ORIGINAL ARTICLE

Association between Inflammatory Bowel Disease, Irritable Bowel Syndrome, and Miscarriage in Saudi Arabia

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Abstract

Introduction: Inflammatory bowel disease (IBD) and irritable bowel syndrome (IBS) are gastrointestinal (GI) disorders that may influence pregnancy outcomes. Miscarriage, defined as the loss of a pregnancy before viability, has not been clearly associated with either condition. **Objective:** This study aims to investigate the association between IBD and IBS and the risk of miscarriage among Saudi women. **Materials and Methods:** A cross-sectional study was conducted between July and December 2024 across multiple regions in Saudi Arabia. The sample included women aged 18–45 years with prior pregnancies, diagnosed with either IBS or IBD. Fifty women with IBD diagnosed during pregnancy or within 1-year postpartum were included from a general hospital. Data were collected through questionnaire. **Results:** Among 268 participants, 82% had no GI disease, 16% had IBS, and 1.5% had IBD. Approximately half of all women reported a miscarriage. Neither IBS nor IBD was significantly associated with increased miscarriage risk. Sociodemographic factors did not predict GI disease presence. **Conclusion:** In this Saudi cohort, IBS and IBD were not significantly associated with miscarriage. These findings provide reassurance that GI conditions may not independently increase the risk of early pregnancy loss.

Key words: Association, miscarriage, Saudi Arabia

INTRODUCTION

Worldwide, there are thought to be 23 million miscarriages annually, or 44 pregnancy losses every minute. The term "miscarriage" refers to the loss of a pregnancy before viability.[1] There are several causes of miscarriage, but the link between inflammatory bowel diseases (IBDs) and irritable bowel syndrome (IBS) with miscarriage is not well-established. IBDs are characterized by chronic inflammation of the intestinal mucosa and unknown etiology.[2] On the other hand, the complicated, functional gastrointestinal (GI) illness known as IBS is characterized by changed bowel habits and persistent stomach pain or discomfort.[3]

IBDs, including Crohn's disease (CD) and ulcerative colitis (UC), are prevalent in the young adult population,

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specifically individuals between the ages of 15 and 35. These conditions often give rise to frequent reproductive health issues. Conception during an active IBD is associated with increased chances of negative pregnancy outcomes, such as premature birth, miscarriage, and low birth weight.[4]

In Western countries, around 0.7% of the population is affected with IBD, which encompasses CD and UC. The majority of instances occur during the reproductive years. There is a bidirectional relationship between IBD and pregnancy, which affects both fertility and the results of pregnancy. In addition, pregnancy can also influence the activity of the disease. Studies suggest that the fertility rates of women with IBD are generally similar to those of the whole population, except for those who currently have the condition or have undergone post-ileal-pouch-anal anastomosis (IPAA) surgery. Fertility rates decline in those who have an active disease and after undergoing IPAA surgery, resulting in an increase in infertility rates from 15–20% before IPAA to 48–63% after IPAA. Nevertheless, women diagnosed with IBD (30% for CD and 25% for UC) had a higher prevalence of choosing not to have children voluntarily, in contrast to the general population (7%).[5]

Studies have been previously published on the impact of irritable bowel diseases and IBS on miscarriages. In 2022, a study stated that 90 pregnancies (15.7%) out of 575 resulted in miscarriage before the 12th week in pregnant patients suffering from CD and UC.[6] Another study that took place in 2023 linked many severe adverse side effects of pregnancy with certain medications used to treat patients with UC, stating that it is advisable to take caution while using medications such as cyclosporin during the course of the pregnancy, as it has been linked to low gestational weight, preeclampsia, miscarriage, hypertension, and premature birth.[7]

There is a significant gap in research on how IBS and IBD influence the risk of miscarriage within the Saudi population, as existing studies generally focus on either digestive disorders or reproductive health without addressing their combined impact, particularly for Saudi women. This study aims to fill this gap by providing localized research on the effect of chronic digestive disorders on miscarriage among Saudi females, which is essential for developing tailored medical guidance and support.

