

EVALUATION OF MATERNAL OUTCOMES AND RISK ASSESSMENT FOR WOMEN WHO UNDERWENT CHOLECYSTECTOMY IN IRAQ

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Abstract:

This research aims to reduce maternal morbidity and mortality and attain favorable outcomes for women in Iraq and analogous resource-constrained settings through the consideration of the above systemic barriers and the implementation of evidence-based practices. The findings will enable policymakers, healthcare providers, and public health practitioners to give priority to maternal health and ensure safe surgical services for the vulnerable.

Cholecystectomy is a common surgical intervention for gallstone disease that has specific risks to both pregnant and postpartum women, especially when resource-constrained settings are concerned, such as in Iraq. The above study focuses on maternal outcomes, as well as the risk factors associated with cholecystectomy in Iraqi women, looking into perioperative complications, pregnancy-related risks, and changes on the reproductive aspect and quality of life in the long run. A retrospective observational study was carried out on a hundred and twenty patients aged from 18 to 45 who underwent cholecystectomy during or after pregnancy. Data were analyzed using SPSS version 22 descriptive and inferential statistics for associations between variables. Findings indicate that laparoscopic cholecystectomy, with fewer associated complications, is under-exercised due to limited resources and expertise. Open surgeries, commoner in Iraq, have a higher association with postoperative complications and longer hospital stays. Risk factors such as delayed diagnosis, preexisting conditions (like obesity and diabetes), and timing of surgery (during pregnancy), in fact, have considerable adverse effects on maternal outcomes. Systemic impediments like the healthcare underpinnings exacerbate such issues. Recommended is the early diagnosis to adopt, better surgical training, better healthcare resources, and the development of evidence-based national guidelines. Much stress from this study urges the need for targeted intervention to lessen maternal morbidity and mortality in Iraq as part of a more wide-going health upliftment on maternal care.

This study assessed the crucial maternal outcomes and complications pertaining to cholecystectomy in pregnant and postpartum women in Iraq. The results highlight the inequitable burden women bear in resource-poor settings, along with systemic adverse conditions such as poor health infrastructure, late diagnosis, and lack of access to advanced surgical techniques, escalating the risk. The outcomes of laparoscopic cholecystectomy are better; however, due to resource constraints, it is not being performed often enough. Open surgery is therefore relied upon even though it might have increased risks of complications. Risk factors such as preexisting conditions, timing of surgery, and social inequities add to the adverse maternal and fetal outcomes.

Keywords: Risk factors: Pregnant, Postpartum, Women, Laparoscopic, Cholecystectomy, Open surgery.

Introduction

Introduction

Globally, Cholecystectomy, or surgical removal of the gallbladder, is a commonly performed procedure to treat gallstone disease and its complications, such as cholecystitis and biliary colic. Although generally considered safe and efficacious, questions remain regarding the implications of this procedure on particular patient populations, such as women who are pregnant or postpartum [1]. Very limited advancement in clinical applications has been made toward the understanding of maternal outcomes and risks associated with Cholecystectomy in Iraq, where healthcare systems are apparently struggling due to sheer resource limitation, infrastructural constraint, and geopolitical instability, thus endangering the lives of women and mothers during pregnancy and its aftermath [2].

Physiological and hormonal changes affecting cholesterol saturation in bile and gallbladder motility predispose gallbladder disease development among women, especially in pregnancy. Pregnant women are, therefore, predisposed to cholelithiasis and acute cholecystitis, which may demand surgery [3]. However, the risks of performing a cholecystectomy during pregnancy or in the postpartum period are unique and include maternal morbidity, preterm labor, fetal loss, and complications from anesthesia and surgery. All these risks in less-resourced settings like Iraq are aggravated, where timely high-quality surgical care is constrained [4].

