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Article

A Comparative Study of Iraqi Women to Evaluate The Health Outcomes of Appendectomy in Pregnant Women

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Abstract: The present study sought to identify the negative effects on pregnant patients and those suffering from appendicitis who underwent appendectomy. Furthermore, the quality of life of the participants was evaluated in order to ascertain any statistical differences in Iraq during the period spanning from 2022 to May 2024. The cases encompassed 110 patients diagnosed with acute appendicitis who received treatment across multiple hospitals in Iraq during the period spanning from 2022 to May 2024. The participants in the study ranged in age from 18 to 40 years, with a mean age of (27.15 ± 4.28) years in the control group and from 20 to 50 years in the laparoscopic appendectomy group, with a mean age of (29.28 ± 3.45) years. A statistical analysis was conducted to ascertain whether there was a significant difference in the baseline data between the two groups ($P > 0.05$), and this indicated that the two groups were comparable. Regarding newborns, the following data is collected: weight (g) ± 200.93. The data presented in Table 4 provides a comprehensive overview of the outcomes observed in patients undergoing laparoscopic appendectomy (Operating time (min): 40-80 min; length of postoperative stay (days): 3-6 days) and open surgery (50-80 min; 5-8 days). The newborn data set includes weight (g) of 3400 ± 200.93, gestational age (d) of 280.1 ± 9.8, Apgar score < 7 at 5 minutes for patients 10, and pH of umbilical cord < 7.15 for patients 4. The data set from the open group shows a weight of 3100.3 ± 199, gestational age (d) of 277 ± 7.9, and Apgar score < 7 at 5 minutes for 17 patients. In cases where surgical intervention is deemed necessary, laparoscopic appendectomy is recommended for pregnant patients. Laparoscopy is considered to be both technically safe and feasible during pregnancy when performed by a laparoscopic expert.

Keywords: LA, Pregnancy, Open surgery, Apgar score, Appendectomy, Patients, QOL

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1. Introduction

Acute appendicitis is the most prevalent surgical emergency, constituting approximately 60% of acute abdominal surgical cases [1]. The earliest documented references date back to the Middle Ages, when it was described as a severe ailment characterised by a substantial, pus-filled swelling in the iliac fossa. The term "appendicitis" was introduced in 1886 by the renowned pathologist Reginald Fitz in his seminal work, Perforating Appendicitis. The first successful appendectomy was performed in 1887 by T. G. Morton following a ruptured appendix, and since then, appendectomy has become a common surgical procedure. In 1889, Charles McBurney described his famous pain site and advocated for early diagnosis. Acute appendicitis can affect individuals of all ages, though it is less prevalent in later stages of life [2], [3], [4]. The incidence of acute

appendicitis during pregnancy remains consistent, and it is estimated that one appendectomy is performed for acute appendicitis per 1,000 births, constituting up to 75% of surgical emergencies in pregnant women.2,3 Acute appendicitis is the most prevalent cause of painless, non-obstetric acute abdominal inflammation during pregnancy. 4-8 Early and timely diagnosis is vital to avoid serious complications such as abdominal perforation, endometriosis, Douglas abscess, peritonitis, and septic shock, which may endanger the lives of the mother and fetus [5], [6], [7].

Acute appendicitis is among the most prevalent acute abdominal diseases during pregnancy, with an incidence rate ranging from 0.05% to 0.1% [8]. It is a prevalent surgical problem during pregnancy and can occur at any stage of pregnancy. From a pathological and anatomical perspective, acute appendicitis during pregnancy exhibits distinctive characteristics, and the patient's prognosis and clinical symptoms also have their own unique features. If not diagnosed and treated correctly, it may endanger the mother's life. Due to the special physiological characteristics of pregnant women, in the late stages of pregnancy, as the uterus continues to enlarge, the anatomical part of the appendix will also move upward [9]. Therefore, the tenderness and pain area in the right lower quadrant of the abdomen in patients with acute appendicitis during pregnancy usually moves outward and upward. The presence of the uterus often obscures the appendix, leading to atypical presentations of appendicitis, with the most notable sign being pain upon pressure with a finger. This is followed by a change in the patient's lateral lying position and a shift of the uterus to the left. Following the resolution of pain, the appendix may be found inside or near the uterus. If the sensitivity persists, the source is the appendix [10]. Concurrently, as the uterus continues to enlarge during pregnancy, the greater omentum moves forward. In such cases, it is challenging for the greater omentum to contain inflammation, which can easily lead to diffuse peritonitis, a condition that is often misdiagnosed or overlooked and may even result in complications such as miscarriage, premature birth, and stillbirth [11], [12]. The present study primarily focused on 110 patients with acute appendicitis during pregnancy, with the aim of exploring the clinical diagnosis and treatment of acute appendicitis during pregnancy.

