EUROX 20 (2023) 100258

Contents lists available at ScienceDirect

European Journal of Obstetrics & Gynecology and Reproductive Biology: X

journal homepage: www.journals.elsevier.com/european-journal-of-obstetrics-and-gynecology-and-reproductive-biology

High pre-pregnancy body mass index and gestational weight gain among women belonging to upper SES from Delhi, India

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ARTICLE INFO

Keywords:
India
Obesity
Pregnancy
Gestational weight gain
High pre-pregnancy BMI

ABSTRACT

Background and objective: With increase in prevalence of obesity and an increasing trend in the birth of macrosomic infants, Institute of Medicine (IOM) guidelines pertaining to optimal gestational weight gain (GWG) required for positive pregnancy outcome were revised in 1990 and 2009. Since, in the Indian scenario, no recommendations exist for optimum GWG for obese (OB) and overweight (OW) women, we assessed the pattern of GWG w.r.t Institute of Medicine (IOM), 2009 among the subjects with different body mass index (BMI).

Study design: Present data were a part of a longitudinal observational study wherein, 312 pregnant women (≤12th week of gestation) attending private antenatal clinics were followed till term and their weight was monitored regularly at pre-determined intervals i.e., 12th–14th, 18th–20th, 24th–26th, 30th–32nd, 36th + week of gestation and compared w.r.t IOM guidelines 2009.

Results: 66.37 %, 57.89 % and 11.69 % of OB, OW and normal weight (NW) subjects respectively had weight gain exceeding their GWG limits. About 5 %,10.53 %, 33.77 % of OB, OW and NW subjects respectively had gained weight less than GWG limits ($p = 0.000^{***}$).

Conclusion: An increase in GWG inadequacy with increase in BMI and pronounced variations in GWG among OB and OW subjects underscore the necessity to monitor GWG especially among the subjects with high BMI.

Introduction

In recent years, world has witnessed an upward trajectory of higher pre-pregnancy BMI among the women of reproductive age [1]. The World Obesity Atlas 2023, published by the World Obesity Federation, predicts that two billion people globally will be living with obesity by 2035. The prevalence of obesity is expected to rise in 2035 from 14 % (2020) to 23 % and 18 % (2020) to 27 % among men and women respectively [2]. According to the key findings obtained from the National Family Health Survey (NFHS-5), in India among all the states/UTs Puducherry (women:46.3 %, men: 43.3 %) had maximum proportion of overweight/ obese women followed by Chandigarh (women:44 %, men:34.4 %) and Delhi (women:41.4 %, men:38 %) [3]. In the National Capital Territory (NCT) of Delhi, proportion of overweight/obese men has escalated from 24.6 % (NFHS-4) to 38 % (NFHS-5), whereas the percentage of overweight/obese women has increased from 33.5 % (NFHS-4) to 41.4 % (NFHS-5) [3,4]. Thus, the National data as well as Delhi, State data also portrays a similar picture indicating that women bear a disproportionate burden of obesity as compared to the men so understandably this disproportionate burden would continue in the lifecycle of women including pregnancy and lactation.

Reportedly, there was a high prevalence of 40 % of obesity among the pregnant women (<20th week of pregnancy) across 31 districts in multiple states of India. The risk factors associated with obesity among pregnant women were urban residency (1.43, 95 % CI: 1.18–1.72) and upper wealth quintile (6.37, 95 % CI:4.28–9.48) [5]. This was also evident from the recent NFHS-5 report, wherein high prevalence of overweight/obese women is recorded among urban parts of India (33.3 %) as compared to rural region (19.7 %). Other than urban residence, wealth of the households has emerged as a potential differentiator of abdominal obesity amongst the Indians [3]. This is in concurrence with the findings of other study which found higher prevalence of obesity among those having high standard of living in India [6]. The factors responsible for higher pre-pregnancy BMI and higher gestational weight gain might be greater access to food, limited physical activity, consumption of ultra-processed food and sedentary lifestyle [5,7].

