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A cross-sectional and questionnaire-based study of prevalence of gastro-intestinal symptoms during pregnancy at tertiary care centre

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Abstract

Background: Gastrointestinal symptoms are extremely common in the pregnant patients which may lead to morbidity in pregnancy with only few researches to support the prevalence of these symptoms and the effects on the outcome of pregnancy. Hence the present cross-sectional study was undertaken to determine the prevalence of gastro-intestinal symptoms during pregnancy and its effect on outcome at a tertiary care centre.

Method: A total sample size of 136 pregnant women and 136 non-pregnant women visiting ANC, Gynaecology OPDs and patients admitted in wards were included in the study. The data was collected from patients regarding demographic profile, clinical spectrum. Patients were investigated and treated as per the existing practice without disturbing their routine protocol.

Results: The prevalence rate of nausea and vomiting, regurgitation, flatulence, loss of appetite, diarrhoea, functional constipation and anal incontinence in pregnant women was significantly higher than in non-pregnant women, ($p < 0.01$). Prevalence of nausea and vomiting was observed to be more in first trimester while other symptoms like regurgitation, flatulence, diarrhoea, constipation, and anal incontinence presented more in third trimester, ($p < 0.01$). Certain combinations of gastrointestinal symptoms were found to be more prevalent together which showed fetal growth restriction. Maximum frequency was seen of the combination symptoms like nausea and vomiting and diarrhoea which was 62.5% and 36.47% among them had SGA babies. Among 136 deliveries, majority were full-term (77.94%) followed by preterm, (22.06%). All neonates were live birth with 34.55% babies being SGA.

Conclusion: There is a high prevalence of gastro-intestinal symptoms during pregnancy as compared to non-pregnant state. Higher prevalence of nausea, vomiting and diarrhoea have an indirect cause and effect relationship with small for gestational age babies. However, more studies are needed to highlight the vast spectrum of knowledge pertaining to these symptoms and their impact on maternal and fetal health.

Keywords: Gastrointestinal symptoms, nausea, vomiting, pregnancy, regurgitation, diarrhoea, constipation, incontinence

Introduction

Pregnancy is characterised by numerous physiological changes that may lead to a diversity of symptoms and frequently to gastrointestinal complaints, such as nausea and vomiting, regurgitation, diarrhoea, or constipation [1]. Most of these symptoms are a manifestation of normal altered physiology with both functional and anatomical changes. These changes may cause new symptoms, worsen pre-existing disease, or mask potentially deadly disease [2]. However, nausea and vomiting are common experiences in pregnancy, affecting 70–80% of all pregnant women, usually due to rapid fluctuations of hormones like beta hCG, estrogen and progesterone, leading to contraction and relaxation of muscles of stomach and intestine [3]. Women with severe nausea and vomiting during pregnancy (NVP) may have hyperemesis gravidarum (HG), an entity distinct from NVP, which if left untreated may lead to significant maternal and fetal morbidity. HG is rare in comparison to NVP, occurring in 0.3–2% of all pregnancies [4]. The incidence appears to vary with ethnicity and ranges between 3 and 20 per 1,000 pregnancies [5].

Regurgitation in pregnancy are almost ubiquitous symptoms, occurring in 50–90% of all pregnancies, but typically mild, becoming severe in only a small percentage of women [6]. Constipation is frequently seen during pregnancy because of progesterone causing relaxation of smooth muscles of GI tract.

