



West Middlesex University Hospital

Body Mass Index Cut Off Values

Date of Search: 02/08/2016

Sources: Medline, Embase, Google, NHS Evidence, Google Scholar

Search History:

1. Medline; (optimal adj2 weight).ti,ab; 722 results.
2. Medline; pregn*.ti,ab; 406353 results.
3. Medline; exp PREGNANCY/; 790177 results.
4. Medline; 2 OR 3; 873219 results.
5. Medline; 1 AND 4; 121 results.
6. Medline; (bmi OR "body mass index").ti,ab; 163910 results.
7. Medline; exp BODY MASS INDEX/; 94647 results.
8. Medline; 6 OR 7; 194171 results.
9. Medline; 5 AND 8; 44 results.
10. Medline; (optim* adj2 weight).ti,ab; 1380 results.
11. Medline; 4 AND 8 AND 10; 64 results.
12. Medline; (gestational adj2 "weight gain").ti,ab; 1478 results.
13. Medline; exp WEIGHT GAIN/; 25516 results.
14. Medline; 4 AND 13; 3992 results.
15. Medline; 12 OR 14; 4562 results.
16. Medline; 8 AND 15; 1699 results.
17. Medline; exp REFERENCE VALUES/; 148943 results.
18. Medline; 16 AND 17; 57 results.
19. Medline; (optim* adj2 (gestational OR pregn*) AND "weight gain").ti; 9 results.
20. Medline; exp THINNESS/; 4408 results.
21. Medline; 15 AND 20; 80 results.
22. Medline; (IOM OR "institute of medicine").ti,ab; 4889 results.
23. Medline; 15 AND 22; 431 results.
24. Medline; ((foetal OR fetus OR fetal) adj2 growth).ti,ab; 15050 results.
25. Medline; exp FETAL DEVELOPMENT/; 79611 results.
26. Medline; (lbw OR "low birth weight").ti,ab; 22094 results.
27. Medline; exp INFANT, LOW BIRTH WEIGHT/; 28728 results.
28. Medline; 24 OR 25 OR 26 OR 27; 120385 results.
29. Medline; 23 AND 28; 131 results.
30. Medline; (RCOG OR "royal college of obstet*").ti,ab; 1500 results.
31. Medline; 15 AND 30; 24 results.
32. Medline; 28 AND 30; 210 results.
33. Medline; guideline*.ti,ab; 231187 results.
34. Medline; 32 AND 33; 13 results.
35. EMBASE; (optim* adj2 weight).ti,ab; 1250 results.
36. EMBASE; exp PREGNANCY/; 623464 results.
37. EMBASE; 35 AND 36; 163 results.

