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Dietary Intake and Lifestyle Characteristics among Pregnant Women Attending Antenatal Care in Gausia Bangladesh

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ABSTRACT

Gestational diabetes mellitus needs to be taken care of maternal diet, exercise, and quality of antenatal examination. This research paper reported the consumption rates of food, chosen lifestyle factors and gestational diabetes-related status of pregnant women in DKMC Hospital, Gausia, Bangladesh. The survey was a cross-sectional survey, involving a hospital, and was conducted between October 2022 and June 2023. Convenience sampling involved 368 women who had 24 or more gestation weeks. Data was gathered by using face-to-face interviews, a semistructured questionnaire, antenatal records and physical measurements. Descriptively summarized available aggregate results. Mean age was 25.65 years (SD = 4.97). 89.9% of participants had rice two or three times per day. Reported 76.1% daily egg consumption and 54.1% fish two or three times a week. The percentage that ate general vegetables was 73.1% and ate two or three times a day, whereas leafy vegetable was normally eaten twice or thrice a week. 55.4% had soft drinks weekly. The proportion of gestational diabetes reported was 38.2% but could not be independently verified due to diagnostic denominators and inconsistencies within the charts. The underweight gain was less than 7 kg and these values were considered underweight gain and inadequate gestation period and baseline body mass index. The results reveal priorities of culturally appropriate dietary assessment and enhanced antenatal documentation. They do not create a correlation between the individual food, activity, weight gain and the gestational diabetes. Future studies with standardized diagnostic tests and dietary information on the individual level are needed.

INTRODUCTION

Gestational diabetes mellitus (GDM) is a significant issue in the antenatal care as the level of maternal glucose influence pregnancy management and fetal development. It should be interpreted in a very clear differentiation between diabetes that is present at the time of conception and hyperglycaemia, which was initially diagnosed during pregnancy. World Health Organization (WHO, 2013) differentiates diabetes mellitus during pregnancy and GDM based on the extent of glucose abnormalities. This difference enhances clinical categorization and avoids the use of various conditions in one name. It is especially applicable when hospital records employ generalizations like those with history of diabetes without further specifying when the condition started.

Hyperglycaemia and Adverse Pregnancy Outcome study support the clinical relevance of maternal glycaemia (Akter *et al.*, 2021). These cross-national studies found out the graded associations between maternal glucose levels and various undesirable pregnancy consequences such as increased birth weights and fetal hyperinsulinaemia. These results were indicative that risk associated with glucose persists below the point of manifested diabetes. This has meant that depending on the testing processes and the levels at which diabetes is detected, and the nature of the population studied, the understanding of GDM prevalence varies (HAPO Study Cooperative Research Group, 2008).

Bangladesh is an appropriate environment to study the dietary habit of mothers and pregnancy issues associated with glucose. Bangladesh Demographic and Health Survey 2017-2018 provided the GDM estimate of 35 % in 272 pregnant women who took part in their analysis. The adjusted model showed higher odds associated with urban residence and older maternal age. That estimate, however, must not be considered to be equivalent to a hospital-based estimate based upon a different sampling frame or a different diagnostic process. Its main applicability lies in the fact that the abnormalities in glucose levels have been reported to be significant in a Bangladeshi sample of pregnancy (Mazumder *et al.*, 2022).

Maternal health is a potentially modifiable factor, but is conceptually challenging to measure. The fact that a woman eats rice often does not determine her overall carbohydrate intake. Correspondingly, the number of times one consumes cooking oil does not measure the dietary fats. The meaning of any frequency response is influenced by the portion size, food preparation, the foods it is accompanied by, as well as the timing of meals (Jahan *et al.*, 2023). Research on maternal nutrition should thus clarify the difference between describing eating habits and measuring nutrient adequacy and between estimating the risk of disease.

One of the measures to take into account foods together is the dietary pattern analysis. Hu (2002) added that patterns can be used to augment the study

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of each nutrient since they reflect the overall design of dietary intake. Nevertheless, a food frequency list is not necessarily an approved dietary pattern (Nguyen *et al.*, 2020). A pattern must have some form of scoring mechanism or statistical derivation out of personal observations. This difference is significant to the current work as the existing data characterize individual food items and not a complex index or pattern that is obtained through empiric findings.

There is prospective evidence showing concern about the quality of food in general prior to pregnancy. High compliance with some official healthy eating habits in the Nurses' Health Study II was linked to the reduced risk of GDM with the consideration of other covariates (Costanza *et al.*, 2022). These results related to prepregnancy dietary exposure, and incident GDM. They thus offer a justification of nutritional inquiry and do not prove that the identical relationships can be found in all settings and at all developmental levels of pregnancy. The time of study and cultural make up of meals are also crucial (Tobias *et al.*, 2012).

The current research deals with a current descriptive question in an antenatal service. It also explores the types of foods that were regularly eaten, how the chosen lifestyle elements were reported and what maternal attributes were recorded among the women who were involved. These observations may be used to determine the areas of dietary counselling and limitations in regular data gathering (Silva *et al.*, 2021). They are unable to tell whether certain food led to GDM or whether it was appropriate to walk to prevent GDM, or whether it was appropriate to gain weight.