Silvestris et al. have also documented detrimental influence of being obese on the reproductive health. Reportedly, obese women can

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https://doi.org/10.1016/j.eurox.2023.100258
Received 8 June 2023; Received in revised form 14 October 2023; Accepted 20 October 2023
Available online 21 October 2023

undergo perturbations of the 'hypothalamic pituitary ovarian axis', and suffer from menstrual dysfunction leading to anovulation and infertility [8]. Besides this, gaining excessive weight by the women during pregnancy can cause hypertensive disorders of pregnancy (HDP), gestational diabetes mellitus (GDM), caesarean section (CS), preterm delivery, fetal macrosomia and unexplained stillbirths [9–12]. Studies conducted in India have reiterated the fact that overweight (OW) or obese (OB) women are likely to experience foeto-maternal complications i.e., GDM, HDP, CS and preterm labour [13–15].

Thus, growing numbers of OW and OB women before or during pregnancy worldwide have raised concerns among health workers, with India being no exception [16]. It underscores the need for the women to maintain normal weight prior to conception and gain desirable weight throughout the pregnancy which can reduce the likelihood of any adverse pregnancy outcome [17].

In 2009, the Institute of Medicine (IOM) had published their revised guidelines pertaining to absolute weight gain (kg) based on the women's BMI cut-offs recommended by WHO, 1995 [18]: 18.5–24.9 kg/m^2 (normal weight), 25–29.9 kg/m^2 (overweight), and $\geq$ 30 kg/m^2 (obese) [17]. According to these guidelines, it has been recommended to gain 11.5–16 kg weight for normal weight women; 7–11.5 kg for overweight women and 5–9 kg for obese women. However, these recommendations are based on the Caucasian population [17] and its applicability among the Asian population is still unclear [13,19]. There is a dearth of studies in this regard especially in the Indian settings, which might be due to difference in BMI classification available for the Asian-Indians [20] and WHO, BMI cut-off [18] recommended for population residing western countries [13]. Furthermore, there is lack of evidence-based recommendations for adequate GWG for overweight/obese women in the Indian settings [13,21]. Therefore, weight gain limits recommended by the IOM (2009) are based on western WHO, BMI cut-off making it difficult to compare, translate, or generalize their findings to Asian Indians [13].

Therefore, the current study assessed the gestational weight gain and examine w.r.t the IOM, 2009 [17] recommendations among normal weight and higher pre-pregnancy BMI category subjects (using Asian-Indians BMI cut-off criteria,2009) [20] belonging to upper socio-economic status (SES) residing in North-West Delhi, India.

Materials and methods

Study design

The present study was an observational longitudinal study which was conducted among pregnant women (n = 312) attending private antenatal clinics situated at North-West district of Delhi, between July 2018-March 2020. Since, there is surging rise in obesity in Delhi and urban residence being a potential risk factor for obesity [3,5], urban region of this metropolitan city was chosen for conducting the present study. Second, criterion of selection of locale was accessibility and ease of obtaining permission for collecting data from the subjects. The present study was approved by the Ethics Committee of Institute of Home Economics (IHE/2018/1139), Delhi University, India. The nature of the study was stated to the subjects and written informed consent was obtained from them, prior to their participation in the study.

Participants

All the women attending the selected antenatal clinics with confirmed pregnancy of $\leq$ 12th week, with pre-pregnancy of BMI $\geq$ 18 kg/m^2, belonging to upper SES and willing to participate were recruited in the study purposively included in the study. Women above 40 years of age, physically challenged and cognitive impaired (epilepsy, bipolar disorder or any other mental disorder) were excluded from the study.

Tools and technique

Weight of subjects was measured by a standardised digital weighing scale at the time of their first antenatal visit i.e., within first 12 weeks of pregnancy was considered as the pre-pregnancy weight of subjects. Height of subjects was measured using standardised stadiometer. Using height and pre-pregnancy weight, pre-pregnancy BMI was computed. According to the Asian-Indians, BMI-cut off (2009) [20], subjects were classified into normal weight (BMI = 18–22.9 kg/m^2), overweight (BMI =23–24.9 kg/m^2) and obese (BMI $\geq$25 kg/m^2). In order to compute GWG, participants were followed up till their deliveries and weight of the participants was measured regularly at pre-determined intervals i.e., 12th–14th week, 18th–20th week, 24th–26th week, 30th–32nd week, 36th + week of gestation. Further, GWG of the subjects obtained across different pre-pregnancy BMI categories were compared w.r.t IOM-guidelines 2009 [5]. In addition to this, structured and standardised questionnaire was developed for in-person interview person interview with subjects. Information about their age, family background, education, occupation and obstetric history were collected from subjects during their interview session at baseline i.e., $\leq$ 12th week of pregnancy.

