



# Assessment of nutritional status among a sample of pregnant women in Al-Samawah City in Iraq: a cross-sectional study

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## Abstract

**Introduction:** Pregnant women experiencing poor nutritional status remains a problem which is still commonly found in Iraq. Poor nutritional status is one of the causes of increased mortality in pregnant women.

**Objective:** Assess the nutrition status of pregnant women, and to determine the obese by nutrition and demographic variables

**Methods:** A cross-sectional design study with 400 samples of pregnant women were collected. The sample distributed throughout (Al-Hussein Teaching Hospital, Maternity and Children's Teaching Hospital, and Samawah Primary Healthcare Sector). The data collection period starts on 21, December 2025 to 1, March 2026. The reliability of the questionnaire was assessed to determine its internal consistency and stability. **Result:** The two primary variables that were substantially linked to a higher BMI were age and gravidity. The relationship between age group and BMI was statistically significant ( $p = 0.044$ ). The incidence of overweight and obesity was lowest in the under-20 age group, while it was highest in women aged 20–34. This suggests that the bulk of this population's overweight and obese individuals are in the reproductive age range (20–34 years). BMI and gravidity were substantially correlated ( $p = 0.025$ ). Compared to prim-gravida women, multigravida women were more likely to be overweight or obese. **Conclusion:** Pregnant women in Samawah are frequently overweight or obese, and these conditions are strongly linked to maternal age, gravidity, and progressing gestation. However, there was no significant correlation found between BMI and socioeconomic indicators or reported physical activity.

**Keywords:** Assessment. Nutritional. Pregnant. Women. Iraq.

## Introduction

Pregnancy is an anabolic process and, a woman's typical nutritional needs rise throughout pregnancy in order to fulfill the demands of the developing fetus and the tissues of the mother. Given that pregnant women have one of the most crucial factors influencing pregnancy outcomes [1]. For women's health and reproductive function as well as the development, survival, and well-being of their offspring, a healthy diet is crucial [2].

Pregnant women's health and the success of their pregnancy depend on their having an adequate nutritional condition. Pregnancy is a crucial time to satisfy the body's needs for macro and micronutrients because of the increased dietary demands. Therefore, anemia and vitamin A Common micronutrient deficiencies (VAD) harm 53.8 million pregnant women worldwide [3].

Maternal nutrition and health is considered as the most important regulator of human fetal growth. Improved maternal nutrition has been associated with increased fetal growth and a reduction in adverse birth outcomes in developing countries and in populations with nutrient deficiencies [4].

Malnutrition is still one of the most important health problems in the world, not only because its consequences are so pervasive and persistent, but also because prevention is the greatest way to end it [5].

Poor nutrition in pregnancy in combination with infections is a common cause of maternal and infant mortality and morbidity, low birth weight and intrauterine growth retardation (IUGR) [4].

Maternal vitamin D deficiency is linked to fetal rickets; maternal folate deficiency is linked to an increased risk of neural tube defects in the infant; maternal iodine deficiency is linked to congenital abnormalities; mental deficiency; spastic diplopia and squint; myxoedymateous cretinism and dwarfism; psychomotor effect; and maternal zinc deficiency is linked to fetal growth retardation and congenital abnormalities [6,7].

Iron deficiency anemia, vitamin B12 insufficiency, vitamin K deficiency, iodine shortage, zinc deficiency, and magnesium deficiency are often more common in women who have deficits in certain micronutrients prior to becoming pregnant [8].

It is commonly known that a mother's weight increase during pregnancy and the baby's birth weight are correlated with her calorie consumption. Low birth weight increases the risk of developing chronic illnesses such diabetes mellitus, hypertension, and cardiovascular disease later in life. It is also strongly linked to growth retardation, poor cognitive function, morbidity, and death throughout infancy [9].

## Methods

### Study Design and Setting

A cross-sectional study with analytic was conducted to assess the nutritional status of pregnant women in Al- Samawah city. The study conducted at Al-Samawah City which includes two main government hospitals: Al-Hussein Teaching Hospital and the Maternity and Children's Teaching Hospital. It also has two primary healthcare sectors: Samawah Primary Healthcare Sector 1 and Samawah Primary Healthcare Sector 2.