Service relevance is also found in a descriptive account when foods are consumed during communal meals at home. An antenatal attendee is not always in charge of all ingredients, buying, and preparation procedures. Resource allocation can be defined by household income and does not reflect who distributes food or whether advice can be taken. These decisions were not measured in the current study. However, the understanding of the constraints of the variables documented will assist in determining what a fuller evaluation ought to inquire. This method maintains the connection of recommendations with the data required to care instead of laying blame on a particular woman based on the intake of foods alone (S. Khatun *et al.*, 2021).

The aim of the study was to describe the sociodemographic factors, food intake frequencies, perceived walking behaviour, weight gain groups, and perceived GDM in pregnant women at DKMC Hospital in Gausia. Another purpose was to explain these results concerning the boundaries of the measurement processes. The subsequent input is a facility-based history of dietary patterns of the mother and chosen antepartum signs (Liu *et al.*, 2023). The scope is descriptive since there were no individual level cross-tabulations, diagnostic measures as well as adjusted association estimates available to the current manuscript.

LITERATURE REVIEW

Maternal glycaemia and diagnostic interpretation

The Consensus Panel of the International Association of Diabetes and Pregnancy Study Groups (2010) suggested that there should be a standardized method of identifying hyperglycaemia in pregnant women. It recommends a 75 oral glucose tolerance test at 24-28 weeks old in women who have not been categorized through previous testing. The diagnostic strategy takes fasting, one-hour and two-hour measurements. This information is important since an account that includes mentioning fasting and two-hour glucose is insufficient to show that all the elements of the suggested protocol have been followed (Larbi, 2021).

When comparing studies, diagnostic consistency is crucial. Some testing timetables can involve women in various stages of pregnancy and have varying thresholds that can identify the same glucose distribution but under different terms (Islam *et al.*, 2022). The previously identified diabetes should also be differentiated with the recently identified gestational hyperglycaemia. Based on this, the proportion of GDM in a facility report must be viewed in conjunction with its case definition, test completeness, and denominator. In places where such elements are not fully reported, the proportion provided is a description with limited comparability.

Dietary Quality and Food Combinations

Comments on the quality of carbohydrates are more informative than a mere categorization of foods as carbohydrate-containing and carbohydrate-free. In a prospective study, prospective dietary fibre intake of higher levels was linked to a reduced risk of GDM, but a combination of high dietary glycaemic load and low cereal fibre intake was linked to increased risk. The findings validate the study of the quality and composition of carbohydrate sources. These do not mean that the consumption of rice alone can be used to define the metabolic exposure of a woman (Zhang *et al.*, 2006).

Special attention should be paid to the interpretation of local food categories. Ruti, paratha and muri are different types of cereal preparations and could vary in ingredients used, fat added and the serving size of the preparation. Pulses like lentils can be added to dishes in various amounts and ratios. General fruits (including meat, fruits in general), and local fruits (also including meat) are also heterogeneous (Chanda *et al.*, 2020). Inferences regarding the intake of red meat, processed meat, fruit sugar, or fibre would go beyond the information gathered, without the identification of the foods.

Nutritional assessment ought to be culturally sensitive so as to have familiar food names but categorize how each is documented. There should also be no overlap of categories in classification. An example would be a locally sourced fruit that can be registered as a general fruit and a local fruit unless the questionnaire is explicit on the matter. In the same manner, the logic of the consumption of soybean must indicate that an item is the soybean oil, which is consumed in cooking, or the soybean food

(Astuti *et al.*, 2020). These are measurement problems that have an impact on how one interprets frequency tables.

Physical Activity and Maternal Weight

Physical activity applies to the GDM research but a perceived walking frequency is not similar to a programmed exercise intervention. Wang *et al.* (2017) compared the benefits of exercise at the early stages of a pregnancy in women with no contraindications to exercise. The trial indicated that there was a decrease in GDM in the exercise group. Its results are related to a specified intervention and chosen respondents. They are not convertible into a numerical protective effect of the walking categories obtained in the current survey.

Similar care must be taken in gestational weight gain. Gestational period also depends on the gestation period at a specific visit and recommended amount varies depending on the pre-pregnancy body mass index. Without these details it is impossible to consider a total gain less than 7 kg as inadequate or appropriate. The model created by Institute of Medicine and National Research Council (2009) puts focus on the maternal size and pregnancy environment baseline. Therefore, the current work qualifies categories of weight, but not the clinical adequacy.

Conceptual Orientation

The conceptual orientation views the dietary intake and physical activity in a wider maternal and household context. Access to resources and opportunities to activate and foods may be affected by age, education, occupation, house resources, and family situations. A prior pregnancy history, underlying metabolic vulnerability, and baseline body size, as well as gestational length, might have an impact on clinical status and behaviour (Billah *et al.*, 2022). Subsequent change may then be diet or activity through antenatal counselling. This framework recognizes multiple potential relationships without stating that they were tested statistically.

One of the main issues is the direction of any perceived relationship. Women with a diagnosis of GDM can cut down on sweetened drinks, alter the amounts of cereals or start walking even before a dietary interview. Their present behaviour might thus be a reaction towards diagnosis. It might be mistaken that this response is an antecedent exposure when observing it in a cross-sectional comparison (Begum and Biswas, 2020). The descriptive one employed in this case does not make such an inference but instead the future longitudinal evaluation is considered as requiring to investigate the relationships with time.

MATERIALS AND METHODS

Study Design and Setting

The cross-sectional study was carried out in a hospital DKMC Hospital, Gausia, Bangladesh, between October 2022 and June 2023. The study population included the pregnant women who received the antenatal services within the study period. Only women who were 24 weeks or above of gestation were recruited. This was made possible by the facility-based design which made interviews and the use of available antenatal information accessible within the same service environment. It failed to give a sampling frame of all the pregnant women living in the surrounding community.