38. EMBASE; (bmi OR "body mass index").ti,ab; 287683 results.
39. EMBASE; exp BODY MASS INDEX/; 253557 results.
40. EMBASE; 38 OR 39; 365066 results.
41. EMBASE; 37 AND 40; 82 results.
42. EMBASE; (gestational adj2 "weight gain").ti,ab; 2158 results.
43. EMBASE; (IOM OR "institute of medicine").ti,ab; 5985 results.
44. EMBASE; 42 AND 43; 577 results.
45. EMBASE; exp UNDERWEIGHT/; 7532 results.
46. EMBASE; 44 AND 45; 96 results.
47. EMBASE; (optim* adj2 (gestational OR pregn*) AND "weight gain").ti; 13 results.
48. EMBASE; exp REFERENCE VALUE/; 58455 results.
49. EMBASE; 42 AND 48; 14 results.
50. EMBASE; exp PREGNANCY/; 623464 results.
51. EMBASE; 40 AND 48 AND 50; 126 results.
52. EMBASE; exp WEIGHT GAIN/; 79153 results.
53. EMBASE; 51 AND 52; 21 results.
54. EMBASE; exp UNDERWEIGHT/; 7532 results.
55. EMBASE; 48 AND 50 AND 54; 3 results.
56. EMBASE; exp PRACTICE GUIDELINE/; 371696 results.
57. EMBASE; 50 AND 54 AND 56; 15 results.
58. EMBASE; guideline*.ti,ab; 354383 results.
59. EMBASE; 50 AND 54 AND 58; 71 results.
60. EMBASE; *BODY MASS/; 19863 results.
61. EMBASE; *PREGNANCY/; 125901 results.
62. EMBASE; 60 AND 61; 345 results.
63. EMBASE; 58 AND 62; 27 results.
64. EMBASE; 43 AND 60; 113 results.
65. EMBASE; (IOM OR "institute of medicine").ti; 1235 results.
66. EMBASE; 52 AND 65; 87 results.
67. EMBASE; "cut off*".ti,ab; 71711 results.
68. EMBASE; 42 AND 67; 16 results.
69. Medline; (IOM OR "institute of medicine").ti; 1223 results.
70. Medline; 15 AND 69; 48 results.
71. EMBASE; 62 AND 67; 6 results.
72. EMBASE; (BMI adj2 threshold*).ti,ab; 189 results.
73. EMBASE; 50 AND 72; 7 results.
74. EMBASE; (RCOG OR "royal college of obstet*").ti,ab; 2812 results.
75. EMBASE; 52 AND 56 AND 74; 2 results.
76. EMBASE; 72 AND 74; 1 results.
77. EMBASE; exp SMALL FOR DATE INFANT/; 10324 results.
78. EMBASE; 74 AND 77; 91 results.
79. EMBASE; (low adj2 (bmi OR "body mass index")).ti,ab; 5047 results.
80. EMBASE; 74 AND 79; 3 results.
81. EMBASE; guideline*.ti,ab; 354383 results.
82. EMBASE; 78 AND 81; 17 results.

Summary

- The [IOM recommendations for weight gain during pregnancy \(2009\)](#) defines underweight as having a pre-pregnancy BMI of <18.5 (see table below). This co-relates with the WHO classification of adult BMI categories:
http://apps.who.int/bmi/index.jsp?introPage=intro_3.html

2009 Institute of Medicine Recommendations for Weight Gain During Pregnancy:

Prepregnancy BMI	Total Weight Gain		Rates of W
	Range in kg	Range in lbs	Mean (range) kg/week
Underweight (< 18.5 kg/m ²)	12.5-18	28-40	0.51 (0.44-0.58)
Normal weight (18.5-24.9 kg/m ²)	11.5-16	25-35	0.42 (0.35-0.5)
Overweight (25-29.9 kg/m ²)	7-11.5	15-25	0.28 (0.23-0.33)
Obese (≥ 30 kg/m ²)	5-9	11-20	0.22 (0.17-0.27)

Abbreviation: BMI, body mass index.

Source: DynaMed [Internet]. Ipswich (MA): EBSCO Information Services. 1995 - . Record No. 115362, Weight gain in pregnancy; [updated 2016 Jul 08, cited 02/08/2016]; [about 25 screens]. Available from <http://search.ebscohost.com/login.aspx?direct=true&db=dnh&AN=115362&site=dynamed-live&scope=site>. Registration and login required.

- The RCOG [Investigation of the small for gestational age fetus green-top guideline](#) (2nd edition, 2013) references the following study with respect to maternal BMI of <20 as a minor risk factor for restricted foetal growth:

Adverse pregnancy outcome and association with small for gestational age birthweight by customized and population-based percentiles.

American journal of obstetrics and gynecology, Jul 2009, vol. 201, no. 1, p. 28.e1, 1097-6868 (July 2009)

Gardosi, Jason, Francis, Andre

Abstract: The objective of the study was to investigate the association between pregnancy complications and small for gestational age (SGA) birthweight, comparing SGA based on the customized growth potential with SGA based on the birthweight

standard of the same population. This was a retrospective analysis of a database from a US multicenter study. Pregnancy complications included threatened preterm labor, antepartum hemorrhage, pregnancy-induced hypertension, preeclampsia, stillbirth, and early neonatal death. Compared with SGA by the birthweight standard, SGA by customized growth potential showed higher risk for each of the 6 adverse indicators. A third of the SGA group was small by customized centiles but not by population-based centiles, yet was strongly associated with each of the pregnancy complications studied. This subgroup of unrecognized SGA babies included 26% preterm deliveries. In contrast, a subgroup that was SGA by the population standard but not by the customized standard (17.2%), was not associated with any of the indicators of adverse outcome. SGA defined by customized growth potential improves the differentiation between physiologically and pathologically small babies.