### Ethical Consideration

This study was approved by the International Review Board at the College of Health and Medical Techniques, University of Baghdad. The study was registered in Clinical Trials Registry (ClinicalTrials.gov) under the ID MEC176. Each participant was asked for their informed consent after ensuring they understood the purpose, procedures, and their rights in the study. The randomization sequence and block arrangements were automatically generated in Microsoft Excel 2010 using the RAND function. This method ensured maintained allocation concealment throughout the participant recruitment process.

### Sample Size

400 samples of pregnant women were collected. They ranged in age from 15 to 45 years.

### Inclusion Criteria

Pregnant women aged 15 to 45 residing in Samawah, and pregnant women attend the Maternity and Children's Hospital and health centers affiliated with the Samawah First and Second Sectors only.

### Exclusion Criteria

Pregnant women over 45 years of age, pregnant women diagnosed with chronic diseases (e.g. diabetes mellitus, hypertension before pregnancy), and pregnant women who visited the hospital and health centers from outside the city of Samawah.

### Data Collection

After confirming the validity and reliability of the study instrument, the researcher used an approved questionnaire by structured interview technique with pregnant women, the first step was to get a diagnosis from the specialist physician that this woman is pregnant to collect Sociodemographic Information, and Clinical Examination. The laboratory team has completed the biochemical tests (Blood group, Hemoglobin level, Blood Glucose level, GUE) for pregnant women as a final step. Data were collected 21, December 2025 to 1, March 2026.

### Statistical Analysis

The collected data were coded, entered, presented, and analyzed by computer using the available data base software program statistical package of IBM SPSS-29 (IBM Statistical Packages for Social Sciences- version 29, Chicago, IL, USA). Data were presented in simple measures of frequency, percentage, mean, standard deviation, and range (minimum-maximum values). The significance of difference of different means (quantitative data) were tested using Students-t-test for difference between two independent means or Paired-t-test for difference of paired observations (or two dependent means), or ANOVA test for difference among more than two independent means.

## Results

Table 1 showed the demographic characteristics of the study sample, which included 400 pregnant women in the city of Samawah. The findings show that 81.5% of participants were between the ages of 20 and 34, with the largest percentage in the 25–29 age group (33.0%) and the lowest number in the under-20 age group (6.8%). The participants' ages ranged from 16 to

40, with a mean age of  $26.9 \pm 5.5$  years. In terms of the mothers' level of education, the largest proportion had a university degree or above (33.8%), followed by those with only a primary school education (22.3%), and those who were only Read and write (5.0%). In a similar vein, husbands with a university degree or above made up the largest percentage (37.3%), while those who were merely literate had the lowest percentage (6.3%). According to this study, the majority of moms were housewives (70.8%), followed by working mothers (24.8%) and self-employed mothers (0.5%). In terms of the husbands' occupations, over half (51.5%) were skilled, followed by liberal professionals (37.0%), and unskilled workers (11.5%). In terms of marital status, 99.8% of participants were married, whilst only 0.3% were separated. crowding index indicate that the majority of the study participants were living in less crowded housing conditions, as 73.8% (n=295) were classified as less crowded. Only 3.3% (n=13) of the population lived in overcrowded conditions, whereas 23.0% (n=92) fell into the average group. With a range of 0.4 to 7.5, the mean crowding index was  $2.26 \pm 1.09$ , indicating a considerable degree of variation in household crowding across participants, with a general tendency toward lower crowding levels.