Convenience sampling was used to recruit eligible attendees (Venkataraman *et al.*, 2022). Women who had types 1 or 2 diabetes previously conception were not included as well as women who refused consent. The report available lacked the number approached, a number excluded due to any reason, and a flow diagram of the recruitment. The last sample has been 368 participants. There was no calculation of response rate since the denominator of all eligible women approached, was not recorded.

Sample Size Determination

The initial planning calculation was the single-proportion formula $n = Z^2p\ (1 - p)/d^2$. With $Z = 1.96$, $p = .35$, and $d = .05$, the calculated minimum was 349.59, rounded to 350. This figure was increased by adding another 18 people as an approximate allowance the 5% which resulted in the mentioned target 368. This is a document the planning process; it does not equal to a division of the minimum sample by an expected proportion of response of.95.

The expected percentage of .35 was not an outcome of the current study, but a planning assumption. The last sample was greater than the result of the calculation of the minimum. However, a precision-based formula fails to eliminate the limitations of convenience sampling on selection (Ruggieri *et al.*, 2022). The nominal margin of error presumes some conditions related to probability sampling which were not proven in this case. Consequently, the sample size obtained is useful in presenting descriptively within the group recruited without determining representativeness of Gausia, Dhaka, or Bangladesh.

Data Collection

Face-to-face interviews with study participants, using a semistructured questionnaire, were used to collect data. The tool addressed sociodemographic characteristics, medical and family history, physical measurements, physical activity, diet and food frequency. Available clinical data (glucose and blood pressure levels, prepregnancy weight data) were gathered via antenatal records (W. Khatun *et al.*, 2020). A weighing scale was used to measure the present weight. One of the equipment was a measuring tape but no specification of the calibration or the measurement procedure was mentioned.

Social demographic factors involved age, education, religion, marital status, occupational status, monthly household income and monthly household expenditure. The revenues and expenses were in Bangladeshi taka

(BDT). The source reported family and personal histories of various conditions, but the numerical distributions of these histories were not provided. These variables were therefore not included as findings. This was also the case with glucose levels, blood pressure, height, and body mass index since there were no values that could be analyzed.

The quantity of food consumed was captured on the basis of items in frequency categories. These options were two or three times per day, once per day, two or three times per week, once per week and never. The food groups included cereals, animal-source foods and pulses, fats, fruits and vegetables, and a few snacks and soft drinks (Akter *et al.*, 2021). The documentation available failed to set the portion sizes, overall energy intake, nutrient conversion processes and the reference period of habitual intake. The measurement proceeded as a food frequency measure as opposed to a quantitative nutrient measure.

The source indicated that the food frequency questionnaire was proved to be valid in its discussion, but they failed to cite a validation study, reliability coefficient, and citation of the instrument. It is not claimed in the present manuscript as a known property of the instrument. Language of interview, training of interviewers and pretesting procedures were also not clearly defined. These gaps relate to reproducibility and are taken into consideration when interpreting the findings as opposed to substituting them with supposed procedures.

Variables and Outcome Definitions

The main dietary variables were the frequency of consumption of individual foods. Weight gain was categorized as less than 7 kg, 7-12 kg and more than 12kg. Walking was coded under a duration category whereas the time frame under which they took the walk had no reporting period. The status in the study summary was retained in the GDM status. Pregnancy was an eligibility criterion in its own right, and no longer a dependent variable, as all the participants were pregnant.

Even though the narrative of the study mentioned IADPSG criteria, full diagnostic threshold, dates of testing, and glucose results of individuals were not given. One could thus not be sure that the reported GDM classification was in accordance of those criteria to each woman. The source terminology was also not always clear on recent pregnancy status and a history of GDM. To maintain the finding without providing a claim of independently verified clinical diagnosis, the manuscript reported GDM status.

Statistical Presentation and Consistency Assessment

The initial research indicated that it was analyzed with the help of IBM SPSS Statistics, version 22. The current manuscript tabulates the existing aggregate outputs and converts percentages of food and sociodemographic counts based on 368 numbers as the denominator. Continuous variables are given as mean, standard deviation and range where there are. The counts and percentages are used to represent categorical variables. No person-level data were provided and no further hypothesis tests, regression models or dietary pattern scores were created.

To facilitate a small-scale comparison, food frequencies were unified into daily, weekly and never categories. Combination Daily eating once a day, two or three times a day. Combination once/week with two or three times/week. These combined categories were computed solely on the table counts that were reported. We counted each food item individually, and therefore the sums of various food items cannot be assumed to be mutually exclusive eating groups. The item-specific differences are elaborated where they are material to the interpretation.

Categorizing frequencies enhances the readability but lowers the detail. Indicatively, the daily consumption has both once-daily and more frequent consumption, and the weekly consumption has two categories of responses (Jahan *et al.*, 2023). The tables in groups must thus be viewed alongside the results of each item as explained in the text. A daily category is not a standardized serving, and a weekly category does not mean that the number of eating occasions would be the same among all women. These differences preclude the tabular summary implying a certain amount of dietary accuracy that was not quantified.

