. BMI provides the most useful population-level measure of overweight and obesity as it is the same for both sexes and for all ages of adults ***(WHO obesity and overweigh,2010)***.

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) ***(Felix et al., 2011).***

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-SSI-HAI, 2008)*** SSI has a great impact on the economy and health care resources. Infection has always been a feature of modern surgery and continues to be a significant problem for

health care practitioners across the world ***(Galal and El-Hindawy, 2011).***

The ideal skin closure would be safe and effective, associated with minimal patient discomfort, and have a good cosmetic result. It would also be inexpensive and require fewer health care resources by being fast and easy to apply, require minimal follow-up evaluation, and be associated with a low rate of complications. Methods for closing the skin at the time of cesarean delivery include stainless steel staples, subcuticular absorbable staples, subcuticular suture, adhesive closure strips, and tissue adhesives (cyanoacrylates). Each of the methods has its postulated benefits for wound outcomes; however, none of these have been compared in a prospective trial ***(Basha et al., 2010).***

Aim of the work

The aim of this study is to determine the surgical site infection rate and patient satisfaction for absorbable versus non absorbable suture in closure of skin at cesarean section in obese women.

Cesarean Section (CS)

Background:

A cesarean delivery is a surgical procedure in which a fetus is delivered through an incision in the mother's abdomen and uterus ***(American College of Obstetricians and Gynecologists. 2010).*** Cesarean deliveries were initially performed to separate the mother and the fetus in an attempt to save the fetus of a moribund patient. This operation subsequently developed into a surgical procedure to resolve maternal or fetal complications not amenable to vaginal delivery, either for mechanical limitations or to temporize delivery for maternal or fetal benefit ***(Richard et al., 2000).***

Cesarean birth rates:

Caesarean section rates have been rising worldwide over the past decades in both developed and developing countries ***(Sandmire, 1996) (Martin et al., 2002)***. 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 caesarean delivery was 33%; rates of up to 51% were noted in private hospitals ***(Villar et al., 2006)***. Results from the WHO Global Survey show that increased caesarean section rates are

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 with babies born through vaginal deliveries ***(Villar et al., 2006)***.

Indications:

Causes of caesarean section; elective or emergency as mentioned at cocharan review; "techniques for caesarean section" are summarized at table (1) ***(Hofmeyr et al, 2008)*.**

Table (1): The common indication of caesarean 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 malpresentation (e.g. breech, transverse lie).
6. Placenta praevia.
7. Placental abruption.
8. Multiple pregnancies.
9. Suspected fetopelvic disproportion.
10. Cord prolapse.
11. Severe pre-eclampsia, HELLP syndrome or eclampsia.
12. Maternal infections (e.g. HIV, active Herpes simplex).
13. Mother's choice.
Less common indications include
1. Fetal coagulation defects.
2. Some fetal anomalies.

Surgical procedure:

Preoperative preparation:

Includes clinical assessment; blood tests such as hemoglobin, Rhesus group and antibody screen, testing for syphilis and HIV, and blood compatibility testing in high-risk cases ***(Cousins 1996; Ransom 1999)***; anesthetic assessment; oral intake restriction when caesarean section is anticipated ***(Singata 2002)***); interventions to reduce the volume or acidity of stomach contents ***(Peskett 1973)***; intravenous fluids (avoiding excessive dextrose) ***(Kenepp 1982)***; antibiotic prophylaxis (see reviews 'Antibiotic prophylaxis for caesarean section' ***(Smaill 2002)***, and 'Antibiotic prophylaxis regimens and drugs for caesarean section' ***(Hopkins 1999)***); A urinary catheter is inserted, and hair in the region of the proposed skin incision may be clipped. In the operating theatre, the fetal lie, presentation and position are checked, and the presence of fetal heart beats confirmed. The indication for caesarean section is reviewed, as the obstetric situation may have changed since the original decision was made ***(Hopkins 1999).***

Anesthesia:

Regional analgesia (spinal and epidural) has largely replaced general anesthesia in many services. When other methods are not available or safe, local analgesic infiltration may be used ***(Hofmeyr 1995).***