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Healthy women report a 11–38% rate of constipation during pregnancy, most commonly in the third trimester [7]. It seems pregnancy predisposes more to constipation than diarrhoea. Diarrhoea may occur in pregnant women due to intestinal infections or may be a component of IBS [7] and the differential diagnosis is probably identical to that in nonpregnant women [8]. Other complaints like fecal incontinence may have a devastating effect on a woman's quality of life [9]. Previous vaginal delivery has been implicated as a predisposing factor, leading to pelvic floor weakness with subsequent postpartum fecal incontinence. Increased joint mobility due to systemic alterations in collagen may also be responsible [10, 11]. Recent studies revealed prevalence of fecal incontinence before, during and after pregnancy as 3.6%, 43.7% and 14.6% respectively, with fecal urgency being more common after spontaneous vaginal and instrumental deliveries as compared to caesarean sections [12, 13]. Few studies have been conducted to find the correlation of these symptoms with delivery outcomes, with most studies being associated with a favorable outcome for the fetus. Adverse outcomes, however, have been reported in some studies. Deuchar *et al.* found an increased risk for intrauterine growth retardation in women with severe NVP, but could not account for potential confounding by antiemetic medication use on fetal growth [14]. Similarly, Zhou *et al.* found an increased risk for low birth weight in women with severe NVP, likely due to the deleterious effects of nausea and vomiting on maternal nutrition [15].

A lack of experience in dealing with these symptoms can have devastating effects on the pregnant woman. The obstetrician must be able to distinguish whether these symptoms are those of normal pregnancy or a pregnancy related complications such as preeclampsia, intrauterine growth retardation, spontaneous abortions, preterm births. The studies pertaining to the above symptoms have been conducted less so far, and no study has been conducted in this setup. Considering the lacunae pertaining to these symptoms, the present study was conducted to determine the prevalence of gastrointestinal symptoms during first, second and third trimester of pregnancy and to compare prevalence of those symptoms during and before pregnancy of the same subject and in pregnant vs matched non-pregnant women.

Materials and Methods

After obtaining Institutional Ethical Committee approval and written informed consent from the patients, this cross-sectional study was conducted in the Department of Obstetrics & Gynaecology, at Tertiary Care Hospital over period of 24 months from November 2019 to October 2021. The study

population was all pregnant women visiting ANC OPD, Gynaecology OPD and those admitted in wards and non-pregnant women in reproductive age group visiting Gynaecology OPD free of major illness and female relatives of patients in the hospital. A total of 272 patients were included. Patients suffering from major illnesses like heart disease, those patients having difficulty with mobility, communications or poor compliance, patients with history of cancer, rheumatic diseases, neurological diseases, endocrine diseases like hypothyroidism, blood diseases, those on medications like salbutamol, ritodrine, magnesium sulfate and multiple gestation were excluded from the study.

Method of measurement was interview method and study tool was a questionnaire containing demographic data, details regarding menstrual history, parity, family history, past history, clinical symptoms elaborating gastrointestinal symptoms trimester wise containing PUQE Scoring for NVP, Disease severity scoring system for diarrhoea, Wexner constipation scoring system, Wexner incontinence score, were recorded. Women were assigned to two groups of pregnant and matched non pregnant with 136 subjects in each group. Gastro-intestinal symptoms during and before pregnancy of the same subject was recorded. Patients were investigated as per the existing practice without disturbing their routine protocol.

Statistical Analysis

Statistical data was collected by a blinded observer in the form of observation charts. Statistical analysis was done by using proportions and percentage for qualitative characters and chi-square or z-test was applied for quantitative type of data, mean & SD was calculated. Z-test & ANOVA was used wherever necessary. Data was compared and analysed statistically for the significance of observed differences if any. Statistical analysis was done by using SPSS software and conclusions were drawn.

Observations and Results

A total sample size of 136 pregnant women and 136 non-pregnant women visiting ANC, Gynaecology OPDs and patients admitted in wards were included in the study. Majority of pregnant women were in age group 21-25 years (41.18%) with mean age being 26.3 years, while non-pregnant women in age group of 26-30 years (31.62%) as shown in table 1. Most of the pregnant women and non-pregnant women were educated till secondary school i.e., 31.61% and 30.88% respectively and majority were housewives i.e., 66.91% and 58.82% respectively (Table 1). Out of total 136 pregnant women, 68 (50%) women were multigravida while 58 (42.65%) were primigravida and 10 (7.35%) women had previous abortion (Table 1).