2. Materials and Methods

Collection Data

The cases encompassed 110 patients diagnosed with acute appendicitis who received treatment across multiple hospitals in Iraq during the period spanning from 2022 to May 2024. The inclusion criteria encompassed the following: (1) A documented history of clear migration pain in the right lower abdomen, with an onset time ranging from 4 to 72 hours; (2) Age between 18 and 70 years; (3) Signed informed consent form; (4) Reviewed by the hospital ethics committee. Exclusion criteria: (1) Patients with concomitant abnormalities in lungs, kidneys, heart, liver, etc.; (2) Patients with mental illness and contraindications to surgery; (4) Patients were randomly divided into open operation group (n = 50) and patient group (n = 60) using the random number table method. The ages of the participants ranged from 18 to 40 years, with a mean age of (27.15 ± 4.28) years in the control group, the ages ranged from 20 to 50 years, Laparoscopic Appendectomy with a mean age of (29.28 ± 3.45) years. A statistical analysis was conducted to ascertain whether there was a significant difference in the baseline data between the two groups ($P > 0.05$). This indicated that the two groups were comparable.

Study design

The present study was designed according to a comparison system between two groups: the patient group, which included 60 patients, and the open operation group, which included 50 patients. All demographic and graphic characteristics related to the two groups were identified, as well as general and secondary complications that occurred after

surgery. Furthermore, statistical differences were identified. The study utilized the Quality-of-Life Questionnaire program to assess the negative and positive effects that occurred after surgery. The statistical analysis programme IBM SOFT SPSS was utilized in conjunction with the Microsoft Excel 2010 programme to analyses and collate all demographic data pertinent to this study. The research design of this study was formulated according to a comparison system between two groups: the patient group, which comprised 60 Laparoscopic Appendectomy, and the control group, which comprised 50 patients. The demographic and graphic characteristics of these two groups were identified, as well as any general or secondary complications that occurred after surgery. The study also sought to identify statistical differences between the two groups. The quality-of-life questionnaire programme was administered to both groups in order to ascertain the negative and positive effects that occurred after surgery. The statistical analysis programme IBM SOFT SPSS was also used in addition to the Microsoft Excel 2010 programme to analyse and draw all demographic data related to this study.

Study period

All relevant authorities were contacted for the purpose of conducting this study and obtaining special approvals, which included informed consent for patients without mentioning names to maintain complete confidentiality and privacy related to patients who received treatment across multiple hospitals in Iraq during the period spanning from 2022 to May 2024

Aim of study

This study aimed to identify the negative effects on pregnant patients and those suffering from appendicitis who underwent appendectomy. In addition, the quality of life was evaluated for both groups to identify the statistical differences.

3. Results

A cross-sectional study was conducted on 110 pregnant women who underwent appendectomy to determine the type of surgical procedure, given its significant contribution to the complications and negative effects that occur after the procedure. One hundred ten patients were collected, and the average age ranged from 22 to 35 years in Iraq. Their body mass index was observed to be significantly high in some patients, which clearly negatively affects the occurrence of complications after the surgical procedure. The study also examined the type of anaesthesia administered, finding that general anaesthesia was used extensively in 79 patients from the general group, which included all 110 patients.

Tabel 1. Description of the parameters and demographic data of 110 pregnant female patients

Variable	Laparoscopic Appendectomy	Open	P-value
Age			
Mean (SD)	29.28 ± 3.45	27.15 ± 4.28	
BMI			
Overweight	30	35	
Obese	30	15	0.948
Smoking			

Yes	2	3	0.9438
No	58	47	0.77
Education			
Low	10	5	
College	39	30	
High	11	15	
Comorbidities			
Diabetes	17	9	0.09
Blood Pressure	5	6	0.671
Joints	8	6	0.88
Others	40	29	0.077
Alcohol			
Yes	1	1	0.00
No	59	49	0.00
Type of operation			
CS	15	12	
V	45	38	
Type of anesthesia used			
General	40	39	0.72
spinal anesthesia	20	11	0.044

The main cause of acute appendicitis is obstruction due to infection, where the cavity of the appendix is blocked by enlarged submucosal lymph nodes, fecal stones, narrowing of the duct, tumors, or other conditions, and mucus accumulates in the cavity to create pressure. Within 6 hours after the outlet of the appendix is blocked,

There are many causes of abdominal pain, but the pain caused by acute appendicitis is one of the few types of abdominal pain that occurs without warning; although similar abdominal pain is often felt, Vomiting usually occurs early and occurs in about half of patients,

Local deep-pressure pain does not often occur in the early stage and is often hidden by other, more obvious symptoms. When other symptoms disappear, deep pressure pain becomes apparent naturally. As shown in the table below, the distribution of patients according to the causes and symptoms

Tabel 2. Distribution of patients according to the causes and symptoms of appendicitis

Variable	Laparoscopic Appendectomy	Open	P-value

causes			
Obstruction	20	10	0.092
Infection	25	18	0.82
Dietary Factors	15	12	0.993
symptoms			
Periumbilical pain	30	28	0.77
Nausea, vomiting	15	6	0.066
loss of appetite	5	5	0.00
Fever and rebound tenderness	4	3	0.85
back pain	3	4	0.92
urinary symptoms	3	4	0.63

As illustrated in Table 4, the outcomes of patients are evaluated based on intraoperative and postoperative characteristics.