STATA, version 15 SE was used for statistical analysis of the current study. Numerical characteristics were summarized as mean $\pm$ standard deviation. Categorical variables were summarized using frequencies and percentages. Chi-square tests were used to test differences in proportions. $P < 0.05$ was considered as statistically significant.

Results

A total of 312 participants were recruited initially at baseline ($\leq$12th week) after appropriate screening according to pre-determined inclusion and exclusion criteria. Mean pre-pregnancy weight of subjects was 63.6 $\pm$ 11 kg and based on their weight, subjects were categorised into four groups: < 55 kg (23.17 %), 55–75 kg (64.4 %), 75–95 kg (9.9 %) and > 95 kg (2 %). Majority of subjects (76.6 %) had pre-pregnancy weight more than the weight of the Indian reference woman i.e., 55 kg [22]. Mean height of subjects was 158.89 $\pm$ 6.06 cm and 75 % of subjects had height equivalent to or more than 155 cm followed by 150–154.9 cm (18.9 %), 145–149.9 cm (5.12 %) whereas only 3 subjects had short height of less than 145 cm (0.96 %). Based on pre-pregnancy weight and height, BMI of the subjects was computed. According to the Asian-Indians cut off [14], normal weight (NW: 18–22.9 kg/m^2), overweight (OW:23–24.9 kg/m^2) and obese (OB: $\geq$25 kg/m^2) category comprises of 90 (28.8 %), 90 (28.8 %) and 132 (42.3 %) subjects respectively.

Socio-economic profile of subjects (Table 1) indicated that mean age of subjects was 29.83 $\pm$ 3.10 years. Based on different BMI categories, OB and OW subjects were older ($\geq$30 years) as compared to the NW subjects (<30 years, p = 0.007 **). Majority of subjects from each category of BMI were well- educated (graduate/postgraduate, p = 0.099). Further, more than half of OB subjects (56.1 %) were unemployed/housewives as compared to OW (38.9 %) and NW (46.6 %) subjects. Socioeconomic status of subjects was classified using B.G Prasad's socioeconomic scale [23,24] and 63.1 % subjects had a monthly household income within Rs 80,000 to 1,25,000, followed by 24.7 % of subjects with monthly household income between Rs 50, 000–80,000 (p = 0.174).

Table 2 summarises the obstetric history of the subjects which show that 42.42 % and 38.89 % of OB and OW subjects respectively were multigravida while slightly lower percentage of NW subjects (21.11 %) were multigravida (p = 0.003*). As far as, parity was concerned, higher percentage of OB (28.03 %) and OW (22.22 %) subjects were found to be primiparous as compared to the NW subjects (11.11 %, p = 0.032*).

Positive correlation was found between gravidity and parity across all three BMI categories i.e., OB; r = 0.7409 (p = 0.031*), OW; r = 0.5446 (p = 0.022*) and NW; r = 0.7802 (p = 0.000***) which highlights

Table 1
Distribution of subjects according to their age, education, nature of employment, type of family, monthly household income (Rs/month).

Characteristics	Pre-pregnancy Body Mass Index (BMI) Category			p-Value	TOTAL (N = 312)
	OB (N = 132)	OW (N = 90)	NW (N = 90)		
AGE (years)				0.007*	
21–24	5(3.79)	0 (0)	1(1.11)		6 (1.92)
25–29	59 (44.7)	39 (43.33)	59 (65.56)		157 (50.32)
30–34	57 (43.18)	46 (51.33)	25 (27.78)		128 (41.03)
≥35	11 (8.33)	5(5.56)	5.56 (5)		21(6.73)
EDUCATION					
Metric	3 (2.3)	0 (0)	0 (0)	0.099	3 (1)
Intermediate	2 (1.5)	3 (3.3)	3 (3.3)		8 (2.6)
Graduate	69 (52.3)	35 (38.9)	49 (54.4)		153 (49)
Postgraduate /higher Education	58 (43.9)	52 (57.8)	38 (42.2)		148 (47.4)
NATURE OF EMPLOYMENT					
Government	8 (6.1)	8 (8.9)	3 (3.3)	0.024*	19(6.1)
Private	38(28.8)	38(42.2)	41(45.6)		117(37.5)
Entrepreneur/ self-employed	12 (9.1)	9 (10)	4 (4.4)		25 (8)
Unemployed/Homemaker	74(56.1)	35 (38.9)	42(46.66)		151 (48.3)
TYPE OF FAMILY					
Nuclear	70(53)	47 (52.2)	55 (61.1)	0.398	172(55.1)
Joint	62 (47)	43 (47.8)	35 (38.9)		140 (44.9)
Monthly Household Income (Rs/Month)					
<50,000	5 (3.8)	2 (2.2)	2 (2.2)	0.174	9 (2.9)
50,000–80,000	25(18.9)	28 (31.1)	24(26.7)		77 (24.7)
80,000–1,25,000	90 (68.2)	48 (53.3)	59(65.6)		197 (63.1)
>1,25,000	12 (9.1)	12 (13.3)	5 (5.6)		29 (9.3)