Table 1: Demographic characteristics of study and control groups

Characteristics	Category	Pregnant Women		Non-pregnant women	
		Frequency	Percentage	Frequency	Percentage
Age (years)	<20	05	3.68	03	2.21
	21-25	56	41.18	33	24.26
	26-30	53	38.97	43	31.62
	31-35	13	9.56	33	24.26
	36-40	09	6.62	23	16.91
	>40	00	00	01	0.74
Education	Illiterate	06	4.41	06	4.41
	Primary	16	11.76	14	10.29
	Secondary	43	31.61	42	30.88
	Higher secondary	39	28.67	34	25.00
	Graduate & above	32	23.52	40	29.41
Occupation	Housewife	91	66.91	80	58.82

	Farmer	05	3.68	05	3.68
	Semi-skilled	13	9.56	12	8.82
	Skilled	17	12.50	23	16.91
	Professional	10	7.35	16	11.76
Parity	Primigravida	58	42.65	00	00
	Multigravida	68	50.00	93	68.39
	Previous any abortion	10	07.35	14	10.29
	Nulligravida	00	00	29	21.32
Contraception use	Condom	20	14.71	23	16.91
	IUCD	05	3.67	09	6.62
	TL done	00	00	24	17.65
	None	111	81.62	80	58.82

Majority of the pregnant (81.62%) as well as non-pregnant (58.82%) women did not use any contraception, however amongst the 25 who used contraception in pregnant women, 80% were using condom. 41.91% of pregnant women had loss of appetite during pregnancy which was most commonly

observed in 2nd trimester. Aversion of food was present in 34.56% pregnant women. 50% of pregnant women developed disliking for carbohydrates while 45.65% women detested proteins like eggs and chicken as depicted in figure 1.

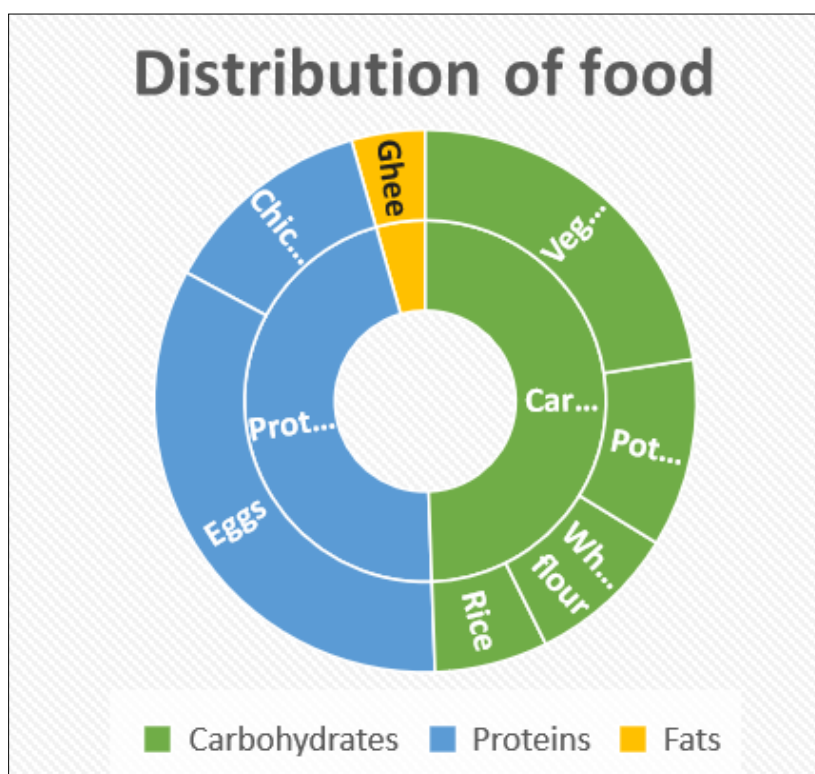


Fig 1: Distribution of food items to which aversion was observed

The prevalence rate of gastro-intestinal symptoms like functional constipation, nausea and vomiting, diarrhoea, flatulence, loss of appetite, anal incontinence and regurgitation

in pregnant women was significantly higher than in non-pregnant women as shown in table 2.