Reviewing chart data and narrative embedded was done on consistency. The GDM categories added up to 99.7% and the weight gain categories added up to 99.7%. These inconsistencies were kept as unresolved reporting restrictions since original counts were not available. There were less problematic with walking data: the narrative showed that 61.0% did not walk, but the embedded worksheet showed 59.9%. Some unused chart-template entries were included in the worksheet as well (Nguyen *et al.*, 2020). These observations were not considered participant observations.

Inferential assertions were limited as such. Marginal frequency tables are not able to determine the relationship between a food and GDM since we do not know the joint frequency. Likewise, separate percentages of walking and GDM could not be combined to obtain an odds ratio of physical inactivity. The GDM proportion had no confidence intervals since it was not certain how many cases it had and the denominator of its diagnosis. This method of reporting is aligned with the focus of clear practices and constraints of observational studies (von Elm *et al.*, 2007).

Ethical Considerations

According to the study documentation, it has been ensured that the ethical approval was given by ethical review committee of Bangladesh University of Health Sciences. Informed consent was obtained prior to

interview in written form and the participants were made aware of their right to withdraw. The study account guaranteed privacy and confidentiality (Costanza *et al.*, 2022). The document provided lacked the approval identifier, date of approval, and procedure to be applied to participants who were below the age of 18 years. The details related to administration must be verified by the actual research records.

RESULTS AND DISCUSSION

Sociodemographic Characteristics

The participants of the study were 368 pregnant women aged between 17 and 40 years. The average age was 25.65 years with SD of 4.97. Household income stood at BDT 49,418.48 per month whereas expenditure was 43,467.39 per month. These two variables were highly dispersed with an income of BDT 15,000 up to BDT 200,000 and expenditure BDT 14,000 up to BDT 180,000. These scales characterize the financial situations of households without defining personal purchasing power in diets.

The biggest category of education was higher secondary education, which represented 126 women (34.2%). An additional 79 women (21.5%) said education beyond graduation and 52 (14.1%), said graduation. There was only a single participant who did not have formal schooling. Majority of the respondents were married and 244 (66.3%) identified themselves as homemakers. Homemaker was not equated with unemployment as it remained as an occupational category. Household income between BDT 21,000 and BDT 69,000 was reported for 245 women (66.6%).

Table 1: Sociodemographic characteristics of participants

Characteristic	Mean ± SD or n	Range or %
Age in years	25.65 ± 4.97	17–40
Monthly household income in BDT	49,418.48 ± 34,117.35	15,000–200,000
Monthly household expenditure in BDT	43,467.39 ± 27,827.50	14,000–180,000
No formal schooling	1	0.3
Primary education	34	9.2
Secondary education	76	20.7
Higher secondary education	126	34.2
Graduate	52	14.1
Above graduate	79	21.5
Homemaker	244	66.3
Teacher	26	7.1
Banker	15	4.1
NGO worker	11	3.0
Business	23	6.2
Service holder	46	12.5
Other occupation	3	0.8
Single	2	0.5
Married	365	99.2
Widowed	1	0.3
Muslim	266	72.3
Hindu	57	15.5
Christian	30	8.2
Buddhist	15	4.1
Income ≤ BDT 20,000	45	12.2
Income BDT 21,000–69,000	245	66.6
Income ≥ BDT 70,000	78	21.2

Note: N = 368. Continuous variables are expressed as mean ± standard deviation and range. Other entries are counts and percentages. BDT = Bangladeshi taka. Percentages were recalculated from counts.

Reported GDM and Maternal Indicators

The research report indicated GDM among 38.2% and no GDM among 61.5%. These percentages did not give the auditable number of women in each category. We cannot solve the discrepancy just because of rounding since everything in the denominator and any missing diagnostic observations were unspecified. As a result, these values are reported as percentages (Chanda *et al.*, 2020). They are not to be taken as a proven population prevalence or as an incidence estimate.

Reported weight gain was below 7 kg for 58.5%, between 7 and 12 kg for 35.5%, and above 12 kg for 5.7%. The distribution shows that the least gain category was the most prevalent. It does not determine the percentage of poor or superior gain. The fact that there are no participant-specific gestational age and prepregnancy body mass index does not allow a valid comparison with individualized weight gain recommendations.

Those reporting walking between 38.2% and 0.5% respectively during some period of their life but less than one hour and one hour plus but less than three hours respectively. The percentage of no-walking was different in both the narrative and embedded worksheet. The highest percentage in that category was, however, in both versions. These durations could not be transformed to minutes per week or to determine adherence to physical activity recommendations since the reference period was ambiguous.

Table 2: Reported clinical and walking indicators

Indicator and category	Reported %
GDM yes	38.2
GDM no	61.5
Weight gain < 7 kg	58.5
Weight gain 7–12 kg	35.5
Weight gain > 12 kg	5.7
Walking some time but < 1 hour	38.2
Walking ≥ 1 hour but < 3 hours	0.5
No walking	61.0 in narrative; 59.9 in worksheet

Note: Percentages are reproduced as reported and were not converted into counts. GDM and weight gain categories each sum to 99.7%. Diagnostic denominators and the walking reference period were unspecified. Conflicting walking values remain unresolved.

Cereal Consumption

The main cereal product was rice. One hundred and thirty-one women (89.9%), out of 372, indicated they were consuming twice or three times a day, and thirty-four (9.2%), indicated once a day. Integrated daily rice consumption thus constituted 365 women (99.2%). The frequency of consumption of rice was only one of the women who consumed rice once in a week, and two women said they never took rice. This distribution shows almost universal daily intake of rice among the sample but does not show the amount intaken per meal.

