Preplanned Studies

# Unhealthy Eating Behaviors During Pregnancy and Gestational Weight Gain — Huai'an City, Jiangsu Province, China, 2020–2021

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## Summary

### What is already known about this topic?

Maintaining a healthy diet and appropriate weight during pregnancy is crucial for both the expectant mother and the fetus. Unhealthy eating behaviors (UEBs) such as eating out frequently are becoming increasingly prevalent across the globe. However, there is a dearth of research investigating the relationship between UEBs and gestational weight gain (GWG) specifically in the context of Chinese women.

### What is added by this report?

The study revealed that a majority of pregnant women reported experiencing one or more UEBs such as eating fast, eating three meals irregularly, eating away from home, and skipping breakfast. A positive association was also observed between the number of UEBs and elevated odds of experiencing excessive GWG.

### What are the implications for public health practice?

The uptake of emerging UEBs is prevalent among pregnant women in China. It is recommended that healthy eating behavior become the focal point of gestational weight management in clinical practice. Moreover, preconception care should take into account customized health education and promotion programs.


Both excessive and inadequate gestational weight gain (GWG) are related to adverse maternal and neonatal health outcomes. Recent studies indicate an escalating trend in the prevalence of excessive GWG in China. One such study, using data from the China Nutrition and Health Surveys, reported that 57% of women had excessive GWG, and 13.7% of women had inadequate GWG (*1*). Currently, there appears to be a rise in unhealthy eating behaviors (UEBs) among the Chinese youth population such as skipping breakfast, eating fast, or frequently eating away from home. Multiple dietary guidelines globally have emphasized the critical role of avoiding UEBs to optimize GWG (*2*). However, very few studies have explored the relationship between these UEBs and GWG, particularly in relation to Chinese women and the newly released GWG guidelines from the Chinese Nutrition Society (CNS). The present study utilized data from 8,218 pregnant women in Huai'an City, Jiangsu Province collected between 2020–2021 to estimate the association between UEBs and GWG. The results indicated that 51.7% of women reported one or more UEBs and in addition, 55.8% of women experienced excessive GWG. Both single and multiple UEBs were found to be associated with excessive GWG. These findings underscore the public health necessity and clinical relevance of considering UEBs in the management and intervention of gestational weight, as well as in health education as part of preconception care.

The study sample comprised 27,923 pregnant women who gave birth between July 1, 2020, and June 30, 2021, in Huai'an, Jiangsu Province. The population distribution was approximately equal in terms of rural and urban residents and economic statuses. The per capita gross domestic product in Huai'an paralleled the national average. These individuals' profiles were logged in the Maternity Information System (MIS), which includes data on basic maternal characteristics, maternal disease history, pregnancy outcomes, and basic neonatal and anthropomorphic characteristics. Of these constituents, 8,218 were solicited to take part in the Grandmothers, Mothers, and Their Children's Health (GMATCH) inquiry, and their data was incorporated in the present analysis. Comprehensive characteristics for the participating and non-participating individuals are depicted in Supplementary Table S1 (available in https://weekly.chinacdc.cn/). This investigation received approval from the Huai'an Maternal and Child Health Care Center Ethics Committee (Approval Number: 2021060), and written informed consent was acquired from all enrollees before the study initiation.

Four eating behaviors were assessed through a self-administered questionnaire. The conditions encompassed: eating fast (less than 15 minutes), eating

meals on an irregular basis, eating away from home at least once a week, and skipping breakfast at least once a week. UEBs were classified as eating fast (under 15 minutes) (*3*), eating three meals irregularly (*2*), eating away from home at least once weekly (*4*), and skipping breakfast at least once weekly (*4*). To ensure adequate sample size, the number of UEBs was categorized into three groups: 0, 1, and at least 2. Pre-pregnancy body mass index (BMI) was computed using self-reported height and weight data prior to pregnancy. BMI ranges were subdivided into underweight (below 18.5 kg/m$^2$), normal weight (between 18.5 and 23.9 kg/m$^2$), overweight (between 24.0 and 27.9 kg/m$^2$), and obese (28 kg/m$^2$ or greater) (*5*). GWG was calculated as the differential between pre-pregnancy weight, as self-reported, and the weight measured prior to delivery. GWG was categorized into three groups — inadequate, appropriate, and excessive — in accordance with CNS guidelines (*5*).