Table 1. Socio-demographic characteristics of the study sample.

|                              |                       | No.            | %       |
|------------------------------|-----------------------|----------------|---------|
| Age (years)                  | <20years              | 27             | 6.8     |
|                              | 20---24               | 112            | 28.0    |
|                              | 25---29               | 132            | 33.0    |
|                              | 30---34               | 82             | 20.5    |
|                              | =>35years             | 47             | 11.8    |
|                              | Mean $\pm$ SD (Range) | 26.9 $\pm$ 5.5 | (16-40) |
| Age (years)                  | <20years              | 27             | 6.8     |
|                              | 20---34               | 326            | 81.5    |
|                              | =>35years             | 47             | 11.8    |
|                              | Mean $\pm$ SD (Range) | 26.9 $\pm$ 5.5 | (16-40) |
|                              | Illiterate            | 84             | 21.0    |
|                              | Read & Write          | 20             | 5.0     |
| Educational level of mother  | Primary               | 89             | 22.3    |
|                              | Intermediate          | 34             | 8.5     |
|                              | Secondary             | 38             | 9.5     |
|                              | College & Higher      | 135            | 33.8    |
|                              | Illiterate            | 56             | 14.0    |
|                              | Read & Write          | 25             | 6.3     |
| Educational level of husband | Primary               | 82             | 20.5    |
|                              | Intermediate          | 52             | 13.0    |
|                              | Secondary             | 36             | 9.0     |
|                              | College & Higher      | 149            | 37.3    |
|                              | Employee              | 99             | 24.8    |
|                              | Free work             | 2              | 0.5     |
| Occupation of mother         | Student               | 16             | 4.0     |
|                              | Housewife             | 283            | 70.8    |
| Occupation of husband        | Professional          | 148            | 37.0    |
|                              | Skilled labour        | 206            | 51.5    |
|                              | Unskilled labour      | 46             | 11.5    |
| Marital status               | Married               | 399            | 99.8    |
|                              | Separated             | 1              | 0.3     |
|                              | Others                | -              | -       |

|                       |              |                 |           |
|-----------------------|--------------|-----------------|-----------|
| Crowding index        | Less crowded | 295             | 73.8      |
|                       | Average      | 92              | 23.0      |
|                       | Overcrowded  | 13              | 3.3       |
| Mean $\pm$ SD (Range) |              | 2.26 $\pm$ 1.09 | (0.4-7.5) |

Source: Own authorship.

Table 2 demonstrated a relationship between the study participants' socio demographic characteristics and BMI categories. Age and BMI were shown to be statistically significantly correlated ( $p = 0.044$ ), suggesting that the distribution of BMI differs significantly among age groups. The age group of 20–34 had the highest percentage of overweight (81.0) and obese participants (77.1), whereas the under-20 age group had the lowest percentages. However, there were no statistically significant associations found between body mass index and the mother's educational level ( $p = 0.238$ ), the husband's educational level ( $p = 0.544$ ), the mother's occupation ( $p = 0.326$ ), or the husband's occupation ( $p = 0.295$ ). With the exception of age in this study, differences in BMI categories between other social and demographic groups were not statistically significant.

Table 2. Association between BMI and socio-demographic characteristics of pregnant women.