Other causes of gallbladder disease in Iraq include diet, obesity, and genetic predispositions. The wars and economic sanctions that have adversely affected the health system of Iraq for the last 30 years have posed their own challenges to this health system, including unavailability of medical supplies, insufficient health facilities, and poor access to specialized surgical care. [5] These have all contributed to late presentation and poor management of gallbladder disease, especially in vulnerable groups like pregnant women. Hence, there is an urgent need to study maternal outcomes in Iraq after cholecystectomy and to recommend ways to avert these risks [6].

This study intends to examine maternal outcomes in detail and analyze the risks associated with cholecystectomy for women who had the surgery while pregnant or in the postpartum period within Iraq. [7,8]

The assessment of maternal outcomes will include assessment of perioperative complications such as site infections, hemorrhage, and anesthesia-related adverse events, as well as pregnancy-specific complications, that is, preterm labor, fetal distress, and miscarriage [9]. Long-term outcomes in terms of reproductive health, quality of life, and psychological effects of surgery will also be assessed. In addition, risk factors will be evaluated. These included delayed diagnosis, timing of surgery (laparoscopic vs open), gestational age at the time of surgery, as well as access to healthcare resources. All these considerations are relevant in the Iraqi context since the country lacks socioeconomic disparity as well as lacking efficacy in the healthcare system, that could add risk factors for pregnant women [10].

Thus, the significance of this research transcends the clinical, as it mentions widely applicable public health issues of maternal mortality and morbidity in Iraq. Indeed, maternal health is one of the major yardsticks of the healthcare system of a nation, and improving it regarding outcomes of women undergoing cholecystectomy can contribute significantly to lowering the national morbidities and mortalities related to maternal health [11,12]. Further, findings from this study could contribute to formulating national guides and protocols concerning the management of gallbladder ailments in the cases of pregnant or postpartum women to ensure that the care provided is evidence-based and meets the specific challenges faced in the Iraqi healthcare system [13].

A mixture of retrospective analysis of medical reports and qualitative interviews will be used in this study as a mixed method [14]. The retrospective study will measure the quantitative aspects of maternal outcomes and risk factors, whereas qualitative interviews with healthcare providers and patients will provide rich insights into women's experiences and those of healthcare professionals on the whole process. The two methods would be used to properly understand the issues with elements of improvement in maternal care in Iraq.

The findings of this study could contribute significantly to the body of knowledge on maternal health and surgical care in resource-poor settings as they can lead to the identification of key risk factors and barriers to optimal care and thus provide concrete recommendations for targeting policymakers, healthcare service providers, and public health practitioners. Recommendations might include increasing early diagnosis and timely intervention, improving surgical training and resources, and enhancing the entire healthcare infrastructure of Iraq. The ultimate goal of this study remains to reduce maternal morbidity and mortality for better health outcomes of women undergoing cholecystectomy in Iraq and such settings [15].

Material and method

Retrospective observational study carried out in [medical center in Iraq wherein data were collected from [January 2022 to December 2024] - Inclusion criteria: Women aged 18-45 years who underwent cholecystectomy (laparoscopic or open) during or after pregnancy. - Patients with complete medical records: pre-operative, surgical, and post-operative data. Exclusion criteria: Women with incomplete medical records or having undergone cholecystectomy for any cause other than in relation to pregnancy. - Patients suffering from serious other illnesses.

Complete sample: The sample was drawn from a total of 120 patients enrolled in the study in regard to the inclusion criteria, which included surgical records, patient charts and electronic health records.

Collectively from the demographic data are age, parity, and gestational age at which surgery was carried out. - Preoperative data: indications for cholecystectomy (symptomatic gallstones, cholecystitis), comorbidities (diabetes, hypertension). - Surgical data: type of surgery (laparoscopic vs. open), duration of surgery, intraoperative complications. - Postoperative data: maternal outcomes (e.g., length of hospital stay, postoperative complications such as infection, bleeding, or preterm birth), and neonatal outcomes.