The position and incisions:

1. The woman's position may be supine or with a lateral tilt ('Lateral tilt for caesarean section'***(Wilkinson, 2006).***
2. Most caesarean sections are performed using a transverse supra pubic skin incision (a horizontal cut just above the pubic bone) (Pfannenstiel, Joel-Cohen, Pelosi, Maylard, Mouchel or Cherney) which heals well because of the lack of tension on the skin edges ***(Alderdice et al., 2003).*** For very obese women, a transverse incision above the umbilicus has been suggested, but not shown to decrease morbidity ***(Houston 2000).***

   The lower leaf of the rectus sheath may be freed or not ***(Oguz et al., 1998).***

3. The bladder peritoneum may be reflected downward or not ***(Hohlagschwandtn et al., 2001).***
4. The uterine incision may be transverse lower segment midline lower segment or midline upper segment ('classical') ***(Murray and Pradenas, 1997).***
5. The uterus may be opened with a scalpel, scissors, by blunt dissection, or using absorbable staples ***(Wilkinson et al., 2006b).***
6. The placenta may be removed manually or with cord traction, and allowing the cord to bleed has been used to assist placental delivery ***(Wilkinson et al., 2006c).***

7. The uterus may be delivered from the abdominal cavity or left in position during repair (***Jacobs-Jokhan 2004).***
8. The uterus may be closed with interrupted or continuous sutures in one, two or three layers ***(Enkin* and *Wilkinson 2006)***. Observational studies have suggested that a single-layer closure is associated with more ultrasound scar defects ***(Hayakawa et al., 2006)*** and is more likely to dehisce in subsequent pregnancies (***Gyamfi et al., 2006***). In another study, increased uterine 'windows' were found following single-layer closure, but no scar ruptures occurred ***(Durnwald and Mercer, 2003).***
9. Blood may be recovered during the procedure for re-transfusion ***(Rainaldi et al., 1998).***
10. The visceral or the parietal peritoneum, or both, may be sutured or left un sutured ***(Bamigboye and Hofmeyr, 2003).***
11. Various materials may be used for closure of the fascia. In women at increased risk for wound dehiscence, a running Smead-Jones suture has been suggested ***(Wallace et al., 1980).***
12. Careful handling of tissues and good surgical technique are suggested to reduce the risk of infection ***(Iffy et al., 1979; Lyon and Richardson, 1987).***

13. The subcutaneous tissues may be sutured or not ***(Naumann et al., 1995).***
14. Various techniques and materials may be used for skin closure ***(Alderdice 2003).***
15. Good documentation of the procedure is of paramount importance. This should include the categorization of the degree of the urgency of the procedure and critical timings, skin incision, delivery of the baby. The type of suture material used, the procedure and any complications must be recorded. (***David and Philip, 2010)***.

Postoperative care:

Postoperative care includes regular checking of vital signs and urine output, and for signs of uterine relaxation and hemorrhage. Restricting oral intake has not been found to be of benefit ***(Mangesi et al., 2002).*** Analgesia is provided as a Single dose oral ibuprofen and diclofenac for postoperative pain ***(Collins et al., 1999);*** Single dose oxycodone and oxycodone plus paracetamol (acetaminophen) for acute postoperative pain ***(Edwardset al., 2000)***; with and without codeine, for postoperative pain' ***(Moore et al., 1998)***.

Early mobility, skin-to-skin contact with the baby and breastfeeding are encouraged ***(Mooreet 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)***.