The relationships between individual and multiple UEBs and GWG were analyzed using logistic regression, presenting odds ratios (*OR*s) along with a 95% confidence interval (*CI*). For our reference group, we considered adequate GWG. Factors including maternal age, pre-pregnancy BMI, educational attainment, employment status, family income, geographical residence, physical activity level, parity, eating fast, eating three meals irregularly, eating away from home, and skipping breakfast were accounted for when adjusting the regression models. To test for a linear trend, we modeled UEB categories as a continuous variable. Stratified analyses were undertaken to assess if pre-pregnancy BMI altered the associations between multiple UEBs and GWG. Given the high prevalence of excessive GWG, using logistic regression could potentially lead to overestimated associations, hence suggesting the use of modified Poisson regression as an alternate solution. We implemented a modified Poisson regression to ascertain the relative risk association by categorizing the inadequate and adequate into a non-excessive group, measured against the excessive group. Our computations were performed using SAS (version 9.1, SAS Institute, Cary, NC), and we deemed *P*-values less than 0.05 to be statistically significant.

Among 8,218 pregnant participants, 55.8%, 38.2%, and 6.0% experienced excessive GWG, adequate GWG, and inadequate GWG, respectively. Out of these, 4,245 women (51.7%) reported one or more UEBs. Within this subgroup, 40.9% reported eating away from home at least one time per week. Among the women with one or more UEBs, 2,466 (58.1%) and 256 (6.0%) demonstrated excessive and inadequate GWG respectively. Women who experienced excessive GWG tended to have an elevated pre-pregnancy weight, increased weight gain during pregnancy, higher total GWG, and were typically normal weight or overweight prior to pregnancy. These women were also likely to exhibit higher education levels, elevated income, rural residency, and frequently engage in UEBs such as eating fast, eating away from home at least one time per week, and skipping breakfast at least one time per week (Table 1).

Compared to women reporting zero UEBs, those with one and two or more UEBs demonstrated an increased likelihood of excessive GWG by 18% (*OR*=1.18, 95% *CI*: 1.07–1.30) and 35% (*OR*=1.35, 95% *CI*: 1.14–1.59) respectively ($P_{trend}$<0.001) (Table 2). Each individual UEB was linked with increased odds of excessive GWG. Notably, eating fast (*OR*=1.15, 95% *CI*: 1.00–1.32) and eating away from home (*OR*=1.13, 95% *CI*: 1.03–1.25) were associated with excessive GWG even in fully adjusted models.

In the analysis stratified by pre-pregnancy BMI, among women with a normal pre-pregnancy BMI, those reporting ≥2 UEBs showed a significantly larger propensity for excessive GWG (*OR*=1.53, 95% *CI*: 1.24–1.90) in the fully adjusted model. Furthermore, overweight women reporting one UEB manifested larger odds of excessive GWG (*OR*=1.32, 95% *CI*: 1.06–1.66) (Table 3). The results of the modified Poisson regression were congruous with those of the odds ratio from the logistic regression. Detailed outcomes are presented in the Supplementary Tables S2–S3 (available in https://weekly.chinacdc.cn/).

## DISCUSSION

This study discovered an elevated incidence of excessive GWG, with 55% of women in Huai'an City, Jiangsu Province, exceeding the Chinese Nutrition Society (CNS) guideline. Compared to prior studies adhering to the CNS guideline, this rate surpasses that found in Chengdu City, Sichuan Province (46%), yet it is somewhat lower than the rate in Xuzhou City, Jiangsu Province (61%) (*6*–*7*). Furthermore, the incidence aligns closely with the rate for China (57%) as reported according to the National Academy of Medicine guideline (*1*). Consequently, these results suggest that excessive GWG is prevalent among Chinese women, with a heightened occurrence in the developed region of Jiangsu Province.