Objectives

This study aims to assess the prevalence of IBD and IBS among Saudi married women aged 18–65 years who have experienced at least one pregnancy, whether carried to term or resulting in miscarriage. Specifically, the study investigates whether either condition is associated with an increased risk of miscarriage, contributing to evidence-based management of these conditions in pregnancy.

MATERIALS AND METHODS

Study design, setting, and participants

This cross-sectional study was conducted in various regions of Saudi Arabia between July and December 2024. The study targeted Saudi married women aged 18–65 years who had experienced at least one pregnancy, whether carried to term or resulting in miscarriage. Participants completed a structured questionnaire. The sample included women from both urban and rural areas to ensure geographic and demographic diversity. Information regarding GI health status was obtained through self-reported medical histories, specifically noting the presence of IBD or IBS. The questionnaire also collected data on pharmacological history, including current and past medications, and other relevant clinical details to provide a comprehensive understanding of each participant's health and treatment background.

Inclusion and exclusion criteria

Participants were included if they met the following criteria: Saudi nationality, married females aged 18–65 years, and a history of at least one pregnancy (either completed or miscarried). Diagnosis of IBD (including CD or UC) or IBS was based on self-reported medical history. Exclusion criteria included the presence of autoimmune diseases such as lupus or rheumatoid arthritis, other chronic digestive disorders including celiac disease, GI malignancies, or any severe medical condition known to contribute to miscarriage. Non-Saudi women and Saudi females younger than 18 or older than 65 were also excluded from the study.

Method for data collection and instrument (data collection technique and tools)

A structured questionnaire was the study tool used for data collection. The questionnaire, developed and modified by the research team based on previous literature and similar epidemiological studies, consisted of several key sections: general information about the participant and the medical history of the participant, questions regarding irritable bowel diseases and IBS, and finally, questions focusing on different fetal events that might have occurred during the entire course of the pregnancy. The questionnaire was distributed to women of childbearing age all over Saudi Arabia through a Google Form link.

Pilot test

Twenty people were given the questionnaire and asked to complete it. This was done to assess the study's viability and the ease of use of the questionnaire. The pilot study's results were not included in the study's final analysis.

Analyze and entry method

Collected data were entered on a computer using the Microsoft Excel program (2016) for Windows. Data were then transferred to the Statistical Package for the Social Sciences Software program, version 25 for statistical analysis. Descriptive statistics were used to summarize the numerical variables for baseline characteristics. For categorical variables, frequencies and percentages were calculated. The Chi-square test was used to identify associations between IBD and IBS and the risk of miscarriage among Saudi women.

Study results

Among the 297 Saudi women included, the largest proportion were aged 41–45 years (34.0%), followed by 36–40 years (25.6%) and 31–35 years (20.2%). Most participants resided in urban areas (90.6%) and were from the Northern (37.4%) and Western (35.4%) regions. Over half held a bachelor's degree (58.2%) and 16.5% had a high-school education; diplomas and postgraduate degrees were less common. Employment status was split between unemployed (44.1%) and employed (43.1%), with small proportions of students (5.1%), self-employed (4.0%), or retired (3.7%). Monthly household income varied: 26.6% reported 1,000–5,000 SAR, 26.3% reported 5,001–10,000 SAR, and 25.3% earned <1,000 SAR, while only 6.7% exceeded 20,000 SAR [Table 1].

Figure 1 shows that 83% of respondents reported no chronic GI diagnosis, 16 % (n = 46) met criteria for IBS, and only 1.7% (n = 5) carried a physician diagnosis of IBD (IBD; 4 ulcerative-colitis, 1 Crohn's).

Figure 2 shows that miscarriage was reported by 50.7% of the participants; the proportion was virtually identical in women with IBS (52.2%) and in those without any GI disease (48.8%), while 3 of 5 IBD patients (60%) had miscarried.

Among the 46 respondents who reported IBS, disease activity most commonly occurred in the first trimester (41.3%), with smaller proportions experiencing symptoms throughout pregnancy (28.3%), during the third trimester (21.7%), or the second trimester (8.7%). Nearly three-quarters received no pharmacologic therapy (73.9%). Systemic mesalamine was reported by 6.5%, whereas 2.2% each used a systemic plus topical mesalamine combination or topical steroids alone; 15.2% mentioned other single agents [Table 2].