|                                                                                                                 |                  | BMI (kg/m <sup>2</sup> ) |      |                        |      |                  |      | p- value |
|-----------------------------------------------------------------------------------------------------------------|------------------|--------------------------|------|------------------------|------|------------------|------|----------|
|                                                                                                                 |                  | Normal<br>1 (n=106)      |      | Overweigh<br>t (n=189) |      | Obese<br>(n=105) |      |          |
|                                                                                                                 |                  | No.                      | %    | No.                    | %    | No.              | %    |          |
| Age (years)                                                                                                     | <20years         | 9                        | 8.5  | 13                     | 6.9  | 5                | 4.8  | 0.044*   |
|                                                                                                                 | 20--34           | 92                       | 86.8 | 153                    | 81.0 | 81               | 77.1 |          |
|                                                                                                                 | =>35years        | 5                        | 4.7  | 23                     | 12.2 | 19               | 18.1 |          |
| Educational level of<br>mother                                                                                  | Illiterate       | 19                       | 17.9 | 41                     | 21.7 | 24               | 22.9 | 0.238    |
|                                                                                                                 | Read & Write     | 5                        | 4.7  | 9                      | 4.8  | 6                | 5.7  |          |
|                                                                                                                 | Primary          | 24                       | 22.6 | 39                     | 20.6 | 26               | 24.8 |          |
|                                                                                                                 | Intermediate     | 16                       | 15.1 | 15                     | 7.9  | 3                | 2.9  |          |
|                                                                                                                 | Secondary        | 12                       | 11.3 | 16                     | 8.5  | 10               | 9.5  |          |
|                                                                                                                 | College & Higher | 30                       | 28.3 | 69                     | 36.5 | 36               | 34.3 |          |
| Educational level of<br>husband                                                                                 | Illiterate       | 13                       | 12.3 | 28                     | 14.8 | 15               | 14.3 | 0.544    |
|                                                                                                                 | Read & Write     | 10                       | 9.4  | 10                     | 5.3  | 5                | 4.8  |          |
|                                                                                                                 | Primary          | 18                       | 17.0 | 38                     | 20.1 | 26               | 24.8 |          |
|                                                                                                                 | Intermediate     | 18                       | 17.0 | 23                     | 12.2 | 11               | 10.5 |          |
|                                                                                                                 | Secondary        | 7                        | 6.6  | 16                     | 8.5  | 13               | 12.4 |          |
|                                                                                                                 | College & Higher | 40                       | 37.7 | 74                     | 39.2 | 35               | 33.3 |          |
| Occupation of mother                                                                                            | Employee         | 19                       | 17.9 | 54                     | 28.6 | 26               | 24.8 | 0.326    |
|                                                                                                                 | Free work        | -                        | -    | 1                      | .5   | 1                | 1.0  |          |
|                                                                                                                 | Student          | 6                        | 5.7  | 8                      | 4.2  | 2                | 1.9  |          |
|                                                                                                                 | Housewife        | 81                       | 76.4 | 126                    | 66.7 | 76               | 72.4 |          |
| Occupation of husband                                                                                           | Professional     | 33                       | 31.1 | 72                     | 38.1 | 43               | 41.0 | 0.295    |
|                                                                                                                 | Skilled labor    | 58                       | 54.7 | 93                     | 49.2 | 55               | 52.4 |          |
|                                                                                                                 | Unskilled labor  | 15                       | 14.2 | 24                     | 12.7 | 7                | 6.7  |          |
| *Significant difference between percentages using Pearson Chi-square test (χ <sup>2</sup> -test) at 0.05 level. |                  |                          |      |                        |      |                  |      |          |

\*Significant difference between percentages using Pearson Chi-square test ( $\chi^2$ -test) at 0.05 level.

Source: Own authorship.

Table 3 presented the association between obstetric, reproductive, and health-related characteristics and BMI categories (normal, overweight, and obese) among pregnant women. Gravidity and BMI were shown to be statistically significantly correlated ( $p=0.025$ ), with multigravida women making up a larger percentage of the overweight and obese groups than prim gravida. In contrast, no significant associations were found between BMI and number of parity ( $p=0.658$ ) or inter-pregnancy interval ( $p=0.333$ ). However, there was a highly significant correlation ( $p=0.001$ ) between gestational age (trimester) and

BMI, with obesity being more common in the third trimester. Furthermore, there was no significant correlation found between BMI and the majority of obstetric history characteristics, such as history of ectopic pregnancy or miscarriage ( $p=0.195$ ), stillbirth ( $p=0.196$ ), preterm labor ( $p=0.432$ ), cesarean section ( $p=0.161$ ), and twin pregnancy ( $p=0.283$ ). Regarding healthcare utilization, antenatal care visits did not show a statistically significant association ( $p=0.080$ ), while vaccination during pregnancy was significantly associated with BMI ( $p=0.010$ ), indicating higher vaccination rates among overweight and obese women. Additionally, there were no significant correlations found between BMI and general health disorders, such as dietary preference ( $p=0.855$ ), menstrual cycle issues ( $p=0.890$ ), allergy or medication use ( $p=0.095$ ), or history of medical difficulties ( $p=0.350$ ).