TABLE 1. Characteristics of pregnant women based on recommended GWG in Huai'an City, Jiangsu Province, China, 2020–2021.

| Characteristic | Total (*N*=8,218) | Inadequate (*N*=490) | Adequate (*N*=3,143) | Excessive (*N*=4,585) | *P*-value* |
|---|---|---|---|---|---|
| Age (mean±SD) | 28.2±4.8 | 28.0±5.2 | 28.2±4.8 | 28.2±4.8 | 0.503 |
| Pre-pregnancy weight (mean±SD) | 58.7±9.2 | 59.2±10.8 | 57.0±8.3 | 59.7±9.4 | <0.001 |
| Trimester weight (mean±SD) | 73.3±10.1 | 64.1±9.5 | 68.3±7.5 | 77.7±9.4 | <0.001 |
| Total GWG (mean±SD) | 14.6±5.5 | 4.8±3.7 | 11.2±2.2 | 18.0±4.4 | <0.001 |
| Pre-pregnancy BMI, *n* (%) | | | | | <0.001 |
| Underweight | 638 (7.8) | 73 (14.9) | 292 (9.3) | 273 (6.0) | |
| Normal weight | 5,127 (62.4) | 239 (48.8) | 2,201 (70.0) | 2,687 (58.6) | |
| Overweight | 1,900 (23.1) | 132 (26.9) | 532 (16.9) | 1,236 (27.0) | |
| Obese | 553 (6.7) | 46 (9.4) | 118 (3.8) | 389 (8.5) | |
| Parity, *n* (%) | | | | | 0.575 |
| 0 | 3,350 (40.8) | 198 (40.4) | 1,287 (40.9) | 1,865 (40.7) | |
| 1 | 4,050 (49.3) | 239 (48.8) | 1,565 (49.8) | 2,246 (49.0) | |
| ≥2 | 818 (10.0) | 53 (10.8) | 291 (9.3) | 474 (10.3) | |
| Education, *n* (%) | | | | | 0.002 |
| Middle school and below | 528 (6.4) | 46 (9.4) | 189 (6.0) | 293 (6.4) | |
| High school or technical secondary school | 4,758 (57.9) | 273 (55.7) | 1,766 (56.2) | 2,719 (59.3) | |
| Junior college and above | 2,932 (35.7) | 171 (34.9) | 1,188 (37.8) | 1,573 (34.3) | |
| Employment status, *n* (%) | | | | | 0.665 |
| Unemployed | 179 (2.2) | 10 (2.0) | 67 (2.1) | 102 (2.2) | |
| Employed or self-employed | 3,713 (45.2) | 217 (44.3) | 1,392 (44.3) | 2,104 (45.9) | |
| Others | 4,326 (52.6) | 263 (53.7) | 1,684 (53.6) | 2,379 (51.9) | |
| Distribution of family income (*n*, %) | | | | | 0.007 |
| Quartile 1 (lowest) | 1,964 (23.9) | 151 (30.8) | 749 (23.8) | 1,064 (23.2) | |
| Quartile 2 | 2,088 (25.4) | 115 (23.5) | 814 (25.9) | 1,159 (25.3) | |
| Quartile 3 | 2,113 (25.7) | 116 (23.7) | 775 (24.7) | 1,222 (26.7) | |
| Quartile 4 (highest) | 2,053 (25.0) | 108 (22.0) | 805 (25.6) | 1,140 (24.9) | |
| Residential area, *n* (%) | | | | | 0.046 |
| Urban | 5,663 (68.9) | 313 (63.9) | 2,177 (69.3) | 3,173 (69.2) | |
| Rural | 2,555 (31.1) | 177 (36.1) | 966 (30.7) | 1,412 (30.8) | |
| Physical Activity, *n* (%) | | | | | 0.687 |
| Rarely | 722 (8.8) | 48 (9.8) | 289 (9.2) | 385 (8.4) | |
| 1–2 times/ week | 606 (7.4) | 32 (6.5) | 222 (7.1) | 352 (7.7) | |
| 3–5 times/ week | 1,576 (19.2) | 88 (18.0) | 606 (19.3) | 882 (19.2) | |
| Everyday | 5,314 (64.7) | 322 (65.7) | 2,026 (64.5) | 2,966 (64.7) | |
| Number of UEBs, *n* (%) | | | | | <0.001 |
| 0 | 3,973 (48.4) | 234 (47.8) | 1,620 (51.5) | 2,119 (46.2) | |
| 1 | 3,391 (41.3) | 206 (42.0) | 1,246 (39.6) | 1,939 (42.3) | |
| ≥2 | 854 (10.4) | 50 (10.2) | 277 (8.8) | 527 (11.5) | |
| Eating fast, *n* (%) | | | | | 0.001 |
| No | 7,094 (86.3) | 433 (88.4) | 2,761 (87.8) | 3,900 (85.1) | |
| Yes | 1,124 (13.7) | 57 (11.6) | 382 (12.2) | 685 (14.9) | |
| Eating three meals regularly, *n* (%) | | | | | 0.108 |
| Regular | 8,002 (97.4) | 477 (97.3) | 3,075 (97.8) | 4,450 (97.1) | |
| Irregular | 216 (2.6) | 13 (2.7) | 68 (2.2) | 135 (2.9) | |
| Eating away from home, *n* (%) | | | | | 0.013 |
| Rarely | 4,859 (59.1) | 289 (59.0) | 1,921 (61.1) | 2,649 (57.8) | |
| ≥1 times/week | 3,359 (40.9) | 201 (41.0) | 1,222 (38.9) | 1,936 (42.2) | |
| Skipping breakfast, *n* (%) | | | | | 0.028 |
| Rarely | 7,666 (93.3) | 448 (91.4) | 2,958 (94.1) | 4,260 (92.9) | |
| ≥1 times/week | 552 (6.7) | 42 (8.6) | 185 (5.9) | 325 (7.1) | |