Percentage is in parenthesis. p-value was calculated using Chi-sq. test at 5 % level of significance. * Significant at 0.05 level of significance.

Table 2
Distribution of subjects according to their obstetric history.

Characteristics	Pre-pregnancy BMI categories			P-value	Total Subjects (N = 312)
	OB (N = 132)	OW (N = 90)	NW (N = 90)		
Gravidity					
Primigravida	76 (57.58)	55 (61.11)	71(78.89)	0.003**	202(64.74)
Multigravida	56 (42.42)	35 (38.89)	19 (21.11)		110(35.26)
Parity					
Nulliparous	91(68.94)	68 (75.56)	79(87.78)	0.032*	238(76.28)
Primiparous	37 (28.03)	20 (22.22)	10 (11.11)		67 (21.47)
Multiparous	4 (3.03)	2 (2.22)	1(1.11)		7(2.24)
Abortion					
0	103(78.03)	73 (81.11)	80 (88.89)	0.247	256(82.05)
1	27(20.45)	15(16.67)	10 (11.11)		52 (16.67)
≥2	2(1.52)	2(2.22)	0 (0)		4(1.28)

Percentage is in parenthesis. p-value was calculated using Chi-sq. test at 5 % level of significance. *Significant at 0.05 level of significance. **Significant at 0.005 level of significance

that BMI increased with the number of times subjects conceived and their pregnancy beyond 20th week of gestational age. Though high number of pregnancies (regardless of pregnancy outcome) were recorded among subjects with high BMI, it was also noted that high BMI was also associated ($p = 0.247$) with higher incidence of abortions (above 20th week of gestation) among the subjects with the prevalence being 20.45 % among OB and 16.67 % among OW subjects and 11.11 % among NW subjects.

Out of 312 subjects, data pertaining to GWG was analysed for 266 subjects (OB:113, OW:76, NW:77) because 46 subjects were either lost to follow up or had miscarriage/induced abortion post-baseline. Fig. 1 depicts GWG trajectory throughout pregnancy among OB, OW and NW subjects respectively. It was noted that mean GWG of OB subjects (n = 113) was 12.04 $\pm$ 4.79 kg. OB subjects had gained 2.17 kg, 4.27 kg, 6.02 kg, 8.56 kg,11.46 kg and 17.78 kg till 12th–14th week, 18th–20th week, 24th-26th week, 30–32nd week, 36–38th week and > 38th week respectively. In case of OW subjects, mean GWG was observed to be 12.64$\pm$ 4.31 kg. OW subjects had gained 2.16 kg, 4.19 kg, 6.09 kg, 9.23 kg, 11.88 kg and 14.31 kg of weight till 12th-14th week. 12t –14th week, 18th-20th week, 24th-26th week, 30–32nd week, 36–38th week and > 38th week respectively. Further, among NW subjects (n = 77), mean GWG was found to be 12.38 $\pm$ 3.6 kg. It was seen that NW subjects gained 2.16 kg, 4.72 kg, 7.34 kg, 9.92 kg, 12 kg and 13.64 kg of weight till 12th–14th week, 18th-20th week, 24th-26th week, 30–32nd week, 36–38th week and > 38th week respectively.