Among the four UC cases, disease activity most frequently presented in the second trimester (50.0%) and less often in the third trimester (25.0%). Half of the patients reported no therapy (50.0%), one received systemic steroids and one received a biologic-based triple regimen. Only one participant described proctitis/left-sided colitis and none had extensive colitis. Inflammatory behavior predominated (75.0%), with a single case of structuring disease [Table 3].

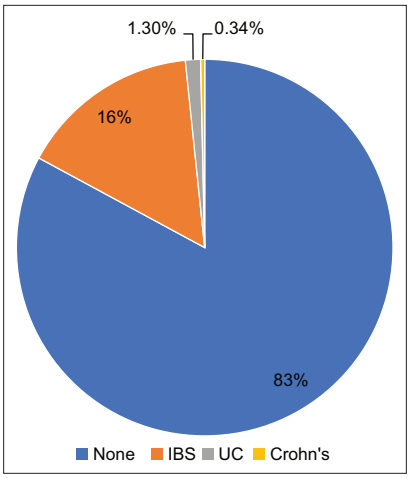

Figure 1: Distribution of gastrointestinal diagnosis among participants

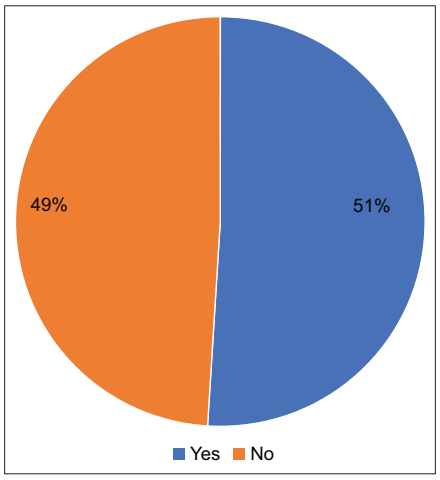

Figure 2: Did you experience miscarriage before?

Table 4 shows that the single CD case exhibited disease activity throughout pregnancy with no medication exposure. The disease was ileal in location and inflammatory in behavior.

Cross-tabulation of sociodemographic factors by GI diagnosis showed no statistically significant associations. Age, region, residency, education, job status, and monthly income did not differ between respondents with no diagnosis, those with IBS or those with IBD (all $P > 0.05$) [Table 5].

A logistic regression model examined the association between IBS and miscarriage among respondents without IBD. IBS was not a significant predictor of miscarriage ($\beta = 0.14 \pm 0.32$, odds ratio [OR] = 1.15, 95% confidence interval [CI] 0.61–2.15, $P = 0.673$). The model intercept was also not significant ($P = 0.702$) [Table 6].

DISCUSSION

This cross-sectional study set out to estimate the prevalence of IBS and IBD among Saudi women of reproductive age

Table 1: Sociodemographic characteristics of the studied participants (*n*=297)

Parameter	No.	Percentage
Age group (in years)		
18–25 years	23	7.7
26–30 years	37	12.5
31–35 years	60	20.2
36–40 years	76	25.6
41–45 years	101	34.0
Region		
Western	105	35.4
Central	42	14.1
Eastern	32	10.8
Northern	111	37.4
Southern	7	2.4
Residency		
Urban	269	90.6
Rural	28	9.4
Education		
Bachelor's	173	58.2
High school	49	16.5
Diploma	34	11.4
Post-graduate	28	9.4
Others	13	4.4
Working status		
Employed	128	43.1
Unemployed	131	44.1
Student	15	5.1
Self-employed	12	4.0
Retired/other	11	3.7
Monthly income (SAR)		
1,000–5,000	79	26.6
5,001–10,000	78	26.3
<1,000	75	25.3
10,001–20,000	45	15.2
>20,000	20	6.7
Which GI diagnoses have you been diagnosed with?		
None	246	83.0
Irritable bowel syndrome	46	15.5
Ulcerative colitis	4	1.3
Crohn's disease	1	0.34

GI: Gastrointestinal

Table 2: IBS-specific pregnancy characteristics among the respondents who reported having IBS (*n*=46)