Table 3. Association Between Obstetric, Reproductive, and Health-Related Characteristics and Body Mass Index (BMI) Among Pregnant Women.

|                                                                         |                  | BMI (kg/m <sup>2</sup> ) |      |                     |      |               |      | p- value |
|-------------------------------------------------------------------------|------------------|--------------------------|------|---------------------|------|---------------|------|----------|
|                                                                         |                  | Normal (n=106)           |      | Overweigh t (n=189) |      | Obese (n=105) |      |          |
|                                                                         |                  | No.                      | %    | No.                 | %    | No.           | %    |          |
| Gravidity                                                               | Prim gravida     | 32                       | 30.2 | 38                  | 20.1 | 16            | 15.2 | 0.025*   |
|                                                                         | Multigravida     | 74                       | 69.8 | 151                 | 79.9 | 89            | 84.8 |          |
| Number of parity for multigravida                                       | P2               | 33                       | 44.0 | 64                  | 42.7 | 30            | 33.7 | 0.658    |
|                                                                         | P3               | 17                       | 22.7 | 33                  | 22.0 | 23            | 25.8 |          |
|                                                                         | P4 & more        | 25                       | 33.3 | 53                  | 35.3 | 36            | 40.4 |          |
| Inter-pregnancy interval (years)                                        | <2               | 30                       | 40.0 | 54                  | 36.0 | 26            | 29.2 | 0.333    |
|                                                                         | =>2              | 45                       | 60.0 | 96                  | 64.0 | 63            | 70.8 |          |
| GA Trimester                                                            | First trimester  | 40                       | 37.7 | 48                  | 25.4 | 18            | 17.1 | 0.001*   |
|                                                                         | Second trimester | 33                       | 31.1 | 63                  | 33.3 | 26            | 24.8 |          |
|                                                                         | Third trimester  | 33                       | 31.1 | 78                  | 41.3 | 61            | 58.1 |          |
| History of miscarriage \ectopic                                         | Yes              | 29                       | 27.4 | 62                  | 32.8 | 41            | 39.0 | 0.195    |
|                                                                         | No               | 77                       | 72.6 | 127                 | 67.2 | 64            | 61.0 |          |
| History of still birth                                                  | Yes              | 3                        | 2.8  | 13                  | 6.9  | 9             | 8.7  | 0.196    |
|                                                                         | No               | 103                      | 97.2 | 176                 | 93.1 | 95            | 91.3 |          |
| History of preterm labour                                               | Yes              | 2                        | 1.9  | 9                   | 4.8  | 5             | 4.8  | 0.432    |
|                                                                         | No               | 104                      | 98.1 | 180                 | 95.2 | 100           | 95.2 |          |
| History of cesarean section                                             | Yes              | 28                       | 26.4 | 58                  | 30.7 | 40            | 38.5 | 0.161    |
|                                                                         | No               | 78                       | 73.6 | 131                 | 69.3 | 64            | 61.5 |          |
| Have a twin pregnancy or more                                           | Yes              | 1                        | .9   | 3                   | 1.6  | 4             | 3.8  | 0.283    |
|                                                                         | No               | 105                      | 99.1 | 186                 | 98.4 | 101           | 96.2 |          |
| History of antenatal care visits at a primary health center             | Yes              | 48                       | 45.3 | 110                 | 58.2 | 52            | 49.5 | 0.080    |
|                                                                         | No               | 58                       | 54.7 | 79                  | 41.8 | 53            | 50.5 |          |
| History vaccine injected during this pregnancy                          | Yes              | 53                       | 50.0 | 128                 | 67.7 | 67            | 63.8 | 0.010*   |
|                                                                         | No               | 53                       | 50.0 | 61                  | 32.3 | 38            | 36.2 |          |
| History of health problem or medical condition not related to pregnancy | Yes              | 17                       | 16.2 | 35                  | 18.5 | 25            | 23.8 | 0.350    |
|                                                                         | No               | 88                       | 83.8 | 154                 | 81.5 | 80            | 76.2 |          |
| History of allergy or medication                                        | Yes              | 12                       | 11.3 | 35                  | 18.5 | 11            | 10.5 | 0.095    |
|                                                                         | No               | 94                       | 88.7 | 154                 | 81.5 | 94            | 89.5 |          |
| Diet preference                                                         | Vegetarian       | 8                        | 7.5  | 16                  | 8.5  | 7             | 6.7  | 0.855    |
|                                                                         | Non-vegetarian   | 98                       | 92.5 | 173                 | 91.5 | 98            | 93.3 |          |
| History of problem menstruation cycle                                   | Yes              | 29                       | 27.4 | 54                  | 28.6 | 27            | 26.0 | 0.890    |
|                                                                         | No               | 77                       | 72.6 | 135                 | 71.4 | 77            | 74.0 |          |