- Additionally there is a systematic review currently in progress to investigate the application of the IOM guidelines for gestational weight gain across the BMI categories in relation to maternal and infant outcomes:

PROSPERO International Prospective Register of Systematic Reviews

Rebecca Goldstein, Sally Abell, Sanjeeva Ranasinha, Marie Misso, Jacqui Boyle, Christine East, Helena Teede.

Application of the Institute of Medicine (IOM) guidelines for gestational weight gain across the Body Mass Index (BMI) categories to quantify the risk of adverse maternal and infant outcomes. PROSPERO

2015:CRD42015023325

Summary available from

http://www.crd.york.ac.uk/PROSPERO_REBRANDING/display_record.asp?ID=CRD42015023325

Results:

Title: Weight gain in pregnancy: Does the Institute of Medicine have it right?

Citation: American Journal of Obstetrics and Gynecology, March 2015, vol./is. 212/3(362.e1-362.e8), 0002-9378;1097-6868 (01 Mar 2015)

Author(s): Truong Y.N., Yee L.M., Caughey A.B., Cheng Y.W.

Language: English

Abstract: Objective We aimed to examine whether women who adhered to Institute of Medicine (IOM) guidelines for gestational weight gain (GWG) had improved perinatal outcomes. Study Design This is a population-based retrospective cohort study of nulliparous women with term singleton vertex births in the United States from 2011 through 2012. Women with medical or obstetric complications were excluded. Prepregnancy body mass

index was calculated using reported weight and height. Women were categorized into 4 groups based on GWG and prepregnancy body mass index: (1) weight gain less than, (2) weight gain within, (3) weight gain 1-19 lb in excess of, and (4) weight gain >20 lb in excess of the IOM guidelines. The chi² test and multivariable logistic regression analysis were used for statistical comparisons. Results Compared to women who had GWG within the IOM guidelines, women with excessive weight gain, particularly >20 lb, were more likely to have adverse maternal outcomes (preeclampsia: adjusted odds ratio [aOR], 2.78; 95% confidence interval [CI], 2.82-2.93; eclampsia: aOR, 2.51; 95% CI, 2.27-2.78; cesarean: aOR, 2.1; 95% CI, 2.14-2.19), blood transfusion (aOR, 1.22; 95% CI, 1.11-1.33), and neonatal outcomes (5-minute Apgar <4: aOR, 1.22; 95% CI, 1.14-1.31; ventilation use >6 hours: aOR, 1.24; 95% CI, 1.15-1.33; seizure: aOR, 1.53; 95% CI, 1.24-1.89). Women who gained less than IOM guidelines had lower risks of hypertensive disorders of pregnancy and obstetric interventions but were more likely to have small-for-gestational-age neonates (aOR, 1.55; 95% CI, 1.52-1.59). Conclusion Women whose GWG is in excess of IOM guidelines have higher risk of adverse maternal and neonatal outcomes, particularly in women with >20 lb excess weight gain above guidelines while women who had weight gain below the IOM guidelines were less likely to have maternal morbidity but had higher odds of small for gestational age.

Publication Type: Journal: Article

Source: EMBASE

Title: A population-based comparison between actual maternal weight gain and the Institute of Medicine weight gain recommendations in singleton pregnancies

Citation: Journal of Perinatal Medicine, May 2016, vol./is. 44/4(389-392), 0300-5577;1619-3997 (01 May 2016)

Author(s): Tul N., Bregar A.T., Steblovnik L., Verdenik I., Lucovnik M., Blickstein I.