Parameter	No.	Percentage
Active phase during pregnancy		
1st trimester	19	41.3
Throughout pregnancy	13	28.3
3rd trimester	10	21.7
2nd trimester	4	8.7
Medication exposure		
No therapy	34	73.9
Systemic mesalamine	3	6.5
Systemic + topical mesalamine	1	2.2
Topical steroids	1	2.2
Other single mentions	7	15.2

IBS: Irritable bowel syndrome

Table 3: Ulcerative-colitis specific characteristics among the respondents that reported having UC (*n*=4)

Parameter	No.	Percentage
Active phase		
2nd trimester	2	50.0
3rd trimester	1	25.0
1st trimester	1	25.0
Medication		
Systemic steroids	1	25.0
Biologic+triple therapy	1	25.0
Antispasmodics only or none	2	50.0
Location		
Proctitis/left-sided	1	25.0
Upper GI	1	25.0
Ileal	2	50.0
Disease behavior		
Inflammatory	3	75.0
Stricturing	1	25.0

UC: Ulcerative colitis, GI: Gastrointestinal

Table 4: Crohn's-disease pregnancy characteristics among the respondents who reported having Crohn's disease (*n*=1)

Variable	Response
Active phase	Throughout pregnancy
Medication	None
Location	Ileal
Behavior	Inflammatory

and to examine whether either condition is associated with miscarriage. Using a structured questionnaire and pre-specified eligibility criteria, we analyzed 268 prior-pregnancy participants and observed a modest prevalence of IBS (about 16%), very low IBD prevalence (1.5%; three ulcerative-colitis and one Crohn's case), and no statistically significant association between either diagnosis and miscarriage in crude

Table 5: Relation between demographic determinants of GI diagnosis (Chi-square test)

Parameter	None *n* (%)	IBS *n* (%)	IBD *n* (%)	*P*-value
Age group				
18–25	19 (82.6)	3 (13.0)	1 (4.3)	0.125
26–30	28 (75.7)	7 (18.9)	2 (5.4)	
31–35	45 (75.0)	14 (23.3)	1 (1.7)	
36–40	69 (90.8)	6 (7.9)	1 (1.3)	
41–45	85 (84.2)	16 (15.8)	0 (0.0)	
Region				
Central	32 (76.2)	9 (21.4)	1 (2.4)	0.348
Eastern	26 (81.2)	5 (15.6)	1 (3.1)	
Northern	98 (88.3)	11 (9.9)	2 (1.8)	
Southern	4 (57.1)	3 (42.9)	0 (0.0)	
Western	86 (81.9)	18 (17.1)	1 (1.0)	
Residency				
Rural	24 (85.7)	4 (14.3)	0 (0.0)	0.748
Urban	222 (82.5)	42 (15.6)	5 (1.9)	
Education				
Bachelor	141 (81.5)	30 (17.3)	2 (1.2)	0.617
Diploma	30 (88.2)	3 (8.8)	1 (2.9)	
High school	43 (87.8)	5 (10.2)	1 (2.0)	
Others	9 (69.2)	4 (30.8)	0 (0.0)	
Postgraduate	23 (82.1)	4 (14.3)	1 (3.6)	
Job status				
Employed	106 (82.8)	20 (15.6)	2 (1.6)	0.927
Retired/other	10 (90.9)	1 (9.1)	0 (0.0)	
Self-employed	10 (83.3)	2 (16.7)	0 (0.0)	
Student	12 (80.0)	2 (13.3)	1 (6.7)	
Unemployed	108 (82.4)	21 (16.0)	2 (1.5)	
Monthly income				
1,000–5,000	62 (78.5)	16 (20.3)	1 (1.3)	0.499
10,001–20,000	36 (80.0)	7 (15.6)	2 (4.4)	
5,001–10,000	65 (83.3)	11 (14.1)	2 (2.6)	
<1,000	67 (89.3)	8 (10.7)	0 (0.0)	
>20,000	16 (80.0)	4 (20.0)	0 (0.0)	

GI: Gastrointestinal, IBS: Irritable bowel syndrome, IBD: Inflammatory bowel disease

Table 6: Association between IBS and miscarriage (logistic model)

Variable	β (SE)	OR (95% CI)	*P*-value
Intercept	−0.05 (0.13)	0.95 (0.74–1.22)	0.702
IBS (vs. none)	0.14 (0.32)	1.15 (0.61–2.15)	0.673

SE: Standard error, OR: Odds ratio, CI: Confidence interval, IBS: Irritable bowel syndrome

or adjusted models. These aims and methods align with the protocol described in the study proposal.