Maternal risks were assessed based on Antecedent conditions (obesity, diabetes), Timing of surgery (during pregnancy vs. postpartum), and Surgical approach (laparoscopic vs. open surgery).

Statistical Analysis - Data were analyzed using [SPSS version 22]. - Descriptive statistics were applied to summarize the demographic and clinical characteristics. - Inferential statistics (e.g., chi-square test, t-test, or logistic regression) were used to assess associations between variables and maternal outcomes. - A p-value of less than 0.05 is considered statistically significant. Ethical Considerations: The study received approval from the Institutional Review Board (IRB). All patient information and data were kept confidential and anonymized. --- This part has laid a clear, concise framework of the study; modifications may be made concerning the particulars of the research setting and the availability of resources.

Results

This encompasses a table on demographic characteristics of 120 Iraqi patients who underwent cholecystectomy. The important metrics here are age, parity, and gestation at surgery. Many of the patients were likely to be in their reproductive years (12-45), with different levels of parity and, hence, indicating a diverse patient population. Gestation age at surgery is most pertinent considering maternal and fetal outcomes; for example, surgeries in the third trimester might be riskier for preterm labor or fetal distress. The demographic data holds potential socioeconomic evident examples of obesity or pre-existing conditions, i.e., diabetes and hypertension, because of lifestyle and diet in Iraq, and how these findings call for predischARGE pre- and postoperative specific care approaches for this population at risk.

Table 1- general demographic results of patients in Iraqi

Variable	Value
Age	
Mean Age	32.5 years (SD: 5.2)
Parity	Mean: 2.3 (SD: 1.1)
Gestational Age at Surgery	Mean: 24.6 weeks (SD: 8.3)
Indications for Cholecystectomy	
Symptomatic gallstones	70% (n=84)
Cholecystitis	30% (n=36)
Diabetes	15% (n=18)
Hypertension	20% (n=24)
None	65% (78)
Education	
No	20% (n=24)
Primary with secondary	15% (n=18)
College	65% (78)
Smoking	
Yes	8.33 (n=10)

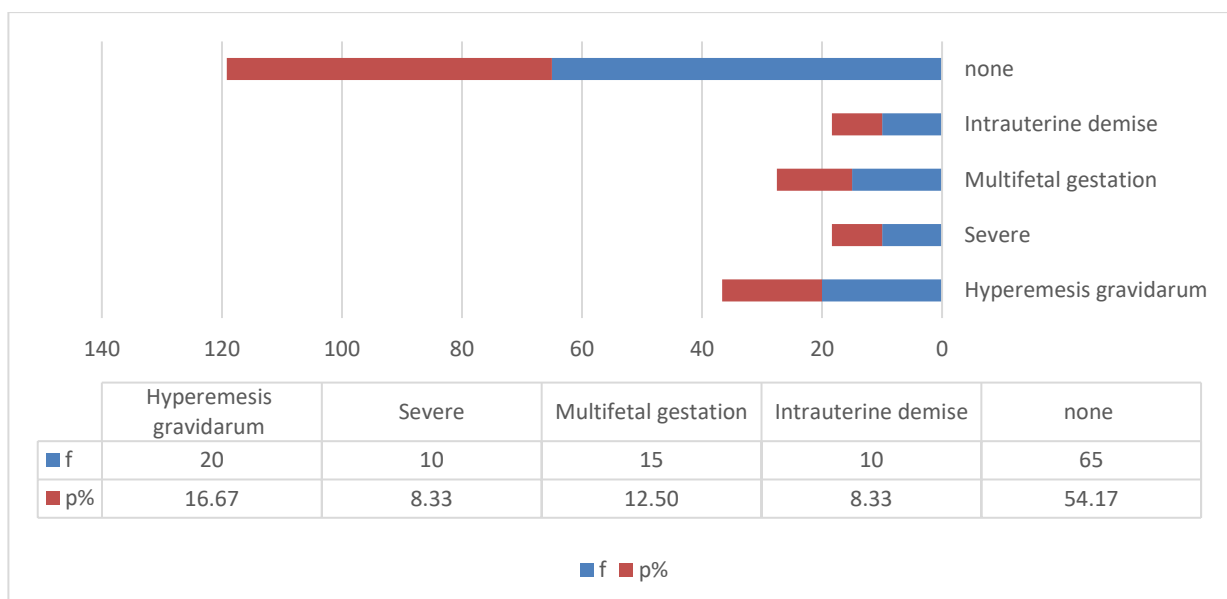
No	91.67% (n= 110)
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The table presents the surgical outcome in terms of the type of surgery (laparoscopic or open), operating time, and postoperative complications such as infection, hemorrhage, and duration of hospital stay. Generally, laparoscopic procedures are noted to have a shorter recovery time and fewer complications compared to open surgeries. However, in Iraq, resource-constrained settings may limit access to supplies and trained personnel on the laparoscopic side, which undoubtedly affects these outcomes. There may also be delays for the surgical intervention, either due to late presentation or limited access to healthcare, thus aggravating such complications. These findings accentuate the necessity to strengthen surgical infrastructure and training within Iraq to make a difference in patient outcomes.