Table 2: Comparison of prevalence of gastro-intestinal symptoms in pregnant vs matched non-pregnant women

Gastro-intestinal symptoms	Pregnant Women		Non-pregnant women		P value	
	Frequency (n = 136)	Percentage (%)	Frequency (n = 136)	Percentage (%)		
Flatulence	82	60.29	49	36.03	<0.01	
Nausea and vomiting	Mild	100	75.53	20	14.71	<0.01
	Moderate	10	7.53	05	3.67	
	Severe	03	2.20	01	0.73	
Regurgitation	54	39.70	27	19.85	0.03	
Loss of appetite	57	41.91	15	11.03	<0.001	
Diarrhoea	Mild-Moderate	81	59.56	33	24.27	<0.01
	Severe	07	5.15	02	1.47	
Constipation	57	41.91	40	29.41	0.04	
Incontinence	67	49.26	30	22.05	0.02	

Prevalence of nausea and vomiting was observed to be more in first trimester while other symptoms like regurgitation and flatulence presented more in third trimester. However, the frequency of diarrhoea, constipation and anal incontinence

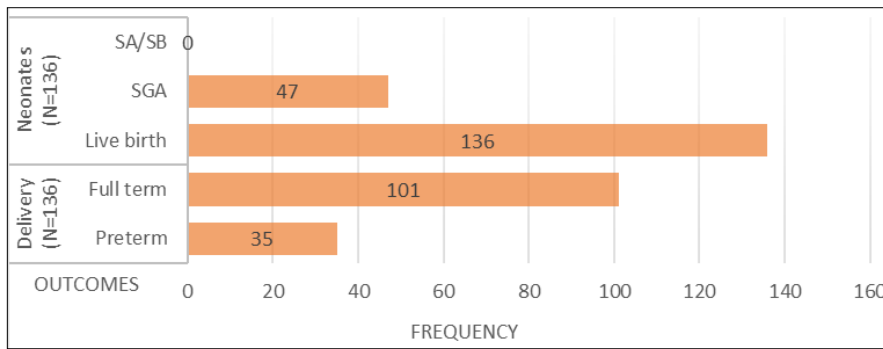
increased gradually with respect to trimester, being most prevalent in 3rd trimester among pregnant women compared to before pregnancy with statistically significant difference, ($p < 0.01$), (Table 3).

Table 3: Comparison of prevalence of gastro-intestinal symptoms during and before pregnancy of the same subject

GI Symptoms		Before pregnancy	1 st trimester	2 nd trimester	3 rd trimester	P value
Flatulence		18	30	46	58	<0.01
Nausea and vomiting	Mild	05	75	42	24	<0.001
	Moderate	00	23	10	13	
	Severe	00	01	02	00	
Regurgitation		01	08	12	43	<0.01
Loss of appetite		02	23	31	14	<0.01
Diarrhoea	Mild -Moderate	07	23	29	60	<0.01
	Severe	00	01	01	05	
Constipation		08	24	42	47	<0.01
Anal Incontinence		03	25	40	42	0.02

From the figure 2, it was observed that among 136 deliveries, majority were full-term (74.26%) followed by preterm, (25.74%). Among neonates, all 136 (100%) were live birth with

no still births (SB) or spontaneous abortions (SA). 34.55% babies born were small for gestational age (SGA).



SGA= Small for gestational age; SA= Spontaneous Abortion; SB= Stillbirth

Fig 2: Outcome among pregnant women

Out of total 136 pregnant women, 71 (52.21%) women gained 9-11 kgs of weight during pregnancy amongst which 19 (26.76%) had fetal growth restriction followed by those with weight gain

of >11 kgs (28; 20.58%) amongst which 01 (3.57%) showed SGA. The maximum frequency of FGR was 72.97% which was seen in those with weight gain of <9 kgs as depicted in figure 3.