The finding that IBD was rare in this community-based female sample is consistent with population data indicating that, although incidence is rising in the Kingdom of Saudi Arabia, absolute prevalence remains lower than in Western countries. Recent Saudi consensus guidance notes increasing IBD incidence over recent decades (e.g., CD rising from 0.32 to 1.66/100,000 person-years between 1983 and 2004 at a Riyadh tertiary center), with ongoing growth in national prevalence—trends that help contextualize the small number of IBD cases captured by our survey window.[8] This background also implies that most Saudi obstetric encounters will involve women without IBD, mirroring our "no GI disease" majority.

Our IBS prevalence (about 16%) falls within the broad range reported in Saudi cross-sectional work, though estimates vary by region, sampling frame, and diagnostic instrument. For example, a 2022 study from the Aseer region using Rome IV criteria reported a 23.8% IBS prevalence, with female sex and psychosocial stressors as correlates.[9] Such heterogeneity is well-described in the IBS literature and underscores that case definition (Rome III vs. IV), health-care setting, and respondent characteristics can materially alter prevalence estimates.

A central result of the present analysis is the absence of a statistically significant association between IBS and miscarriage (adjusted OR ≈1.1 with wide CIs spanning the null). This stands in contrast to the largest registry-based analysis to date, Khashan and colleagues, who reported moderately increased odds of miscarriage (adjusted OR ~1.21) and ectopic pregnancy (adjusted OR ~1.28) among women with pre-existing IBS, after adjustment for key confounders.[10] Differences may reflect study design (our crosssectional survey versus registry linkage), power (43 IBS pregnancies in our data versus tens of thousands in Khashan *et al*.), and unmeasured residual confounding (psychiatric comorbidity, analgesic use, or subfertility) not fully captured in our questionnaire. More recent reports suggest an ongoing signal for adverse outcomes in IBS but are limited by small samples or conference abstracts; thus, the true magnitude and mechanism of any IBS-miscarriage association remain uncertain.[11] In this context, our null finding should be interpreted as inconclusive, not definitive, and highlights the need for larger prospective Saudi cohorts.

In contrast, the IBD-pregnancy literature is comparatively mature and points to disease activity rather than the diagnosis *per se* as the dominant determinant of adverse obstetric outcomes. A 2021 systematic review and meta-analysis in the Journal of Crohn's and Colitis demonstrated that active antenatal IBD substantially increases risks of

miscarriage, preterm birth, and small-for-gestational-age infants compared with quiescent disease.[12] Consistent with this, clinical care pathways and professional society guidance emphasize preconception counseling and tight disease control through pregnancy to achieve remission and minimize maternal-fetal risk.[13] Our dataset contained five IBD pregnancies, precluding precise effect estimation; however, half reported miscarriage, aligning with the principle that small numbers and possibly uncontrolled activity can yield variable outcomes. Medication safety is a second recurring theme in IBD pregnancy counseling. The contemporary evidence base supports the continuation of most maintenance therapies to maintain remission, while discouraging steroid-dependent management where possible. The PIANO registry (the largest prospective IBD pregnancy cohort) reported that corticosteroid exposure during pregnancy was associated with higher adverse perinatal outcomes, reinforcing a steroid-sparing strategy when feasible.[14] By contrast, meta-analytic evidence suggests that biologic therapies (particularly anti-tumor necrosis factor [TNF] agents) are not associated with increased rates of congenital malformations, early pregnancy loss, or stillbirth compared with background IBD or general population benchmarks, supporting continuation through pregnancy when clinically indicated.[15,16] Our participants with IBD reported heterogeneous regimens, including instances of "no therapy" or intermittent use; among IBS respondents, >70% reported no pharmacotherapy. These patterns matter because undertreatment of inflammatory activity may be more dangerous to pregnancy than the majority of IBD drugs themselves, a message that should be amplified in local obstetric-gastroenterology clinics.[13,15,16]