Ruti was more diversely distributed. Daily consumption was reported by 130 women (35.3%), weekly consumption by 93 (25.3%), and no consumption by 145 (39.4%). The less prevalent one was paratha, as 270 women (73.4%) reported never having eaten paratha. Cereals like muri and other cereals were also uncommon: 89.4% and 90.2% of them, respectively, reported never consumed them. These results imply that there is a lack of reported cereal variety, but not all preparations and quantities of grains were covered by the questionnaire.

Table 3: Cereal consumption frequencies

Food item	Daily n (%)	Weekly n (%)	Never n (%)
Rice	365 (99.2)	1 (0.3)	2 (0.5)
Ruti	130 (35.3)	93 (25.3)	145 (39.4)
Paratha	3 (0.8)	95 (25.8)	270 (73.4)
Muri	7 (1.9)	32 (8.7)	329 (89.4)
Other cereals	5 (1.4)	31 (8.4)	332 (90.2)

Note: N = 368. Daily combines once daily and two or three times daily; weekly combines once weekly and two or three times weekly. Percentages were recalculated from source counts. Categories describe frequency, not serving size.

Animal Source Foods and Pulses

There was consumption of milk and eggs. 271 women consuming milk daily (73.6%) and 174 (47.3%) once per day were included in the study. The intake of eggs was 286 women daily (77.7%), and 280 women report consumption once daily (76.1%). More often foods were fish and meat that were bought once per week. The 199 women (54.1%) had reported fish consumption twice or thrice a week whereas the 238 women (64.7%) had reported meat category.

Lentils were consumed daily by 167 women (45.4%) and weekly by 173 (47.0%). The distribution of Simbichir

dal was very similar, having 167 and 173 daily and weekly consumers respectively. These categories were held independently since they were listed independently in the questionnaire. Motor dal, khesari dal and mascolai dal had a low rate of reporting (never consumption proportion of 95.7%, 96.7%, and 94.3% respectively). Participants did not eat other pulses 85.3% of the time. The distribution indicates that some of the animal-source foods and another group of pulses were frequently eaten in diets. Nevertheless, frequency is not a determinant of protein adequacy, total protein intake, and relative protein sources of animal and plant sources. Poultry, red meat, and processed products did not differ in the meat category. Preparation of fish was not specified too. As such, the outcomes cannot justify classifications of foods on the basis of food processing, fat content or specific protein-related metabolic processes.

Table 4: Animal source food and pulse consumption frequencies

Food item	Daily n (%)	Weekly n (%)	Never n (%)
Milk	271 (73.6)	86 (23.4)	11 (3.0)
Fish	77 (20.9)	281 (76.4)	10 (2.7)
Meat	57 (15.5)	306 (83.2)	5 (1.4)
Eggs	286 (77.7)	81 (22.0)	1 (0.3)
Lentils	167 (45.4)	173 (47.0)	28 (7.6)
Simbichir dal	167 (45.4)	173 (47.0)	28 (7.6)
Khesari dal	0 (0.0)	16 (4.3)	352 (95.7)
Motor dal	1 (0.3)	11 (3.0)	356 (96.7)
Mascolai dal	0 (0.0)	21 (5.7)	347 (94.3)
Other pulses	9 (2.4)	45 (12.2)	314 (85.3)

Note: N = 368. Daily combines once daily and two or three times daily; weekly combines once weekly and two or three times weekly. Percentages were recalculated from source counts. Categories describe frequency, not serving size.

Fats and Oils

The product in the source tables was termed as soybean, but in the narrative of the study, it was referred to as soybean oil. Reported daily intake of 365 women (99.2%) of which 328 (89.1%) reported daily use two or three times a day. This probably indicates the frequency of an ingredient in the cooked meals, but the amount was not documented. When considering this very high frequency, the difference between food intake and cooking-ingredient exposure is significant.

None (353 out of 95.9%) of the women had eaten ghee. Butter was consumed daily by 50 women (13.6%), weekly by 24 (6.5%), and never by 294 (79.9%). The 342 women (92.9%) did not consume other fats. These values define the spread of the mentioned items but not the total fat intake. They are not able to detect how much the oil they absorb by cooking, how much they use the same frying oil, and how much the fatty acids of the entire diet are.

Table 5: Fat and oil consumption frequencies

Food item	Daily n (%)	Weekly n (%)	Never n (%)
Ghee	7 (1.9)	8 (2.2)	353 (95.9)
Butter	50 (13.6)	24 (6.5)	294 (79.9)
Soybean oil	365 (99.2)	2 (0.5)	1 (0.3)
Other fats	5 (1.4)	21 (5.7)	342 (92.9)

Note: N = 368. Daily combines once daily and two or three times daily; weekly combines once weekly and two or three times weekly. Percentages were recalculated from source counts. Categories describe frequency, not serving size.

Fruits and Vegetables

356 women (96.7%) consumed general vegetables on a daily basis. In this group, 269 (73.1%) responded that they consumed two or three times a day. The distribution was different with leafy vegetables. Only 23 women (6.3%), used them daily, whereas 342 (92.9%) used them once a week. The highest original category was two to three times per week with 236 women (64.1%). There were only three participants who said that they had never eaten leafy vegetables.

General fruits were consumed daily by 227 women (61.7%) and weekly by 141 (38.3%). No never was reported on this item. Local fruits were consumed daily by nine women (2.4%), weekly by 343 (93.2%), and

never by 16 (4.3%). 246 women (66.8% never consumed other fruits or vegetables. There was no definition of the boundaries between these categories hence their frequency was not summed up to represent the total fruit and vegetable consumption.