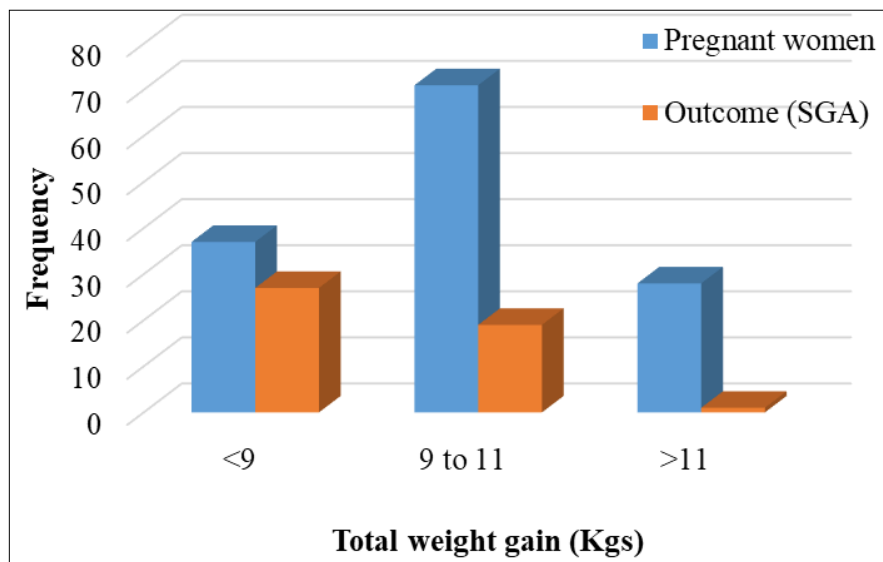


Fig 3: Correlation of total weight gain with outcome of pregnancy (SGA)

There was no statistically significant difference between gastrointestinal symptoms and delivery outcome of preterm and

full term ($p > 0.01$) as shown in table 4.

Table 4: Association of gastrointestinal symptom and delivery outcome among pregnant women

Gastrointestinal symptom	Delivery outcome		P value
	Preterm (n=35)	Full-term (n=101)	
Flatulence	22	60	0.24
Nausea & vomiting	19	94	0.54
Regurgitation	14	40	0.56
Loss of appetite	19	38	0.28
Diarrhoea	22	66	0.43
Constipation	13	44	0.38
Incontinence	19	48	0.41

Out of total 113 pregnant women with nausea and vomiting, 41.59% had fetal growth restriction, maximum frequency of SGA was 79.41% which was seen in those with weight gain of <9 kgs. Whereas among the 83 pregnant women who had

diarrhoea during pregnancy, 43.83% of them had SGA babies, out of which 72.41% SGA babies were seen in those with total weight gain of <9 kgs, (Table 5).

Table 5: Relation of total weight gain in pregnant women and its correlation to nausea and vomiting and diarrhoea

Weight gain (Kg)	NVP	Outcome (SGA)	Diarrhoea	Outcome (SGA)
<9	34 (30.9%)	27 (79.41%)	29 (34.93%)	21 (72.41%)
9-11	65 (57.52%)	19 (29.23%)	40 (48.20%)	10 (25.00%)
>11	14 (12.39%)	01 (7.14%)	14 (16.87%)	01 (7.14%)
Total	113 (100%)	47 (41.59%)	83 (100%)	32 (43.83%)

Certain combinations of gastrointestinal symptoms were found to be frequently present, and they showed fetal growth restriction. Maximum frequency was seen of the combination

symptoms like nausea and vomiting and diarrhoea which was 62.5% and 36.47% among them had SGA babies, (Figure 4).