We have also compared the GWG of subjects in different weight categories with IOM guidelines as shown in Fig. 2. Similar comparisons (based on nation-specific BMI criteria and IOM guidelines) have also been carried out in other studies [13,25,26]. In the present study, findings showed that overall, 62.78 % of subjects had gained inappropriate weight out of which nearly half of the subjects (48.12 %) had gained weight more than recommendations and 14.66 % subjects had gained less than recommended GWG limits. Further, 66.37 % of OB subjects had weight gain exceeding their GWG limits (5–9 kg) while only one-third of OB subjects (29.2 %) were able to achieve GWG as per IOM, 2009 guidelines [17] and merely 5 % of them had gained weight less than GWG limits. Similar trend in the pattern of GWG was observed among the subjects in OW category where 57.89 % of subjects had gained weight more than their GWG limits (7–11.5 kg), 31.58 % of OW subjects were able to achieve optimum GWG whereas 10.53 % of OW

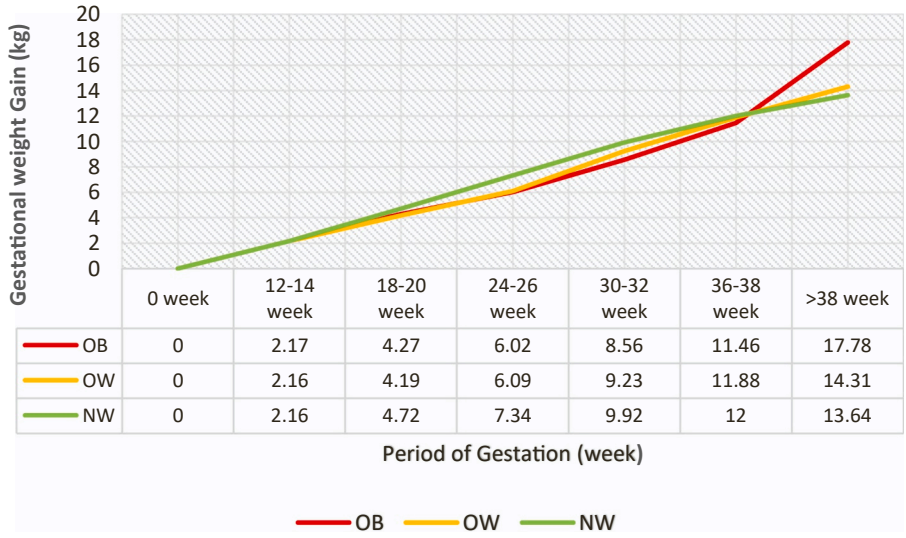

Fig. 1. Gestational weight gain trajectory throughout pregnancy among obese (OB), overweight (OW) and normal weight (NW) subjects.

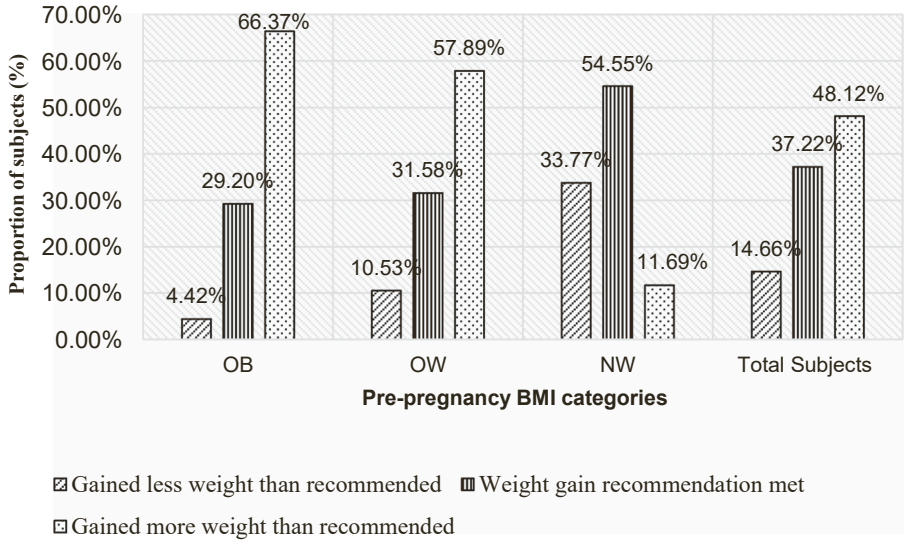

Fig. 2. Gestational weight gain (GWG) adequacy according to the Institute of Medicine, 2009 *Significant relationship was found between gestational weight gain and pre-pregnancy, Body mass index* categories (p value <0.001). Abbreviations- OB: Obese, OW: Overweight, NW: Normal weight.

subjects had gained inadequate weight as per the GWG limits. Among the subjects with normal pre-pregnancy BMI, 11.69 % of NW subjects had gained weight exceeding than recommended GWG limits, 54.55 % of the subjects had gained adequate weight and 33.77 % of them had gained weight lower than GWG limits. There was a significant relationship between GWG and pre-pregnancy body mass index categories ($p = 0.000^{***}$, Fig. 2).