Table 6: Fruit and vegetable consumption frequencies

Food item	Daily n (%)	Weekly n (%)	Never n (%)
Leafy vegetables	23 (6.2)	342 (92.9)	3 (0.8)
General vegetables	356 (96.7)	12 (3.3)	0 (0.0)
General fruits	227 (61.7)	141 (38.3)	0 (0.0)
Local fruits	9 (2.4)	343 (93.2)	16 (4.3)
Other fruits or vegetables	5 (1.4)	117 (31.8)	246 (66.8)

Note: N = 368. Daily combines once daily and two or three times daily; weekly combines once weekly and two or three times weekly. Percentages were recalculated from source counts. Categories describe frequency, not serving size.

Snacks and Soft Drinks

Some of the foods that were selected were consumed weekly. Singara was being consumed by 155 women (42.1%) a week, and 213 (57.9%) never consumed it. Every week 166 women (45.1%) ate Puri. Noodles were eaten once per week by 286 women (77.7%), and 169 (45.9%)) women ate noodles once per week. Biscuits were consumed daily by 104 women (28.3%) and weekly by 234 (63.6%).

The percentage of soft drinks consumption among 294 women (79.9%) was weekly (204 of 55.4% once a week). Four subjects said that they consume them on a daily basis and 70 (19.0%) said that they never consume them. Beverage type, serving size and sugar content were not mentioned in questionnaire. So, the frequency of soft drinks cannot be translated to sugar. These data imply that the exposure to the documented category of beverages is made, but not the contribution to the total dietary energy or GDM state.

Table 7: Snack and soft drink consumption frequencies

Food item	Daily n (%)	Weekly n (%)	Never n (%)
Singara	0 (0.0)	155 (42.1)	213 (57.9)
Puri	1 (0.3)	166 (45.1)	201 (54.6)
Noodles	2 (0.5)	286 (77.7)	80 (21.7)
Biscuits	104 (28.3)	234 (63.6)	30 (8.2)
Soft drinks	4 (1.1)	294 (79.9)	70 (19.0)

Note: N = 368. Daily combines once daily and two or three times daily; weekly combines once weekly and two or three times weekly. Percentages were recalculated from source counts. Categories describe frequency, not serving size.

Discussion

Principal Interpretation

The main observation is a diet pattern that is almost universal with rice being used daily, high frequency of milk and eggs, weekly fish and meat, and high frequency use of the product termed soybean oil. Consumption of general vegetables was common but local fruits and leafy vegetables were a more frequent weekly food. A number of snacks and soft drinks were reported frequently too. These observations include food choice and repeat among a chosen antenatal population. They are useful in presenting certain issues that should be assessed as opposed to the ranking of foods as disease causing.

Interpretation revolves around the difference between dietary description and disease association. There are marginal distributions of all food tables in the entire sample. None of them presents the difference in intake between women having and without GDM. Consequently, a seemingly widespread exposure can be both widespread in both sets (Billah *et al.*, 2022). The existence of the high proportion of people who eats rice every day and the high proportion of reported GDM can exist independently of each other. The existing evidence thus fails to support arguments of dietary causes of GDM.

Rice and Carbohydrate Quality

Almost everyone ate rice daily and this in itself makes rice a necessary aspect of any locally adequate dietary discourse. The counselling along this observation would require considering the meal portions, the vegetables that accompany the food, sources of proteins and how the food is distributed throughout the day. These data would not lead to an instruction to eliminate a culturally central staple. The survey did not measure polished rice consumption, type of grain, or measure overall exposure to carbohydrates.

The potential conclusions of Zhang *et al.* (2006) are useful in making the differentiation between carbohydrate quantity and quality. Their findings associated fibre and glycaemic load with future GDM, but the current study has documented frequency only. Without portion and composition information it would then be improper to refer to the observed rice pattern as a high-glycaemic-load diet. The relevant research implication is to gather the information needed to do such a calculation and compare it with maternal characteristics.

This low reporting of other cereals could possibly imply a lack of variety in reported cereal preferences. It can also denote an unfinished food listing or the translation of the general categories. The consumption of Ruti was varied enough that it warrants a more detailed evaluation in future studies. The usefulness of this variable would be enhanced by the information on flour composition, added oil, and portion size (Begum and Biswas, 2020). Similar information about paratha and muri would stop food names becoming inaccurate replacements of nutritional make-up.

Protein Sources and Preparation

The frequency of food intake of milk and eggs indicates that these foods were already present components of the reported diet. Nevertheless, frequent consumption cannot be supposed to reflect proper maternal nutrition. A small portion that is eaten every day might have less of an impact than a big portion that is eaten less frequently. Sugar could also have been added to milk and eggs could have been cooked using various cooking techniques. Both possibilities were not quantified and both of them demonstrate why the frequency findings should be accompanied with some supplementary information.

Most of the participants were found to consume fish and meat as their weekly foods and lentils daily or weekly (Venkataraman *et al.*, 2022). This mixture provides a point of departure of studying dietary variety in future research. It does not allow concluding that the sample lived on a predominantly animal or on a predominantly vegetable diet. The distributions of lentils and simbichir dal are almost the same as well, and they also should be checked against the original coding records. They have the potential of representing similar habits, and it is not possible to solve possible category overlap based on aggregate tables.