\*Significant difference between percentages using Pearson Chi-square test (χ<sup>2</sup>-test) at 0.05 level

\*Significant difference between percentages using Pearson Chi-square test ( $\chi^2$ -test) at 0.05 level.

Source: Own authorship.

Table 4 showed the relationship between physical activity levels and different body mass index (BMI) categories (normal weight, overweight, and obesity). According to the results, 92.5% of participants in the normal weight category, 90.5% in the overweight category, and 89.5% in the obese category were classified as having moderate physical activity (MET 600–3000). In contrast, the proportions of participants who did not engage in any physical activity (no) or engaged in very low physical activity (low) were relatively small and did not differ significantly between

BMI categories. According to the statistical analysis ( $p = 0.531$ ), there was no statistically significant correlation between physical activity level and BMI categories at the 0.05 significance level. This means there was no statistically significant association between physical activity level and BMI in the studied population.

Table 4. Association Between Physical Activity Level (IPAQ Score) and Body Mass Index (BMI).

|                                                                                                                |                         | BMI (kg/m <sup>2</sup> ) |      |                    |      |               |      | p-value |
|----------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------|------|--------------------|------|---------------|------|---------|
|                                                                                                                |                         | Normal (n=106)           |      | Overweight (n=189) |      | Obese (n=105) |      |         |
|                                                                                                                |                         | No.                      | %    | No.                | %    | No.           | %    |         |
|                                                                                                                |                         |                          |      |                    |      |               |      |         |
| IPAQ Score                                                                                                     | No                      | 3                        | 2.8  | 9                  | 4.8  | 8             | 7.6  | 0.531   |
|                                                                                                                | Low (MET<600)           | 5                        | 4.7  | 9                  | 4.8  | 3             | 2.9  |         |
|                                                                                                                | Moderate (600-3000 MET) | 98                       | 92.5 | 171                | 90.5 | 94            | 89.5 |         |
|                                                                                                                | High (>3000 MET)        | -                        | -    | -                  | -    | -             | -    |         |
| *Significant difference between percentages using Pearson Chi-square test (c <sup>2</sup> -test) at 0.05 level |                         |                          |      |                    |      |               |      |         |

\*Significant difference between percentages using Pearson Chi-square test ( $\chi^2$ -test) at 0.05 level.

Source: Own authorship.

## Discussion

One indication of the community's nutritional condition is the nutritional status of pregnant women. Nutritional deficits may result if a pregnant woman's diet is not harmonized with her body's requirements. The study results showed that 81.5% of participants were between the ages of 20 and 34 years this study in line with [10], According to this age distribution, women are most likely to be in stable reproductive and household responsibilities during the years when pregnancies in the research setting occur.

Regarding to education level the majority of mothers reported a university degree above (33.8%), this study in line with [11], according to a research conducted in the Northern Province, just 34.4% of expectant mothers finished their college. The education level is important to acquire the knowledge about nutritional requirements and to have adequate nutrients during pregnancy. It improves the house-hold food consumption and food security level of the families [12].

Regarding to occupation of mother most mothers were housewives (70.8%), this result similar to study conducted by [13,14], which showed that (91.2%) mother was housewives, distribution may be linked to variations in family financial stability, resource accessibility, and health service consumption; however, socio-demographic characteristics consistently exhibit statistically significant relationships with BMI categories in our study.