Complications:

The major complications of caesarean section are intra operative damage to organs such as the bladder or uretes, anesthetic complications, hemorrhage**,** infection and thromboembolism ***(Hofmeyr et al., 2008).***

Maternal mortality is greater after caesarean than vaginal delivery, though it is difficult to be sure to what extent this is due to the operation or to the reason for the operation. Transient tachypnoea of the newborn is more common after caesarean section, and birth trauma is not eliminated ***(Hofmeyr et al., 2008).***

Long-term risks include an increased risk of placenta praevia, placental abruption, placenta accreta and uterine rupture ***(Hofmeyr et al., 2008).***

Obesity

1- Introduction:

Obesity is one of the most common medical conditions in the Western world. More than one-third of all Americans are obese, and at least eight million are morbidly obese ***(Sturm, 2003)***.The burden of obesity is currently one of the main concerns in health care in (the United States) U.S. and worldwide; more than 300,000 deaths per year in the U.S. are attributed to obesity-related co-morbidities, including diabetes mellitus, hypertension and coronary artery disease ***(Finkelstein, 2003).***

The increase in the number of obese persons, especially those with severe obesity, is creating a rapidly growing subset of high-risk surgical patients. This can be explained not only by obese patients who require standard surgical operations, but also by the fact that bariatric surgery has experienced a dramatic increase over the last few years 120,000 bariatric procedures were performed in 2003 compared with only 20,000 in 1993 ***(Johnson, 2004).*** It is perceived that obesity constitutes a major risk factor for overall morbidity and mortality in surgical patients, specifically for postoperative infectious complications, including SSI ***(Pope et al., 2002).***

As obesity becomes an ever-growing concern, the number of women of reproductive age who are overweight or obese increases and the incidence of obesity among pregnant women is now estimated at between 18.5% and 38.3% ***(Yogev and Catalano, 2009).***

2-Definition:

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health.

Body mass index (BMI) defined as a person's weight in kilograms divided by the square of his height in meters (kg/m2). It is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults ***(WHO, 2000)***.

The WHO (world health organization) definition is: BMI greater than or equal to 25 is overweight and BMI greater than or equal to 30 is obesity. BMI provides the most useful population-level measure of overweight and obesity as it is the same for both sexes and for all ages of adults. Obesity is also subcategorized into 3 subgroups: Class I (BMI 30–34.9), Class II (BMI 35–39.9), and Class III which is morbid obesity (BMI 40 or greater) ***(WHO, 2000).***

3-Classification of obesity:

A-using BMI:

The most commonly used classifications, established by the WHO in 1997 and published in 2000, provide the values listed in the table (4) ***(WHO,2000).***

Table (2) classification of obesity according to the rate of BMI=weight per kg /height per meter square

BMI	Classification
< 18.5	Underweight
18.5–24.9	normal weight
25.0–29.9	Overweight
30.0–34.9	class I obesity
35.0–39.9	class II obesity
≥ 40.0	class III obesity

Some modifications to the WHO definitions have been made by particular bodies. The surgical literature breaks down "class III" obesity into further categories whose exact values are still disputed ***(Sturm R, 2007).***

- Any BMI ≥ 35 or 40 is *severe obesity*
- A BMI of ≥ 35 or 40–44.9 or 49.9 is *morbid obesity*
- A BMI of ≥ 45 or 50 is *super obesity*

B-Using waist: hip ratio:

Obesity can be classified into central or peripheral obesity. In central obesity, otherwise called "android obesity", the distribution of fat is commonly on the upper part of the trunk (the chest and abdomen) and is more common in the males. However, in the peripheral or "gynecoid" type of obesity, the distribution of fat is mainly on the hip and thighs and is more common in females ***(Anate et al., 1998; Ogunranti, 1994).***

Android obesity is more clearly associated with disordered lipid and glucose metabolism and diseases like diabetes mellitus, gout, atherosclerosis, osteoarthritis, cardiovascular disease especially hypertension, and some cancers ***(Anate et al., 1998; Antonio et al., 1997).***

Causes:

A combination of excessive food energy intake and a lack of physical activity is thought to explain most cases of obesity ***(Lau et al., 2007)***. A limited number of cases are due primarily to genetics, medical reasons, or psychiatric illness ***(Bleich et al., 2008)***. In contrast, increasing rates of obesity at a societal level are felt to be due to an easily accessible and palatable diet ***(Drewnowski and Specter, 2004)*** increased reliance on cars, and mechanized manufacturing ***(James, 2008).***