For laparoscopic appendectomy, the operating time is between 40 and 80 minutes, and the length of postoperative stay is between 3 and 6 days. For open surgery, the operation time is between 50 and 80 minutes, and the length of postoperative stay is between 5 and 8 days.

Regarding newborns, the following data is collected: weight (g) ± 200.93. The data presented in Table 4 provides a comprehensive overview of the outcomes observed in patients undergoing laparoscopic appendectomy (Operating time (min): 40-80 min; length of postoperative stay (days): 3-6 days) and open surgery (50-80 min; 5-8 days). The newborn data set includes weight (g) of 3400 ± 200.93, gestational age (d) of 280.1 ± 9.8, Apgar score < 7 at 5 minutes for patients 10, and pH of umbilical cord < 7.15 for patients 4. The open group data set shows a weight of 3100.3 ± 199, gestational age (d) of 277 ± 7.9, and Apgar score < 7 at 5 minutes for 17 patients.

Tabel 3. Outcomes of patients according to Intraoperative and postoperative characteristics

Variable	Laparoscopic Appendectomy	Open	P-value
Operating time (min)	40-80 min	50-80min	0.77
Length of postoperative stay (days)	3-6 days	5-8 day	0.67
Newborn			
Weight (gr)	3400±200.93	3100.3±199	0.074
Gestational age (d)	280.1±9.8	277±7.9	0.883
Apgar < 7 5 min (n)	10	17	0.01

pH umbilical cord < 7.15 (n)	4	8	0.045

Tabel 4. Identify adverse events that the operation was exposed to after the operation (Surgical complications) (n) No

Variable	Laparoscopic Appendectomy	Open	P-value
Intra-abdominal abscesses	6	6	0.79848
Hematoma/ bleeding	4	4	0.9
Paralytic ileus	2	5	0.03
Wound infection	2	5	0.04
Contractions	1	4	0.001
early miscarriage	0	1	0.04

Tabel 5. Evaluation of quality of life in patients who underwent appendectomy according to QOL SF-36 v.2

V	LA	O	P-value
Physical functioning	70±3.8	67.94±1.97	0.883
Social roles dependent on physical ability	81.2±3.1	77.8±2.2	0.792
Bodily pain	79.4±1.66	66.8±2.6	<0.001
Perceived general health status	67.9±3.9	65.7±1.65	0.09
Vitality	64±2.9	60.9±1.7	0.094
Social functioning	70.1±1.1	68.9±1.86	0.0738
Social roles dependent on emotional state	73.6±1.8	67.9±2.7	<0.001
Perceived general mental health status	72.3±2.8	66.9±3.9	<0.001

Tabel 6. Description of risk factors that directly affect patients according to the logistic regression scale

Variable	CIO	P-value

Periumbilical pain	3.82 (2.2-5.8)	<0.001
CS	2.74 (1.88-4.7)	<0.001
Diabetes	1.73 (1.33-2.2)	0.043
Obese	1.66 (1.2-2.2)	0.09218
Intra-abdominal abscesses	1.573 (1.1-2.09)	0.0899
Hematoma/ bleeding	1.4989 (0.88-1.928)	0.04345

4. Discussion

The clinical features of acute appendicitis during pregnancy can be summarized as follows: In early pregnancy, the signs and symptoms of acute appendicitis are similar to those of normal patients, both of which are typical right lower quadrant migratory pain and rebound pain. In late pregnancy, as the uterus continues to enlarge, the anatomical portion of the appendix also moves upward [13]. Consequently, the area of tenderness and pain in the right lower quadrant of the abdomen in patients with acute appendicitis during pregnancy usually moves outward and upward. The uterus often covers the appendix, causing atypical signs and symptoms of appendicitis, the most prominent of which is pain with digital pressure followed by a change in the patient's lateral recumbency position and movement of the uterus to the left side [14], [15]. Following the alleviation or disappearance of pain, the presence of the uterus in or near the appendix can be deduced. Conversely, if tenderness persists, the source is identified as the appendix. Simultaneously, as the uterus continues to enlarge during pregnancy, the large peritoneum moves forward, which can impede its ability to contain inflammation, potentially leading to diffuse peritonitis.