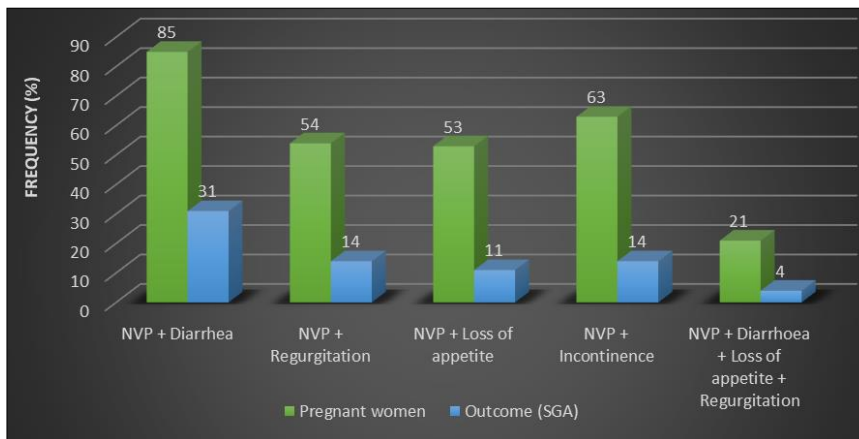


Fig 4: Comparison of various symptoms combination among study population

Discussion

In the present study, majority of pregnant women were in age group 21-25 years (41.18%) while non-pregnant women in age group 26-30 years (31.62%) which was statistically insignificant ($p>0.05$). Most of the pregnant and non-pregnant women were educated till secondary school and majority were housewives. These findings are in accordance with Sharma JB *et al.* [16]. Maximum pregnant women were multigravida and majority of the pregnant women were using condom as contraceptive. 41.91% of pregnant women had loss of appetite during pregnancy which was mostly observed in 2nd trimester. Aversion of food was present in 34.56% pregnant women. 50% of pregnant women developed disliking for carbohydrates while 45.65% women detested proteins like eggs and chicken. Aversion amongst carbohydrates was most for vegetables (22.27%) like brinjal, cabbage, cauliflower and bitter gourd (Karela) followed by potato (11.10%), wheat flour (8.81%), rice (6.68%). Amongst proteins, aversion was highest for eggs (33.05%) and chicken (12.60%). These findings correlate with the study conducted by Yalew A *et al.* [17]. The causes and consequences of food aversion is still basically unknown but is

hypothesized to be multifactorial [18]. Hormonal change during pregnancy plays a huge role in food aversions. Nausea and vomiting are also mentioned as the principal factors for the development of food aversions [19]. Flatulence was present in 60.29% pregnant women compared to 36.03% non-pregnant women, ($p<0.01$). Frequency of flatulence increased gradually with respect to trimester among pregnant women compared to before pregnancy with statistically significant difference, ($p<0.01$). Nausea and vomiting were present in 83.09% pregnant women compared to 11.22% non-pregnant women, ($p<0.01$). The frequency of nausea and vomiting increased in first trimester (72.79%) among pregnant women compared to before pregnancy, ($p<0.01$). These findings are correlated with the study done by Ellilä P *et al.* [20]. The pathogenesis of nausea and vomiting in pregnancy is still undetermined, although many believe the hormonal changes that occur during pregnancy are most likely involved. It was observed in the current study that 5.88% of pregnant multigravida patients had history of past admission due to hyperemesis gravidarum, amongst which 87.5% (7) were admitted during 1st trimester and 12.5% during 2nd trimester.

Regurgitation was present in maximum number of pregnant women (39.70%) compared to 19.85% non-pregnant women, ($p < 0.01$). The frequency of regurgitation increased gradually with respect to trimester among pregnant women compared to before pregnancy, ($p < 0.01$). It was also observed that amongst the 136 patients, 3 patients presented with GERD, with one presenting in 2nd trimester and 3rd trimester, while another presented in 2nd trimester only and third presented in 3rd trimester which is comparable with the previous studies [21, 22]. Loss of appetite was present in 41.91% pregnant women compared to 11.03% non-pregnant women, ($p < 0.01$). Frequency of loss of appetite amongst those 41.91% pregnant women was most in second trimester (22.79%) followed by first trimester (16.91%) followed by third trimester (10.29%) compared to before pregnancy, ($p < 0.01$).