Regarding to crowding index the study showed most women lived in less crowded housing conditions (73.8%), Although the studies did not show a clear correlation between crowding and BMI categories, crowding might impact infection risk and food sufficiency, which may impact pregnancy outcomes. This results in line with study conducted by [15], which stated that crowding in the delivery ward was not linked

with impact on risk factors.

The study found significantly correlation age with BMI categories were ( $p= 0.044$ ). Women in the 25-34 years' age group had the highest percentage of overweight (81.0) and obese participants (77.1), this study in line with study conducted by [15], stated Women over 35 who are overweight or obese make up the GDM population. The reasons may be adult weight growth and fat distribution may rise as a result of cumulative lifestyle variables, decreased physical activity, and hormonal and metabolic changes, and Greater gestational weight gain may result from eating habits or levels of physical activity in women in their most active reproductive years.

Conversely, no statistically significant correlations were found between BMI and education level. The absence of correlation between education and profession indicates that pregnancy-stage characteristics, lifestyle choices, and biological/behavioral processes may have a greater impact on BMI during pregnancy in this cohort than formal education alone. This results in line with study conducted by [16], which stated that Knowledge of a healthy diet and exercise may be influenced by education, but knowledge does not necessarily convert into practice because of factors including cultural feeding customs, family duties, food availability, and limits on physical activity during pregnancy.

Furthermore, study presented that the association between obstetric, reproductive, and health-related characteristics and BMI categories (normal, overweight, and obese) among pregnant women. Gravidity and BMI were shown to be statistically significantly correlated ( $p=0.025$ ), with multigravida women making up a larger percentage of the overweight and obese groups than prim gravida. As found in (Table 3). The association between higher gravidity and increased obesity, as measured by BMI, can be attributed to several underlying mechanisms. During pregnancy, women experience significant physiological and metabolic changes that may have long-term effects on adiposity. These changes include alterations in energy balance, increased fat storage, and hormonal fluctuations. This result agree with [17].

BMI and gestational age (trimester) were shown to be extremely significantly correlated ( $p = 0.001$ ), with obesity being more prevalent in the third trimester. As a study conducted by [18], these findings indicate that gestational weight gain during the 3<sup>rd</sup> trimesters is more strongly associated with BMI. For reasons this makes biological sense because due to fetal development, placental bulk, increased maternal blood volume, and physiological fluid retention, BMI normally rises as gestation goes on. Increased obesity prevalence later in

pregnancy may result from women with higher baseline BMIs gaining weight in diverse ways throughout pregnancy [19].

## Conclusion

Maternal age, gravidity, and gestational age "trimester" are significantly correlated with BMI categories among pregnant women in Samawah City; however, there was no statistically significant correlation between BMI and the majority of sociodemographic variables, obstetric history factors, physical activity, and numerous health-related disorders. These results emphasize the necessity of BMI-focused maternal care systems that take mainly considered multigravida women, women in the "third trimester" of pregnancy, and women in age groups at higher risk.

## CRedit

**Author contributions:** Ta. Ja.: Conceptualization of the study, literature search, data collection, and statistical analysis. At. Sa: manuscript writing and editing, contributed to the conceptualization of the study. Ka Gh. assisted in data collection and analysis, participated in drafting and revising the manuscript, provided critical feedback throughout the research process and helped shape the final version of the article. All authors equally contribute to this study.

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## Ethical Approval

This study was approved by the International Review Board at the College of Health and Medical Techniques, University of Baghdad. The study was registered in Clinical Trials Registry (ClinicalTrials.gov) under the ID MEC176.

## Informed Consent

It was applicable.

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## Data Sharing Statement

The datasets generated and analyzed during the current study are not publicly available due to participant privacy and institutional ethical restrictions but are available from the corresponding author upon reasonable request. The numerical data generated during this research is available with the authors.

## Publication Statement

All authors have agreed to the publication of this article.

## Conflict of Interest

The authors declare no conflict of interest.

## Similarity Check

It was applied by Ithenticate@.

## Application of Artificial Intelligence (AI)

Not applicable.

## Peer Review Process

It was performed.

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