Saudi-specific data on IBD pregnancy outcomes remain limited but are directionally congruent with international observations. A retrospective study from Riyadh Military Hospital (2005–2009) highlighted the feasibility of uneventful pregnancies in women with IBD under specialized care, though small samples and lack of activity stratification restricted inference.[17] Newer regional analyses and the 2024 Saudi consensus further stress multidisciplinary pathways and individualized risk-benefit assessment, which our findings support.[8]

The overall miscarriage proportion in our eligible cohort (~50%) is considerably higher than the ~15% pooled risk among clinically recognized pregnancies synthesized in the 2021 Lancet Series, and higher than rates reported in large population registries from Scandinavia.[1,18] Several features of our study likely inflate this proportion relative to population baselines: (1) by design we restricted to women with at least one prior pregnancy, including many with adverse outcomes; (2) self-report without medical record adjudication can overascertain very early biochemical losses; and (3) our cross-sectional sampling may have enriched for women with reproductive or GI concerns who elected to participate. Accordingly, the miscarriage rate reported here should not be generalized to the broader Saudi obstetric population without caution.

Clinical implications emerge on three fronts. First, for IBD, preconception optimization and maintenance of remission are paramount; most standard maintenance agents (5-ASA, thiopurines, and anti-TNFs) can be continued, whereas reliance on repeated or late-trimester systemic corticosteroids should be minimized where alternatives exist.[13-16] Second, for IBS, even though our analysis did not show excess miscarriage risk, clinicians should be aware of the prior registry signal for early pregnancy loss and ectopic pregnancy in IBS, ensure careful early pregnancy confirmation and follow-up, and address modifiable co-factors (stress, sleep, smoking, nonsteroidal anti-inflammatory drugs use) that co-travel with IBS and may affect reproductive outcomes.[1,9,10] Third, in Saudi practice, where IBD prevalence is rising from a low baseline and IBS is common, coordinated obstetric-gastroenterology services and population education about medication safety could improve outcomes and reduce unwarranted treatment interruption.[8,15,16]

Limitations of the present study include the cross-sectional design (precluding temporal inference), self-reported diagnoses and outcomes (susceptible to recall and misclassification), potential selection bias inherent to online surveys, and very small IBD numbers (three UC, one Crohn's), which severely limit precision for disease-specific associations. Medication exposure was captured at a high level without dose, duration, or timing granularity, and we lacked an objective disease-activity index both critical determinants of IBD pregnancy risk in prior literature.[12,13] Nonetheless, the study contributes locally relevant evidence suggesting that, within this Saudi cohort, neither IBS nor the low-prevalence IBD group was associated with increased miscarriage risk, and it reinforces international guidance prioritizing remission and steroid-sparing strategies in IBD pregnancies.

CONCLUSION

The present study findings are compatible with the broader evidence base: IBD *per se* does not inevitably increase miscarriage risk when disease is quiescent, but adverse outcomes rise with active inflammation; maintaining remission often with continued biologic therapy is therefore essential. IBS may carry a modestly elevated risk of early pregnancy loss in some populations, but our sample did not replicate this, likely due to limited power and design differences. For Saudi clinicians, these results argue for proactive preconception counseling, multidisciplinary follow-up, and reassurance that most recommended IBD therapies can be continued safely during pregnancy to optimize maternal and fetal outcomes.

ACKNOWLEDGMENT

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ETHICAL APPROVAL

Informed consent was obtained from each participant after explaining the study in full and clarifying that participation was voluntary. Data collected was securely saved and used for research purposes only.

INFORMED CONSENT

Written informed consent was obtained from all individual participants included in the study.

DATA AND MATERIALS AVAILABILITY

All data associated with this study are presented in the paper.