Diarrhoea was present in 64.71% pregnant women compared to 25.74% non-pregnant women, ($p < 0.01$). Frequency of diarrhoea increased gradually with respect to trimester among pregnant women compared to before pregnancy, ($p < 0.01$). Similar findings are observed by Sharma JB *et al.* [16] and Newman KL *et al.* [23]. Diarrhoea during pregnancy increased the risk of having an SGA infant by approximately 20%, which may be through impaired nutrition. Undernutrition before and during pregnancy and poor dietary quality are associated with SGA birth. The prevalence of constipation amongst pregnant women was 41.91% compared to 29.41% non-pregnant women, ($p < 0.01$). Frequency of constipation increases gradually with respect to trimester among pregnant women compared to before pregnancy, ($p < 0.01$). Similar findings are reported in earlier studies [16, 24, 25]. It was observed that incontinence of faeces was present in 49.26% pregnant women compared to 22.05% non-pregnant women, ($p < 0.01$). The gradual rising trend of frequency of anal incontinence with respect to trimester among pregnant women compared to before pregnancy, ($p < 0.01$). All patients in first and second trimester showing gaseous incontinence, while amongst the 42 patients showing anal incontinence in third trimester, 2 showed anal incontinence to solid matter, and 5 showed liquid fecal incontinence, with overall prevalence of incontinence of liquid and solid stools being reported in 3.68% and 1.47%, respectively. On further investigating the obstetric history, it was found that the two pregnant females showing solid fecal incontinence were multigravidas with previous vaginal delivery of birth weight > 3.5 kgs with history of repaired episiotomy and no history of operative deliveries. It was observed that the 5 pregnant females with liquid fecal incontinence had mild to moderate and severe diarrhoea in their 2nd and 3rd trimesters of pregnancy. Similar findings are observed by Sharma JB *et al.* [16] and Laine K *et al.* [26].

Among 136 deliveries, majority were full-term (74.26%) followed by preterm, (25.74%). Among neonates, all (100%) were live birth. However fetal growth restriction was observed in 47 (34.55%) which was seen majorly in pregnant women with total weight gain during pregnancy of < 9 kgs (72.97%). It was observed that no gastrointestinal symptoms like flatulence, nausea, regurgitation, frequency of incontinence showed statistically significant difference amongst preterm and full-term deliveries, ($p > 0.01$). These findings are correlated with the other studies [23, 27].

Out of 136 deliveries, 47 (34.55%) babies were small for gestational age. The maximum frequency of fetal growth restriction (FGR) was 72.97% which was seen in those with weight gain of < 9 kgs. 19 (26.76%) out of the 71 pregnant women with total weight gain in the range of 9-11 kgs had SGA

babies. Out of total 113 pregnant women with nausea and vomiting, 65 (57.52%) women gained 9-11 kgs of weight during pregnancy amongst which 19 (40.42%) had SGA. The maximum fetal growth restriction was seen in women with < 9 kgs, with 27 out of 34 pregnant women (79.41%) having SGA babies. 83 out of total 136 pregnant women had diarrhoea, with 69 (83.13%) women having less than 11kgs of total weight gain. Among the 83 pregnant women who had diarrhoea during pregnancy, 43.83% women had fetal growth restriction. It was observed that 72.41% of these SGA babies were born to mothers with total weight gain of < 9 kgs, these findings are comparable with the study conducted by Newman KL *et al.* [23]. Certain combination of gastrointestinal symptoms was more frequently present, in pregnant women and consequently FGR was seen more in these women.

Conclusion

The present study concludes that there is a very high prevalence of gastro-intestinal symptoms during pregnancy as compared to nonpregnant state. Gastrointestinal symptoms like nausea and vomiting and diarrhoea lead to less weight gain thereby adversely influencing the rate of fetal growth leading to fetal growth retardation and ultimately having an adverse effect on the outcome of pregnancy. Although low pre-pregnancy weight and nutritional status with poor weight gain during pregnancy are mentioned as causes of fetal growth retardation, further evaluation is required to prove gastrointestinal symptoms like nausea and vomiting and diarrhoea are direct maternal causes of intrauterine growth retardation leading to small for gestational age babies.

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Conflict of interest: None

Ethical Approval: The study was approved by the Institutional Ethics Committee

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