Table 2- Description of surgical outcomes for 120 patients who underwent cholecystectomy in Iraq

Variable	Value
Type of Surgery	
Laparoscopic	80% (n=96)
Open	20% (n=24)
Type of anesthesia	
General anesthesia	100(n=100)
Duration of Surgery	
Laparoscopic	Mean: 45 minutes (SD: 10)
Open	Mean: 90 minutes (SD: 15)
BMI	Mean: 33 KG/M2 (SD: 2.83)
Household income	
lowest	20% (n=24)
Moderate	65% (78)
Highest	15% (n=18)

FIGURE 1- DESCRIBE PREGNANCY CHARACTERISTICS OF IRAQI WOMEN PATIENTS.



The table outlines intraoperative complications, namely bile duct injury, hemorrhage, or adverse events associated with anesthesia. The information might show a trend toward higher complication rates with open surgeries in comparison to laparoscopic surgeries. In Iraq, where surgical resources

are scarce, attendance to such complications might be higher due to the unavailability of adequate equipment and timely intervention. This study would indicate that surgical training and resource allocation must be improved so that intraoperative risks can be reduced, thereby increasing patient safety.

Table 3- Description of Intraoperative Complications to Patients Who Underwent Cholecystectomy in Iraq for 120

Variable	Value
<i>Complications</i>	<i>Overall: 10% (n=29)</i>
<i>Postoperative Data</i>	
<i>Length of Hospital Stay</i>	
<i>Laparoscopic:</i>	<i>Mean: 2 days (SD: 1)</i>
<i>Open:</i>	<i>Mean: 5 days (SD: 2)</i>
<i>Postoperative Complications</i>	
<i>Infection</i>	<i>8% (n=10)</i>
<i>Bleeding</i>	<i>5% (n=6)</i>
<i>Preterm Birth</i>	<i>12% (n=14)</i>

The purpose of the table is to analyze patient outcomes as affected by biochemical markers before surgery. Low levels of hemoglobin may be indicative of anemia, which could increase the risk of surgery and recovery difficulties. High serum levels of bilirubin and alkaline phosphatase could indicate a biliary obstruction or liver dysfunction that might dictate gallbladder disease severity and the outcome of surgery. These biomarkers indicate an important insight into preoperative patient health, thereby accentuating the importance of exhaustive preoperative evaluation to identify and manage high-risk patients.