REFERENCES

1. Quenby S, Gallos ID, Dhillon-Smith RK, Podesek M, Stephenson MD, Fisher J, *et al*. Miscarriage matters: The epidemiological, physical, psychological, and economic costs of early pregnancy loss. Lancet 2021;397:1658-67.
2. Actis GC, Pellicano R, Fagoonee S, Ribaldone DG. History of inflammatory bowel diseases. J Clin Med 2019;8:1-1970.
3. Ng QX, Sen Soh AY, Loke W, Lim DY, Yeo WS. The role of inflammation in irritable bowel syndrome (IBS). J Inflamm Res 2018;11:345-9.
4. De Aragão MC, Beraldo RF, Marcondes MB, De Barros JR, Herrerias GS, Saad-Hossne R, *et al*. Management of inflammatory bowel disease and serum level of infliximab in newborn exposed to anti-TNF therapy during pregnancy: Case report and literature review. Medicine (Baltimore) 2021;100:e28274.
5. Laube R, Paramsothy S, Leong RW. Review of pregnancy in Crohn's disease and ulcerative colitis. Therap Adv Gastroenterol 2021;14:17562848211016242.
6. Cudalba D, Ciobanu AM, Gica C, Demetrian M, Cimpoca-Raptis BA, Peltecu G, *et al*. Inflammatory bowel disease in pregnancy. Rom Med J 2022;69:68-71.
7. Innocenti T, Roselli J, Taylor A, Dragoni G, Lynch EN, Campani C, *et al*. Pregnancy outcomes in inflammatory bowel disease: Data from a large cohort survey. J Dig Dis 2022;23:473-81.
8. Azzam NA, Almutairdi A, Almudaiheem HY, AlAmeel T, Bakkari SA, Alharbi OR, *et al*. Saudi consensus guidance for the management of inflammatory bowel disease during pregnancy. Saudi J Gastroenterol 2024;30:182-97.
9. Basharat V, Alsubaiei AM, Alshehri AZ, Ayied HA. Irritable bowel syndrome: Prevalence and risk factors among the Saudi population. Cureus 2022;44:1075-81.
10. Khashan AS, Quigley EM, McNamee R, McCarthy FP, Shanahan F, Kenny LC. Increased risk of miscarriage and ectopic pregnancy among women with irritable bowel syndrome. Clin Gastroenterol Hepatol 2012;10:902-9.
11. Irritable Bowel Syndrome Has an Adverse Effect on Pregnancy Outcomes. In: Fertility and Sterility. (Article/ Report Indicating Adverse Outcomes in IBS; Details as Reported; 2024.
12. Kim MA, Kim YH, Chun J, Lee HS, Park SJ, Cheon JH, *et al*. The influence of disease activity on pregnancy outcomes in women with inflammatory bowel disease: A systematic review and meta-analysis. J Crohns Colitis 2021;15:719-32.
13. Mahadevan U, Robinson C, Bernasko N, Boland B, Chambers C, Dubinsky M, *et al*. Inflammatory bowel disease in pregnancy clinical care pathway: A report from the American Gastroenterological Association IBD parenthood project working group. Gastroenterology 2019;156:1508-24.
14. Odufalu FD, Long MD, Lin K, Mahadevan U, PIANO Investigators from the Crohn's and Colitis Foundation (CCF) Clinical Research Alliance Recruited Patients for their Respective Centers for Participant Enrollment. Exposure to corticosteroids in pregnancy is associated with adverse perinatal outcomes among infants of mothers with inflammatory bowel disease: Results from the PIANO registry. Gut 2022;71:1766-72.
15. Nielsen OH, Gubatan JM, Juhl CB, Streett SE, Maxwell C. Biologics for inflammatory bowel disease and their safety in pregnancy: A systematic review and meta-analysis. Clin Gastroenterol Hepatol 2021;19:1113-87.e3.
16. Nielsen OH, Gubatan JM, Kolho K-L, Streett SE, Maxwell C.Updates on the management of inflammatory bowel disease from periconception to pregnancy and lactation. Lancet 2024;403:1291-303.
17. Saleh A, Badroun HI, Al-Khaldi LW, Khalifa HM, Waggass MA. Pregnancy outcome in women with inflammatory bowel disease. Saudi Med J 2010;31:1174-5.
18. Magnus MC, Wilcox AJ, Morken NH, Weinberg CR, Håberg SE. Role of maternal age and pregnancy history in risk of miscarriage: Prospective register based study. BMJ 2019;364:l869.

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