Abbreviation: BMI=body mass index; GWG=gestational weight gain; UEBs=unhealthy eating behaviors; SD=standard deviation.
* Differences between groups were assessed using the $\chi^2$ test for categorical variables and ANOVA for continuous variables.

TABLE 2. Associations between UEBs and GWG among pregnant women in Huai'an City, Jiangsu Province, China, 2020–2021.

| Unhealthy eating behaviors | Crude model (95% *CI*)* | | Fully adjusted model (95% *CI*) | |
|---|---|---|---|---|
| | Inadequate (*N*=490) | Excessive (*N*=4,585) | Inadequate (*N*=490) | Excessive (*N*=4,585) |
| Number of UEBs[†] | | | | |
| 0 | Ref | Ref | Ref | Ref |
| 1 | 1.15 (0.94–1.40) | 1.19 (1.08–1.31) | 1.13 (0.92–1.38) | 1.18 (1.07–1.30) |
| ≥2 | 1.25 (0.90–1.74) | 1.45 (1.24–1.71) | 1.14 (0.81–1.60) | 1.35 (1.14–1.59) |
| *P*-trend | 0.102 | <0.001 | 0.259 | <0.001 |
| Individual UEBs[§] | | | | |
| Eating speed | | | | |
| Not fast | Ref | Ref | Ref | Ref |
| Fast | 0.95 (0.71–1.28) | 1.27 (1.11–1.45) | 0.86 (0.64–1.16) | 1.15 (1.00–1.32) |
| Eating three meals regularly | | | | |
| Regular | Ref | Ref | Ref | Ref |
| Irregular | 1.23 (0.68–2.25) | 1.37 (1.02–1.84) | 1.01 (0.54–1.90) | 1.23 (0.90–1.68) |
| Eating away from home | | | | |
| Rarely | Ref | Ref | Ref | Ref |
| ≥1 times/week | 1.09 (0.90–1. 33) | 1.15 (1.05–1.26) | 1.09 (0.89–1.34) | 1.13 (1.03–1.25) |
| Skipping breakfast | | | | |
| Rarely | Ref | Ref | Ref | Ref |
| ≥1 times/week | 1.50 (1.06–2.13) | 1.22 (1.01–1.47) | 1.37 (0.95–1.98) | 1.10 (0.90–1.34) |

Abbreviation: UEBs=unhealthy eating behaviors; GWG=gestational weight gain; *CI*=confidence interval.
* Crude model: unadjusted.
[†] Adjusted for the maternal age, pre-pregnancy BMI, levels of education, employment status, family income, area of residence, physical activity, and parity.
[§] Data for individual UEBs were gleaned from a comprehensive model that incorporated all four UEBs, in addition to other relevant covariates. These covariates included factors such as maternal age, pre-pregnancy BMI, educational attainment, employment status, family income, geographic living area, level of physical activity, and parity.