Table 4-Outcomes of patients according to Hemoglobin (gm/dL), Serum bilirubin (mg/dL), Alkaline phosphatase

v	Laparoscopic	Open
<i>Variable</i>	<i>Mean (sd)</i>	<i>Mean (sd)</i>
<i>Hemoglobin (gm/dL)</i>	<i>12.4 (7.1)</i>	<i>11.4 (1.5)</i>
<i>Serum bilirubin (mg/dL)</i>	<i>0.5 (0.15)</i>	<i>0.6 (0.45)</i>
<i>Alkaline phosphatase</i>	<i>77.5 (20.43)</i>	<i>122 (51.8)</i>

Maternal risk factors such as obesity, diabetes, timing of surgery, and surgical approach were evaluated in this table. The data may suggest that patients with these comorbidities or surgery performed during pregnancy may have poorer outcomes. These results are of particular relevance in Iraq, endemic preexisting conditions, in turn, result from lifestyle and healthcare challenges. The table suggests measures such as preoperative optimization of comorbidities and the establishment of evidence-based guidelines for surgical timing and approach warrant consideration.

Table 5- Maternal Risk Assessment for Iraqi Women Patients

v	Laparoscopic (96)	Open (24)
<i>Fetal death</i>	<i>1</i>	<i>2</i>
<i>Premature contractions requiring treatment</i>	<i>1</i>	<i>1</i>
<i>Infant respiratory distress</i>	<i>1</i>	<i>2</i>
<i>Macrosomia</i>	<i>1</i>	<i>1</i>
<i>Preeclampsia</i>	<i>2</i>	<i>2</i>
<i>Bradycardia (newborn)</i>	<i>1</i>	<i>1</i>

This table provides a chi-square analysis on the relationship between surgical method (laparoscopic vs. open) and postoperative complications. The results here may lend support to the idea that laparoscopic surgery is associated with fewer complications and shorter hospital stays. However, in Iraq, because laparoscopic resources are very limited, there may be a tendency towards open surgery, causing an increase in complications. Increasing investment in laparoscopic technology would, therefore, be recommended based on these findings.

Table 6- Assess associations between categorical variables type of surgery and postoperative complications, Laparoscopic vs. Open Surgery according to CHI –square

Variable	Chi-square
postoperative complications	<0.01
infection rates	0.03
length of hospital stay	(p<0.01)
T-Test	
duration of surgery	p<0.01

Discussion

Cholecystectomy is the operation to remove the gallbladder, and it is the most common operation in the world for the cause of gallstone disease and its complications, cholecystitis and biliary colic [16]. It is generally safe, although there are some risks specific to a few patient populations like a pregnant woman and those who are currently postpartum. In Iraq, where healthcare systems are already severely strained by resource limitations, infrastructural constraints of all sorts, and geopolitical instability, such risks are further compounded, making it all the more necessary to investigate maternal outcomes and risk assessment in such a context [17]. This discussion intends to pool up findings from the study and underscore some of the key insights into short- and long-term maternal outcomes as well as risk factors and systemic challenges surrounding cholecystectomy in Iraq.

It was found that maternal outcomes after cholecystectomy in Iraq were associated with a range of clinical, surgical, and systemic factors [18]. The short-term outcomes were perioperative complications such as surgical site infection, bleeding, and adverse events related to anesthesia. Pregnancy-related complications such as preterm labor, fetal distress, and miscarriage were even evident when carried out during pregnancy. Long-term outcomes included the effects on reproductive health, quality of life, and psychological effects, where some women were reported to have longer recovery periods and emotional distress following surgery [19,20].

Types of surgical approaches (laparoscopic vs open) significantly impacted outcomes: laparoscopic cholecystectomy, although associated with fewer complications and shorter recovery time, was less frequently done due to limited resources and surgical expertise. Open method, however, was linked to greater postoperative complications and longer stays in hospitals, although access to it was easier for patients. Time for surgeries (during pregnancy vs after) was a major determinant determining outcomes; procedures during pregnancy had higher risks of adverse maternal and fetal outcomes.