Vegetables and Fruit Classification

The results with the vegetables need to be more precise than a blanket statement that there was low fruit and vegetable consumption. 96.7% reported daily general vegetable intake and 61.7 % reported daily general fruit intake. Conversely, consumption of leafy vegetables on a daily basis was not common. The analysis thus finds differences among food groups as opposed to homogenous low consumption on all produce. It is not known whether these frequencies are nutritional requirements since the serving amounts were not measured.

The interpretative is further constrained by the difference between general and local fruits. When the categories overlap, the counts of the overlapping categories would count the same consumption twice. In case of their mutual exclusivity, the food list that determines each group is required to make a comparison (Ruggieri *et al.*, 2022). The nutritional value or seasonality of the fruits used was not recorded. Future questionnaires need to take a form of example and a guard line of the category prior to fieldwork. This would render the findings more translational to both clinical counselling and cross study findings.

Cooking Oil and Discretionary Foods

The use of soybean oil is high, which seems to be a common cooking tradition. It cannot be compared to high intakes of total fats or taken to be an indicator of exposure to harmful fats. The frequency does not tell anything about the number used by a household or the number of people sharing a meal with the participant or the amount of food eaten by the participant. More practical evaluation would document cooking techniques and approximate oil amounts and recognise the impossibility of quantifying the consumption of shared dishes.

Common foods were soft drinks and biscuits, which needed clarification in dietary interviews. But the available tool did not determine whether the beverages contained any added sugar or whether biscuits substituted meals or were used with them. Singara and puri were also different in terms of the frequency they reported with more than half reporting none of them. These differences make it not possible to talk about the whole sample being in a homogenous unhealthy snack pattern. The results can point to the possibly applicable behaviours to be evaluated further without a composite quality of diet.

Reported GDM in Context

The proportion of reported GDM is high, but its quantitative meaning is not as great. It falls within the spectrum of the high estimate by Mazumder *et al.* (2022), but there are variations in recruitment and case finding that do not allow a direct comparison. The current study sampled individuals who attended the hospital at weeks 24 and above whereas the national survey analysis is performed with an alternate sampling plan. Two percentages would not agree to show that either estimate provides the same population.

Evidence of the treatment of gestational hyperglycaemia supports the high impact of its identification and management. Crowther *et al.* (2005) discovered that dietary advice, glucose monitoring, and insulin on demand as part of treatment decreased serious perinatal complications. This fact presents sound prenatal diagnosis and follow-up treatment. It neither determines

what dietary exposure resulted in the reported cases in the current sample nor confirms a hospital percentage the underlying levels of which are not available.

The same study by Lanland *et al.* (2009) also studied the treatment of mild GDM, and found the results to have benefits in various secondary maternal and neonatal outcomes, but not the primary composite outcome, which was not significantly decreased. Such results support the clinical significance of precise diagnosis and demonstrate the necessity to present results correctly. Similar treatment or birth outcomes were not gathered in the current study. It thus adds a description of the characteristics of the ante partum instead of evidence regarding the effectiveness of the management of GDM.

Walking and maternal weight gain

The walking information indicates that no reported walking was prevalent, and is incapable of describing total physical activity. The available results did not measure domestic work; movement related with employment or transport and any other activities. Walking time also did not have a definite daily or weekly point of reference. The difference between the story and worksheet does not allow an accurate estimate of the inactivity. As a result, the remark that inactive participants were twice as likely to get GDM is not supported by the provided outputs and is not preserved.

The study by Wang *et al.* (2017) indicates that further studies should examine structured activity in pregnancy, although the intervention in this study is quite different to the current measure. That trial defined the eligibility, supervision, frequency, and the time of exercise. Similar detail would be necessary prior to assessing an activity programme in this antenatal context. The recommendations that can be made based on the current survey must then be aimed at individual assessment and proper clinical guidance instead of a numerical impact, which is based on an unspecified walking category.

The most common category of weight gain was below 7 kg. However, women were enrolled in the study at varying potential gestational periods since there was no maximum stipulated limit, just that they had to have a minimum of 24 weeks. The woman evaluated in the range of the eligibility threshold cannot be immediately compared with a woman in the range of delivery with the same category of absolute gain. There is another source of variation which is baseline body size. These reasons lead the source to the conclusion that weight gain was usually low which was clinically indeterminate.

Household context and counselling priorities

The results of income and expenditures indicate that there is diversification of the sample. Despite the higher level of average income than spending, the gap between two sample meanings cannot be viewed as resources available to all households as disposable income. The distributions were liberal and no household size was recorded in the results. There was also variation in education amongst participants (W. Khatun *et al.*, 2020). A single-level-of-assumed-literacy, or one-level-of-assumed-affordability, approach to counselling would then demand information to which the existing tables are not going to present.

A practical evaluation may start with a description of a typical meal and the conditions under which this meal is prepared. Questions may determine whether the participant chooses the ingredients, eats together with other members of the family or has been advised on what to eat during this period of pregnancy. Such information would assist in deciphering the intent of normal rice, oil, or snack intake. They would also differentiate between a consistent household practice and a new development regarding nausea, appetite, medical recommendation, or diagnosis. The frequencies that are observed cannot be assigned such an explanation retrospectively.