Language: English

Abstract: Objective: To compare the actual maternal weight gain to that recommended by the Institute of Medicine (IOM) in term singleton gestations. Methods: We used data from the Slovenian National Perinatal Information System to select singleton pregnancies born at >38 weeks during the period from 2003 to 2012. We calculated the frequencies of mothers who gained less than, more than, and as recommended by the IOM according to their pregravid body mass index (BMI). We also compared the fetal size parameters in under- and over-gainer to those who gained weight as recommended by the IOM. Results: We selected 173,715 patients who delivered at >38 weeks. Of these patients, the recommended weight gain was achieved by 56,868 (32.7%, 95% CI 32.5, 32.9) only, 82,617 (47.6%, 95% CI 47.3, 47.8) were over-gainers, and 34,230 (19.7%, 95% CI 19.5, 19.8) gained less than recommended. Neither undergaining nor overgaining were always synonymous with adverse fetal outcomes. Conclusions: Roughly two-thirds of singleton mothers did not gain weight during pregnancy according to the IOM recommendations. Inappropriate maternal

weight gain, however, was not always associated with adverse fetal outcomes and this implies that a tailored approach rather than strict adherence to the IOM recommendations may be more practical.

Publication Type: Journal: Article

Source: EMBASE

Title: Prepregnancy body mass index and gestational weight gain and the risk for adverse perinatal outcome in nondiabetic gravidas

Citation: American Journal of Obstetrics and Gynecology, January 2016, vol./is. 214/1 SUPPL. 1(S423-S424), 0002-9378 (January 2016)

Author(s): Ashwal E., Hiersch L., Aviram A., Gabbay-Benziv R., Hadar E., Wiznitzer A., Yogev Y.

Language: English

Abstract: OBJECTIVE: To assess the associations of prepregnancy body mass index (BMI) and gestational weight gain (GWG) with pregnancy outcomes in non-diabetic women. STUDY DESIGN: A retrospective cohort study of 4,139 non-diabetic women with singleton pregnancies who delivered in a single tertiary center. Women were divided into 4 groups according to pre-pregnancy BMI: underweight (30kg/m², N=378). In addition, our cohort was further subcategorized according to GWG in respect to the Institute of Medicine (IOM). Perinatal outcome was compared between the different BMI and GWG subgroups. RESULTS: Maternal age, preeclampsia, induction of labor, birthweight and LGA increased as BMI increased in a dose-dependent pattern (Table). Using a multivariate logistic regression (adjusted for maternal age, fertility treatments, hypertensive disorders, parity, gestational age at delivery and GWG) compared to normal weight women, overweight women were at increased risk for LGA (1.88, 1.34-2.62;p<0.001), CS (1.64, 1.25-2.15;p<0.001) and NICU admission (1.63, 1.09-2.43;p=0.01), obese women were at increased risk for LGA (2.32, 1.48-3.65;p <0.001), CS (1.71, 1.19-2.46;p= 0.004), Shoulder dystocia (3.39, 1.10-10.43;p=0.03) and NICU admission (2.14,1.28-3.56;p=0.003). Underweight women were at increased risk for SGA, (1.82,0.13-2.93;p=0.01). The rate of gravidas who exceeded the recommended GWG increased as BMI category increased in a dose dependent pattern (Figure 1A). The risk for LGA was increased as GWG and BMI increased in a dose dependent manner (Figure 1B). When dividing our cohort into GWG subgroups, considering appropriate GWG according to IOM guidelines (N=1481) as a reference group, GWG more than IOM guidelines (N=1,210) was associated with LGA (1.57, 1.27-1.96;p4kg (1.50, 1.08-2.06;p<0.001) and a lower rate of SGA (0.53, 0.35-0.80; p=0.003). GWG less than IOM guidelines (N=1448) was associated with lower risk for both LGA (0.42, 0.32-0.56;p <0.001) and birthweight above 4kg (0.45, 0.29-0.69;p<0.001), yet a higher risk for SGA (1.49, 1.09-2.04;p=0.01). CONCLUSION: Both increased pre-pregnancy BMI and GWG are independent risk factors for LGA infants and other adverse perinatal outcomes in non-diabetic patients. These two parameters act independently and synergistically on the risk for LGA infants. (Figure presented).