Furthermore, due to the congestion of blood in the pelvis of pregnant women, the congested appendix tends to spread after inflammation, which can easily lead to perforation and necrosis [16], [17]. Finally, during pregnancy, the patient's steroid hormone levels continue to rise, resulting in a decrease in antibody immunity. At this time, uterine contraction can easily cause septic shock, causing inflammation to spread rapidly in a short period of time. Acute appendicitis manifests more frequently in pregnant women during the second and third trimesters of pregnancy, as the appendix becomes more vulnerable to compression and obstruction due to acute inflammatory attack [18], [19], [20].

The position of the appendix undergoes changes during pregnancy, and its coverage is challenging, thus increasing the risk of appendicitis spreading. [21, 22] During the second and third trimesters, the uterus becomes covered by the appendix, causing local signs to become less obvious. It is, therefore, inadvisable for pregnant women to undergo radiological examinations such as abdominal CT scans in the early stages [23]. Appendicitis during pregnancy can easily be misdiagnosed, ignored, or punctured. Consequently, surgeons must exercise caution in diagnosing and treating appendicitis. Acute appendicitis can occur at any stage of pregnancy; however, the condition is more prevalent in the second trimester [24]. The anatomical location of the appendix undergoes continuous changes with advancing gestational age. In early pregnancy, the appendix lies in the right iliac fossa, gradually ascending toward the pelvis at the brim during the second trimester and finally reaching the right upper quadrant in late pregnancy. Due to the various anatomical and physiological changes occurring in pregnancy, certain features of

typical appendicitis could be misinterpreted; hence, a high index of suspicion is required for an emergency appendectomy. The patient's body temperature remained normal [25].

Mild nausea and vomiting were present during the early stage of the disease, but there were no obvious gastrointestinal symptoms such as vomiting and diarrhea later in the disease. There was no typical sickening pain in the lower right abdomen. Obvious symptoms of peritonitis developed within 2 days after the onset of the disease. Ultrasound puncture showed a peritoneal effusion predominantly in the left lower abdomen. This symptom easily leads us to deny the diagnosis of acute appendicitis. Hence, the diagnosis of AA in pregnancy remains challenging for the surgeon as well as the obstetrician and gynecologist [26]. Therefore, every pregnant woman with abdominal pain should keep acute appendicitis in mind, even when the pain is not localized to the right iliac fossa. Fetal mortality due to peritonitis from appendicitis may be as high as 35%, while fetal death from uncomplicated appendicitis is only 1.5% [24]. Therefore, prompt definitive diagnosis is mandatory by employing all possible laboratory and radiological investigations to avoid any risk to the mother or child as a result of delayed diagnosis and appendicitis treatment [19].

Due to physiological leukocytosis and the ambiguity of C-reactive protein (CRP) levels during pregnancy, it is not sufficient to rely alone on WBC, C-reactive protein, and procalcitonin test. A neutrophil/lymphocyte ratio (NLR) of 4.7 was found to have a sensitivity of 88.9% and specificity of 90.9% for acute appendicitis in a recent systematic review and meta-analysis, along with higher NLR values able to predict complicated appendicitis [20]. In a comparative study of 96 pregnant women (32 healthy pregnant women, 32 pregnant women under observation for acute abdomen, and 32 pregnant women undergoing appendectomy) [26], WBC, CAR, NLR, and LCR proved to be independent variables related to the diagnosis of AA among pregnant women. Critical values were used in this study as WBC >11.965/mm3, NLR > 5.025, CAR > 2.473, and LCR < 0.127 for diagnosing AA in appendectomy pregnant women.

5. Conclusion

The research shows how student bullying in Nigerian educational institutions produces severe psychological anguish while creating social and academic deterioration in affected students. Research demonstrates that victims face health challenges and experience diminished self-esteem and their academic results start to decline because of bullying. The lack of national anti-bullying policy creates an intensified bullying problem because different institutions implement inconsistent reactions to these incidents. The study demonstrates how essential it is for policymakers to establish immediate anti-bullying regulations which should extend from national legislation to institutional measures. To minimize bullying the educational system needs to implement three main preventive steps through awareness programs and teacher training and counseling center services. A supportive environment free from bullying demands active parental involvement to develop the necessary conditions for discouraging bullying behaviors. This research offers important findings about schoolyard bullying incidents in Nigeria although it faces two main restrictions because of available data and the geographic differences in bullying patterns. Research needs to include investigations of extended bullying impact through time and the evaluation of intervention success across different learning environments. The creation of a complete solution for these problems will develop safer educational spaces that include all students in Nigeria.

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