The results of this study revealed an association between both individual and combined UEBs and excessive GWG, underscoring the significance of UEBs in the management and prevention of GWG. To our knowledge, this marks the first investigation quantifying the relationships between multiple UEBs and GWG; preceding research generally centered on individual behaviors. A previous study encompassing 50 low-income pregnant women in the United States demonstrated that those with a higher frequency of dining at fast-food establishments had a higher likelihood of experiencing excessive GWG (*8*). The association between eating fast and excessive GWG partially mirrored a prior study, wherein a meta-analysis posited that eating fast was linked to an elevated risk of obesity with a pooled *OR* of 2.15 (*CI*: 1.84–2.51) (*4*).

The association between multiple UEBs and excessive GWG aligns with prior research, which showed that UEBs amongst the Spanish population tend to coincide, and an accumulation of these UEBs can result in a greater risk of excessive body weight (*4*). Significantly, China has undergone rapid urbanization, leading to increased work hours and a decrease in time available for individuals to cook. This has been further escalated by the emerging online food delivery market in China, which has enhanced the availability and convenience of away-from-home food, potentially encouraging those partaking in multiple UEBs (*9*). This environmental influence can impact not only pregnant women but also those providing care for them, potentially cultivating multiple UEBs including eating away from home and eating fast, thereby increasing the risk of excessive GWG.

This study acknowledges certain limitations. First, data on UEBs were self-reported, potentially leading to recall bias or skewing towards socially desirable behaviors. Yet, a standardized questionnaire for UEBs is not available. This approach aligns with previous studies using similar questionnaires but varying design

TABLE 3. Associations between the number of UEBs and GWG across different pre-pregnancy BMI categories among pregnant women in Huai'an City, Jiangsu Province, China, 2020–2021.

| Number of UEBs | Crude model (95% *CI*)* | | Fully adjusted model (95% *CI*)† | |
|---|---|---|---|---|
| | Inadequate | Excessive | Inadequate | Excessive |
| Underweight | | | | |
| 0 | Ref | Ref | Ref | Ref |
| 1 | 1.30 (0.76–2.24) | 1.03 (0.73–1.47) | 1.23 (0.69–2.19) | 1.14 (0.78–1.65) |
| ≥2 | 1.19 (0.48–2.99) | 1.47 (0.84–2.56) | 1.18 (0.45–3.09) | 1.59 (0.89–2.86) |
| Normal weight | | | | |
| 0 | Ref | Ref | Ref | Ref |
| 1 | 0.99 (0.75–1.32) | 1.13 (1.00–1.27) | 1.00 (0.76–1.35) | 1.12 (1.00–1.27) |
| ≥2 | 1.36 (0.84–2.18) | 1.54 (1.25–1.90) | 1.35 (0.83–2.19) | 1.53 (1.24–1.89) |
| Overweight | | | | |
| 0 | Ref | Ref | Ref | Ref |
| 1 | 1.41 (0.94–2.11) | 1.33 (1.07–1.66) | 1.40 (0.92–2.13) | 1.32 (1.06–1.66) |
| ≥2 | 0.93 (0.50–1.74) | 0.95 (0.69–1.30) | 0.91 (0.48–1.72) | 0.91 (0.66–1.02) |
| Obese | | | | |
| 0 | Ref | Ref | Ref | Ref |
| 1 | 1.05 (0.50–2.20) | 1.64 (1.04–2.57) | 1.12 (0.51–2.46) | 1.54 (0.95–2.49) |
| ≥2 | 0.79 (0.26–2.41) | 1.76 (0.95–3.26) | 0.97 (0.30–3.12) | 1.54 (0.80–2.97) |