The line between counselling and evaluation needs to be clear. After reviewing the clinical needs and pregnancy status of an individual, a clinician can talk to her about her meal pattern. A researcher who assesses that service should also indicate information about what advice was provided, when it was provided and how compliance was evaluated (Costanza *et al.*, 2022). In the absence of this information, it may be hard to interpret differences in subsequent behaviour. The current researches define the categories that have to be taken care of but provide no measurement of the quality of counselling and compliance.

Strengths and Limitations

The paper unites data on various aspects of antenatal health into a single service population. The 368 participants included give a good characterization of foods that are frequently reported and the tables maintain familiar local food categories. The face-to-face interviews also enabled the collection of data as part of normal attendance during antenatal visits. These characteristics contribute to the descriptive contribution of the study. They however, fail to adjust the sampling, diagnostic records, or lack of individual level data on analysis.

A significant weakness is selection bias. Recruitment convenience in one hospital can over represent women who either have access or visit that particular facility at a specific time or need more near clinical focus. Women who obtain care in other places and those who do not use the antenatal services were underrepresented. The education and income distributions also warn against a description of the participants as equally disadvantaged (S. Khatun *et al.*, 2021). Generalization must also be kept to a minimum, on women whose characteristics match that of the recruited attendants.

There are limitations to measurement of the diet. Regarding the reference period and serving sizes, they were not specified, the validation of the instruments was not reported, and the categories of foods might

overlap. Interview responses could have been affected by recall and socially desirable reporting. There were no nutrient database connection, energy and adjustment, and dietary quality scoring. Thus, the frequency tables do not provide sufficient information to estimate energy adequacy, micronutrient deficiency or protein adequacy or to estimate the nutritional value of the entire diet.

The main clinical shortcoming is doubt regarding the determination of GDM. Even though the antenatal records were accessed, glucose values were not available in their entirety, thresholds, testing dates, and the number of diagnostic tests were not provided. The varying percentages do not allow a precise reconstruction of the number of cases. Further limits of precision are the walking discrepancy and the unresolved weight gain denominator. These problems are mentioned directly since changing them with some assumed counts would give an impression of accuracy that is not backed up by the actual data.

Lastly, the cross-sectional design is unable to determine temporality. The changes of diet after a diagnosis can vary with the habits that come before it. Critical covariates such as parity, gestational age distribution, prepregnancy body mass index, history of GDM and exposure to counselling could not be adjusted. No causal pathway, significant association and protection is therefore claimable. The lack of these analyses is a mark of the limit of the current results instead of data supporting that diet or activity does not play a role in GDM.

Implications and Future Research

The observed food profile can be used in providing antenatal services with more specific discussions. Portions and meal composition should be used to evaluate rice intake. The questions concerning vegetables ought to be the difference between the types of vegetables, which are leafy, and those that are not, and the types of fruit ought to be clarified. Milk, eggs, fish, meat, and pulses must be considered by the amounts and methods of preparation. Snacks and beverages are to be analysed in terms of serving size and ingredients (Islam *et al.*, 2022). Such measures would transform the frequency responses in general into information that would be more helpful in individual care.

There is a need to improve clinical documentation. A coded record is required to differentiate between prepregnancy diabetes, GDM during the current pregnancy and preexisting GDM. It must capture gestational age at the time of testing, diagnostic process, glucose levels where appropriate and any missing measurements. Their weight records should record when this was done and the presence or absence of prepregnancy weight. The questions on walking and other activities should state the duration, frequency, intensity and reference period. These are recommended to overcome the measurement gaps that were established in this study.

Future studies must prospectively recruit women prior to GDM screening and re-test dietary intake subsequent to the diagnosis. It would be better to use a multicentre design to enhance the coverage of various population of services. A food frequency tool defined culturally with or without the inclusion of portion assessment or repeated dietary recalls would allow estimation of a wider dietary exposure. Comparison would then be done within the individual records on GDM groups, assessment of confounding, and transparent reporting of missing values. Any score of what one eats must be pre-specified or calculated by a clear procedure of analysis.

Another priority is to dissociate missing information with a negative response. A diagnostic test that was not recorded should not be coded as no GDM and an unanswered food item as never consumed (Chanda *et al.*, 2020). The same difference is on walking records and weight records. Explicit categories would be the only way to see denominators and allow readers to determine completeness. An orthography list would also maintain local names of food with a record of their English names and how they work. Such processes would enhance comparability without having to make unproven assumptions regarding the current outcomes.

Only when measurement and diagnostic procedures are sufficiently standardized, intervention research should follow. Evaluation of a locally adapted nutrition or activity programme could then be measured in terms of specified eligibility criteria and definitively meaningful outcomes. This kind of research would have to differentiate between prevention and treatment and would have to consider the normal antenatal counselling. The current descriptive results give areas of development on that work, yet do not prove that any of the suggested programmes can lessen GDM or enhance birth results.

CONCLUSION

The women of the MHC who are pregnant and reported visiting DKMC Hospital in Gausia formed a report on the dominance of consumption of rice per day with frequent intake of milk, eggs, and overall vegetable intake. Fish, meat, greens, domestic fruits and a few of the foods that were eaten at will were taken on a weekly basis. Categories of reported GDM status and weight gain provide clinically-relevant domains to be further examined, yet incomplete diagnostic data and incoherent chart values limit numerical evaluation. The research defends comprehensive and culturally suitable dietary evaluation and more regular antenatal documentation. It fails to make correlations between certain foods, walking, weight gain, and GDM. Those relationships should be evaluated by prospective studies that have a standardized clinical classification and measurement at the individual level.

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