Discussions

The initial guidelines by the IOM in 1930 recommended that pregnant women should gain 6.8 kg irrespective of weight status [27]. With increase in prevalence of obesity and an increasing trend in the birth of macrosomic infants, these guidelines were revised in 1990 and 2009 [17]. However, the applicability of these guidelines remained inconclusive especially in the Asian settings [13,27]. The IOM, 2009 [17] guidelines are based on the WHO, BMI categories [18], however this BMI cut-off may not be appropriate for the Asian population [13]. It has been argued that prevalence of obesity and obesity related risks which occur at lower BMI among the Asians as compared to population residing in western countries, which make WHO BMI categorization, less relevant to the Asian population [13]. Hence, in the present study, the BMI criteria based on the Asian Indians (2009) [20], was used to classify the pregnant women. Since, there are no national guidelines available for optimum GWG for obese and overweight Indian pregnant women, current study was aimed to assess the pattern of GWG w.r.t IOM guidelines-2009 among the subjects with BMI categories specified for (Asian-Indians,2009) as reported in earlier studies from China and India [13,25,26].

In the present study, 48.12 % of subjects had gained weight exceeding the GWG limits, 37.22 % of subjects had gained weight within their recommended limits while 14.66 % of the subjects had gained weight less than the recommended limits (IOM, 2009), hence nearly one third women had inadequate GWG. Thus, an increase in the subjects with inadequate GWG (w.r.t. IOM, 2009) was observed with the increase in their pre-pregnancy BMI ($p = 0.000^{***}$) recommendations.

Similar pattern of GWG was documented by Wang et al. [28] in the cohort study conducted among the Chinese urban women (n = 8926)

attending different private hospitals at Bejing, China. Reportedly, overall, 50 % of the pregnant women had gained excessive weight than the IOM, 2009 recommendations [17]. 27.4 % of women had gained adequate weight while 22.6 % had inadequate GWG. The study has also recorded that more than 70 % of obese and overweight women had excessive weight gain as compared to normal weight subjects (49 %). Further, highest percentage of normal weight category women (29.5 %) had gained optimum GWG as compared to the obese (14.5 %) and overweight (17.4 %) women which was consistent with the findings obtained in present study.

In another study conducted by Deshpande et al., 6.7 % of pregnant women had gained weight exceeding limits (IOM, 2009) which was less than the proportion of study subjects (48.12 %) with excessive weight gained. This discrepancy might be due to the cohort of women residing in rural region of Pune, India. Secondly, one-third of women had poor socio-economic status. Further, only 12.7 % of recruited women were overweight/obese and remaining proportion belonged to underweight (36.6 %) and normal weight (50.7 %) category. [29].

Moreover, the present study subjects belonged to upper socio-economic strata residing in urban areas of the Delhi. Living in capital of the country with affluent family background, it may be assumed that participants had an easy access to processed foods, ready to eat meals and automobile travel which cannot be afforded by the population residing in rural area with poor socio-economic status. Thus, limited physical activity and sedentary behaviour among the subjects could be responsible for being overweight/obese prior to pregnancy and gaining excessive weight than the recommendations during pregnancy.