Abbreviation: UEBs=unhealthy eating behaviors; GWG=gestational weight gain; *CI*=confidence interval; BMI=body mass index.
* Crude model: unadjusted.
† Fully adjusted model: adjusted for age, education, maternal employment status, family income, residential area, physical activity, and parity.

cut points, such as "number of times per month or per week" (*4*). Second, the self-reporting of pre-pregnancy height and weight could introduce potential bias to GWG and BMI measurements. However, these discrepancies are considered minor and still present an accurate representation of true BMI and GWG (*10*). Third, the study's participant demographic may not be entirely representative of the broader Chinese population due to recognized income disparities between western and eastern regions, such as Huai'an. Fourth, the absence of collected dietary data in this study curtails our ability to fully understand the association between UEBs and GWG. Finally, the cross-sectional nature of this study restricts its capacity to establish a causal relationship between UEBs and GWG.

In summary, there is an increased risk of excessive GWG among women exhibiting UEBs, particularly those of normal weight prior to their pregnancies. Notably, the odds of excessive GWG seem to amplify as the frequency of UEBs escalates. As such, intervening in UEBs provides a cost-effective approach to endorse healthier pregnancies. For instance, healthcare professionals could customize dietary plans and/or physical activities based on a woman's pre-pregnancy BMI. Furthermore, the promotion of wholesome eating behaviors could reinforce the prospects of healthier pregnancies. On a broader scale, policy interventions should consider tackling the growing trend of consuming food outside of the home, or at least enhancing the nutritional quality of such meals to cultivate a healthier food environment, especially for prospective mothers.

**Conflicts of interest**: The authors declare no conflicts of interest.

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SUPPLEMENTARY TABLE S1. Comparison of characteristics between pregnant women included in this study and those not included, from Huai'an City, Jiangsu Province, China, 2020–2021.

| Characteristic | Total (*N*=26,098) | Excluded (*N*=17,880) | Included (*N*=8,218) | *P*-value* |
|---|---|---|---|---|
| Age (mean±SD) | 28.4±4.7 | 28.6±4.6 | 28.2±4.8 | <0.001 |
| Pre-pregnancy weight (mean±SD) | 59.1±9.0 | 59.3±9.0 | 58.7±9.2 | <0.001 |
| Trimester weight (mean±SD) | 73.0±10.0 | 72.9±10.0 | 73.2±10.2 | 0.013 |
| Total GWG (mean±SD) | 14.0±5.4 | 13.6±5.4 | 14.6±5.5 | <0.001 |
| Pre-pregnancy BMI, *n* (%) | | | | <0.001 |
| Underweight | 1,710 (6.6) | 1,072 (6.0) | 638 (7.8) | |
| Normal weight | 16,657 (63.8) | 11,530 (64.5) | 5,127 (62.4) | |
| Overweight | 5,999 (23.0) | 4,099 (22.9) | 1,900 (23.1) | |
| Obese | 1,732 (6.6) | 1,179 (6.6) | 553 (6.7) | |
| Parity, *n* (%) | | | | <0.001 |
| 0 | 12,156 (46.6) | 8,806 (49.3) | 3,350 (40.8) | |
| 1 | 11,785 (45.2) | 7,735 (43.3) | 4,050 (49.3) | |
| ≥2 | 2,157 (8.3) | 1,339 (7.5) | 818 (10.0) | |
| Education, *n* (%) | | | | <0.001 |
| Middle school and below | 1,722 (6.6) | 1,194 (6.7) | 528 (6.4) | |
| High school or technical secondary school | 14,543 (55.7) | 9,785 (54.7) | 4,758 (57.9) | |
| Junior college and above | 9,833 (37.7) | 6,901 (38.6) | 2,932 (35.7) | |
| Employment status, *n* (%) | | | | <0.001 |
| Unemployed | 577 (2.2) | 398 (2.2) | 179 (2.2) | |
| Employed or self-employed | 14,024 (53.7) | 10,311 (57.7) | 3,713 (45.2) | |
| Others | 11,497 (44.1) | 7,171 (40.1) | 4,326 (52.6) | |
| Residential area, *n* (%) | | | | <0.001 |
| Urban | 19,424 (74.4) | 13,761 (77.0) | 5,663 (68.9) | |
| Rural | 6,674 (25.6) | 4,119 (23.0) | 2,555 (31.1) | |

Abbreviation: BMI=body mass index; GWG=gestational weight gain; SD=standard deviation.