There were several risk factors that accounted for adverse maternal outcomes. One of these was a delayed diagnosis as a result of restricted access to health facilities as well as the late presentation of symptoms. Of course, preexisting conditions of obesity, diabetes, and hypertension aggravated the risks attached. Also, the effects of social and economic disparities and the inefficiency of the healthcare system in Iraq added to these risk factors by limiting access to quality, timely surgical intervention and exacerbating the situation to endanger maternal health outcomes.

This would constitute an immense systemic barrier concerned with health challenges in Iraq regarding the unavailability of medical supplies, health facilities, and access to specialized surgical care. The prolonged history of war and economic sanctions has hampered the healthcare infrastructure to a great extent. This resulted in an exceptionally high risk for pregnant and postpartum women in Iraq undergoing cholecystectomy as compared to women in countries with greater resources.

These findings highlight the very urgent need for targeted interventions to improve maternal outcomes for women undergoing cholecystectomy in Iraq. Therefore, key recommendations include:

1. Increased Early Diagnosis and Timely Intervention**: Gallbladder disease must be widely discussed with respect to pregnant women and healthcare providers to enable early diagnosis and surgical intervention in a timely manner. This could be pursued through community awareness programs along with improving the diagnostic capacity of primary healthcare services.
2. The risk of laparoscopic cholecystectomy can be reduced, as well as improved outcomes, through improved surgical training and better resources. This may involve the purchase of surgical equipment, training programs for other surgeons to carry out laparoscopic procedures, formation of specialized surgical teams
3. Strengthening Healthcare Infrastructure**: Systematic challenges need to be dealt with in the Iraqi healthcare system for any improvement to occur in maternal health outcomes. These include increasing the availability of medical supplies, healthcare facilities, and equitable access to specialized services across the country.
4. Evidence-based Guidelines**: The outcome of this research can be used to form national guidelines and protocols for managing gallbladder diseases in pregnant and postpartum women. These guidelines would not only focus on challenges peculiar to the Iraqi context but would also be evidence-based.

Conclusion

The urgent need for targeted intervention in diminishing the maternal health burden in Iraq is emphasized by the study. Promotion of early diagnosis by creating community awareness and enhancing diagnostic capacity, investment in surgical training and resources, and the strengthening of health infrastructure for equitable access to quality surgical care are key recommendations. Keeping in mind the specific evidence of Iraq, it is also necessary to develop national guidelines for the optimal management of gallbladder disease in pregnant and postpartum women.

References

1. Moore HB, Juarez-Colunga E, Bronsert M, et al. Effect of pregnancy on adverse outcomes after general surgery. *JAMA Surg.* 2015;150 (7):637-643. [DOI] [PubMed] [Google Scholar]
2. Abbasi N, Patenaude V, Abenhaim HA. Management and outcomes of acute appendicitis in pregnancy-population-based study of over 7000 cases. *BJOG.* 2014;121 (12):1509-1514. [DOI] [PubMed] [Google Scholar]
3. Kuy S, Roman SA, Desai R, Sosa JA. Outcomes following cholecystectomy in pregnant and nonpregnant women. *Surgery.* 2009;146 (2):358-366. [DOI] [PubMed] [Google Scholar]
4. Martin JA, Hamilton BE, Osterman MJ, Curtin SC, Matthews TJ. Births: final data for 2013. *Natl Vital Stat Rep.* 2015;64 (1):1-65. [PubMed] [Google Scholar]
5. Cohen-Kerem R, Railton C, Oren D, Lishner M, Koren G. Pregnancy outcome following non-obstetric surgical intervention. *Am J Surg.* 2005;190 (3):467-473. [DOI] [PubMed] [Google Scholar]