GWG chart has vital significance from clinical and epidemiological view as it may be utilised to identify women at risk for unfavourable pregnancy outcome [30]. In the present study, weight gain charts were constructed for subjects within different BMI categories. Almost similar pattern of weight gain was noted till 12th–14th week among the subjects within all three study groups. Beyond 14th week of gestation, exponential rise in weight gain was noted among OB subjects followed by OW and NW subjects. Higher fluctuations were recorded in mean weight gained by OB and OW subjects causing a non-linear trajectory of GWG among them. Whereas, weight gain among NW subjects followed a linear shape due to minimum changes in their mean weight gain throughout their pregnancies. This finding was inconsistent with another cohort study conducted among the obese, overweight, normal weight and underweight women residing in Europe, North America and Oceania where a non-linear trajectory was observed among all the women with different BMI categories [30]. Another study conducted among normal weight women residing in Brazil, China, India, Italy, Kenya, Oman, UK, and USA showed a linear shape followed by the normal weight women [31]. This trend can be attributed to inclusion of only healthy and uncomplicated pregnancies. Weight gain during pregnancy comprises of multiple elements such as placenta, amniotic fluid, foetus, mammary tissues, increased blood volume, stored fat and extracellular fluid [32]. Non-linear trajectory of GWG reflects the variation in these multiple elements which was more pronounced in case of OB and OW subjects as compared to NW subjects. These findings might be due to medical illness prior to their conception, faulty dietary practices and pregnancy related complications which could be more common among the subjects with high BMI as compared to the NW subjects.

Higher BMI before pregnancy and an excessive GWG are associated with a greater risk of developing pregnancy related complications. The control of body weight before and during the course of pregnancy is recommended to achieve positive pregnancy outcome [33]. Pharmacotherapy in conjunction with physical activity and healthy eating is considered as a powerful combination for weight management among the adults. There are few anti-obesity drugs such as orlistat, lorcaserin, phentermine/topiramate, naltrexone, liraglutide and metformin which are being currently used by the adults who experience difficulty in weight loss. However, none of them are approved for their use during pregnancy due to known or unclear harm to offspring [34–37]. Hence, such drugs must precede any planned conception or fertility treatment among the women [35].

Conclusion

Results from our study indicated that majority of subjects had gained inappropriate gestational weight w.r.t IOM, 2009 guidelines. Based on different BMI categories, most of the subjects from high pre-pregnancy BMI had exceeded the weight gain limits as compared to NW subjects. An increase in the GWG inadequacy (w.r.t IOM, 2009) with the increase in the pre-pregnancy BMI and pronounced variations in GWG among the OB and OW subjects as compared to NW subjects underscore the need of framing the optimum weight gain guidelines especially for the overweight and obese pregnant women who are still being neglected so far in the Indian settings. Present endeavour provides valuable impetus to control the surging rise in high BMI among the Indian women. This can only be achieved with the collaboration of policies and programs not only at the National level by the Government but also initiatives by the private sector and active participation of the people at an individual level. Behaviour change, a first-line of preventive strategy can be emphasised to prevent the beginning of *inter-generational cycle of obesity* by maintaining desirable body weight especially prior to conception and adhering to gain optimal gestational weight. Our study also indicates that health information system and a comprehensive surveillance frame work needs to be established. Effective tools and norms can be formulated to perform standardized surveys nationwide and analyse emerging overweight, obesity and its risk factors. Periodic and independent evaluation of screening the population at risk of obesity and associated risk factors can be useful. Furthermore, studies assessing the impact of inappropriate GWG based on different BMI categories on feto-maternal outcome are warranted in future.

Strength and limitations

Our study provides the description of the pattern of GWG among the women with different BMI which has received less attention in India as compared to the western countries. In our best knowledge, there is paucity in studies which have addressed this major issue of lack of guidelines available for optimum GWG for the Indian women with higher pre-pregnancy BMI. We hope this study will add to the pool of data in formulating guidelines for Indian pregnant women. Further, the data pertaining to weight gain, was not self-reported, rather data were gathered from the constant monitoring of participants and weight recorded during antenatal visits to avoid any bias. The study had a limitation too. The current study includes the limited sample size of only 312 pregnant women recruited from private antenatal clinics, hence further studies are warranted with larger sample size to validate the findings obtained.

CRediT authorship contribution statement

Priyanka Arora was responsible for study conception, data collection and drafting of the manuscript. Dr. Bani Tamber Aeri was responsible for planning of the study, drafting and finalising manuscript.

Declaration of Competing Interest

All authors declare that there is no potential conflict of interests.

Acknowledgements

The authors acknowledge the financial assistance provided by the University Grant Commission, Government of India, under the Junior/Senior Research Fellow Scheme. We would like to extend our sincere thanks to Vaibhav Miglani for providing his statistical expertise and participants of study and staff of antenatal clinics in North-West Delhi

for supporting us during data collection.

Source of support

The first author has been awarded a University's Grant Commission's (UGC) Research Fellowship (UGC-Ref. No.: 12510) for the present study.

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