* Differences between groups were assessed using the $\chi^2$ test for categorical variables and Student's *t*-tests for continuous variables.

SUPPLEMENTARY TABLE S2. Association between UEBs and GWG among pregnant women in Huai'an City, Jiangsu Province, China, 2020–2021.

| Unhealthy eating behaviors | Crude model (95% *CI*)* | Fully adjusted model (95% *CI*) |
|---|---|---|
| | Excessive | Excessive |
| | (*N*=4,585) | (*N*=4,585) |
| Number of UEBs[†] | | |
| 0 | Ref | Ref |
| 1 | 1.07 (1.03–1.12) | 1.07 (1.02–1.11) |
| ≥2 | 1.16 (1.09–1.23) | 1.12 (1.05–1.19) |
| *P*-trend | <0.001 | <0.001 |
| Individual UEBs[§] | | |
| Eating speed | | |
| Not fast | Ref | Ref |
| Fast | 1.11 (1.05–1.17) | 1.07 (1.01–1.12) |
| Eating three meals regularly | | |
| Regular | Ref | Ref |
| Irregular | 1.24 (1.01–1.25) | 1.08 (0.97–1.21) |
| Eating away from home | | |
| Rarely | Ref | Ref |
| ≥1 times/week | 1.06 (1.02–1.10) | 1.05 (1.01–1.09) |
| Skipping breakfast | | |
| Rarely | Ref | Ref |
| ≥ 1 times/week | 1.06 (0.99–1.14) | 1.02 (0.94–1.10) |

Note: The results presented in this table were derived from a modified Poisson regression, wherein the inadequate and adequate categories were combined to form the non-excessive group, which was then compared with the excessive group.
Abbreviation: UEBs=unhealthy eating behaviors; GWG=gestational weight gain; *CI*=confidence interval.
* Crude model: unadjusted.
† Adjusted for the maternal age, pre-pregnancy BMI, levels of education, employment status, family income, area of residence, physical activity, and parity.
§ The retrieval of individual UEBs was accomplished via a comprehensively adjusted model incorporating all four UEBs. Additional covariates included maternal age, pre-pregnancy BMI, education levels, employment status, family income, residential area, physical activity, and parity.

SUPPLEMENTARY TABLE S3. Association between the number of UEBs and GWG among different pre-pregnancy BMI groups of pregnant women in Huai'an City, Jiangsu Province, China, 2020-2021.

| Number of UEBs | Crude model (95% *CI*)* | Fully adjusted model (95% *CI*)† |
|---|---|---|
| | Excessive | Excessive |
| Underweight | | |
| 0 | Ref | Ref |
| 1 | 0.99 (0.81–1.20) | 1.05 (0.86–1.29) |
| ≥2 | 1.21 (0.92–1.58) | 1.26 (0.95–1.66) |
| Normal weight | | |
| 0 | Ref | Ref |
| 1 | 1.06 (1.00–1.12) | 1.06 (1.00–1.12) |
| ≥2 | 1.19 (1.10–1.30) | 1.19 (1.09–1.30) |
| Overweight | | |
| 0 | Ref | Ref |
| 1 | 1.08 (1.00–1.16) | 1.07 (1.00–1.15) |
| ≥2 | 0.98 (0.88–1.10) | 0.97 (0.87–1.09) |
| Obese | | |
| 0 | Ref | Ref |
| 1 | 1.16 (1.02–1.31) | 1.13 (0.99–1.28) |
| ≥2 | 1.20 (1.04–1.39) | 1.13 (0.97–1.32) |

Note: The results presented in this table were derived from a modified Poisson regression, wherein the inadequate and adequate categories were combined to form the non-excessive group, which was then compared with the excessive group.
Abbreviation: UEBs=unhealthy eating behaviors; GWG=gestational weight gain; *CI*=confidence interval; BMI=body mass index.
* Crude model: unadjusted.
† Fully adjusted model: Adjusted for age, education, maternal employment status, family income, residential area, physical activity, and parity.