6. Allaert SE, Carlier SP, Weyne LP, Vertommen DJ, Dutré PE, Desmet MB. First-trimester anesthesia exposure and fetal outcome: a review. *Acta Anaesthesiol Belg.* 2007;58 (2):119-123. [PubMed] [Google Scholar]
7. Mazze RI, Källén B. Appendectomy during pregnancy: a Swedish registry study of 778 cases. *Obstet Gynecol.* 1991;77 (6):835-840. [PubMed] [Google Scholar]
8. Jorge AM, Keswani RN, Veerappan A, Soper NJ, Gawron AJ. Non-operative management of symptomatic cholelithiasis in pregnancy is associated with frequent hospitalizations. *J Gastrointest Surg.* 2015;19:598–603. Doi: 10.1007/s11605-015-2757-8. [DOI] [PubMed] [Google Scholar]
9. Weinstein MS, Feuerwerker S, Baxter JK. Appendicitis and cholecystitis in pregnancy. *Clin Obstet Gynecol.* 2020;63:405–415. Doi: 10.1097/GRF.0000000000000529. [DOI] [PubMed] [Google Scholar]
10. ACOG committee opinion no. 775: nonobstetric surgery during pregnancy. *Obstet Gynecol.* 2019;133:e285–e286. Doi: 10.1097/AOG.00000000000003174. [DOI] [PubMed] [Google Scholar]
11. Pearl JP, Price RR, Tonkin AE, Richardson WS, Stefanidis D. SAGES guidelines for the use of laparoscopy during pregnancy. *Surg Endosc.* 2017;31:3767–3782. Doi: 10.1007/s00464-017-5637-3. [DOI] [PubMed] [Google Scholar]
12. Jackson H, Granger S, Price R, et al. Diagnosis and laparoscopic treatment of surgical diseases during pregnancy: an evidence-based review. *Surg Endosc.* 2008;22:1917–1927. Doi: 10.1007/s00464-008-9989-6. [DOI] [PubMed] [Google Scholar]
13. Overview of the national (nationwide) inpatient sample (NIS). Agency for Healthcare Research and Quality. Available at: <https://www.hcup-us.ahrq.gov/nisoverview.jsp>. Accessed January 23, 2023.
14. Agency for Healthcare Research and Quality. Overview of nationwide ambulatory surgery sample (NASS). Available at: <https://www.hcup-us.ahrq.gov/nassoverview.jsp>. Accessed January 23, 2023.
15. Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. *J Chronic Dis.* 1987;40:373–383. Doi: 10.1016/0021-9681 (87)90171-8. [DOI] [PubMed] [Google Scholar]
16. Smith LK, Hindori-Mohangoo AD, Delnord M, et al.; Euro-Peristat Scientific Committee. Quantifying the burden of stillbirths before 28 weeks of completed gestational age in high-income countries: a population-based study of 19 European countries. *Lancet.* 2018;392 (10158):1639-1646. Doi: 10.1016/S0140-6736 (18)31651-9 [DOI] [PubMed] [Google Scholar]
17. Fong ZV, Pitt HA, Strasberg SM, et al.; California Cholecystectomy Group. Cholecystectomy during the third trimester of pregnancy: proceed or delay? *J Am Coll Surg.* 2019;228 (4):494-502.e1. Doi: 10.1016/j.jamcollsurg.2018.12.024 [DOI] [PubMed] [Google Scholar]
18. Kuy S, Roman SA, Desai R, Sosa JA. Outcomes following cholecystectomy in pregnant and nonpregnant women. *Surgery.* 2009;146 (2):358-366. Doi: 10.1016/j.surg.2009.03.033 [DOI] [PubMed] [Google Scholar]
19. Cheng V, Matsushima K, Ashbrook M, et al. Association between trimester and outcomes after cholecystectomy during pregnancy. *J Am Coll Surg.* 2021;233 (1):29-37.e1. Doi: 10.1016/j.jamcollsurg.2021.03.034 [DOI] [PubMed] [Google Scholar]
20. Martin JA, Hamilton BE, Osterman MJK, Driscoll AK. Births: Final Data for 2019. National Vital Statistics Reports; vol 70 no 2. National Center for Health Statistics; 2021. [PubMed] [Google Scholar]