Publication Type: Journal: Conference Abstract

Source: EMBASE

Title: Validation of body mass index (BMI)-specific weight gain recommendations for twin gestations in all maternal BMI categories

Citation: American Journal of Obstetrics and Gynecology, January 2016, vol./is. 214/1 SUPPL. 1(S163), 0002-9378 (January 2016)

Author(s): Greenan C.W., Christensen C., Wojciechowski B., Taam R., Newman R.

Language: English

Abstract: **OBJECTIVE:** The Institute of Medicine (IOM) in 2009 provided BMI-specific weight gain recommendations for women carrying twins, but excluded underweight (UW) women. Our objective was to validate the obstetrical and neonatal benefits of achieving maternal weight gain recommendations in each pre-pregnancy BMI category including UW and obese women. **STUDY DESIGN:** A retrospective cohort study of twin gestations delivered at a single academic institution from 2000-2010. Women in all pre-pregnancy BMI categories were included (n=588). BMI-specific weight gain recommendations derived by Luke et al (J Reprod Med, 2003) were used as they include recommendations for UW women, were the standard used at our institution and are otherwise similar to the IOM guidelines. Women were designated as having achieved or underachieved based on weight gain and gestational age at delivery. Pregnancy and neonatal outcomes were analyzed using univariate analysis. **RESULTS:** Achieving women in all BMI categories had significantly improved preterm birth (PTB) rates < 35 weeks and greater birthweights (BW) (Table 1). Composite neonatal outcomes and PTB rates <32 weeks were significantly improved for achieving women with a normal or obese pre-pregnancy BMI. UW women were significantly less likely to achieve gestational weight gain recommendations. However, UW women who achieved weight gain goals had a 3 fold reduction in the rate of PTB < 32 weeks (11.1 vs 34.0 %), which wasn't statistically significant due to small sample size. Neonates born to UW and normal weight women were less likely to have a BW< 10% if maternal weight gain goals were achieved. **CONCLUSION:** Achievement of BMI-specific gestational weight gain goals improves PTB rates <35 weeks and neonatal BW in women carrying twins in all BMI categories. Neonatal outcomes were significantly improved for normal and obese women. This investigation validates previously published maternal weight gain recommendations in all pre-pregnancy BMI categories including UW and obese women. (Table presented).

Publication Type: Journal: Conference Abstract

Source: EMBASE

Title: Gestational weight gain standards based on women enrolled in the Fetal Growth Longitudinal Study of the INTERGROWTH-21st Project: a prospective longitudinal cohort study.

Citation: BMJ (Clinical research ed.), Jan 2016, vol. 352, p. i555., 1756-1833 (2016)

Author(s): Cheikh Ismail, Leila, Bishop, Deborah C, Pang, Ruyan, Ohuma, Eric O, Kac, Gilberto, Abrams, Barbara, Rasmussen, Kathleen, Barros, Fernando C, Hirst, Jane E, Lambert, Ann, Papageorghiou, Aris T, Stones, William, Jaffer, Yasmin A, Altman, Douglas G, Noble, J Alison, Giolito, Maria Rosa, Gravett, Michael G, Purwar, Manorama, Kennedy, Stephen H, Bhutta, Zulfiqar A, Villar, José

Abstract: To describe patterns in maternal gestational weight gain (GWG) in healthy pregnancies with good maternal and perinatal outcomes. Prospective longitudinal observational study. Eight geographically diverse urban regions in Brazil, China, India, Italy, Kenya, Oman, United Kingdom, and United States, April 2009 to March 2014. Healthy, well nourished, and educated women enrolled in the Fetal Growth Longitudinal Study component of the INTERGROWTH-21(st) Project, who had a body mass index (BMI) of 18.50-24.99 in the first trimester of pregnancy. Maternal weight measured with standardised methods and identical equipment every five weeks (plus/minus one week) from the first antenatal visit (<14 weeks' gestation) to delivery. After confirmation that data from the study sites could be pooled, a multilevel, linear regression analysis accounting for repeated measures, adjusted for gestational age, was applied to produce the GWG values. 13,108 pregnant women at <14 weeks' gestation were screened, and 4607 met the eligibility criteria, provided consent, and were enrolled. The variance within sites (59.6%) was six times higher than the variance between sites (9.6%). The mean GWGs were 1.64 kg, 2.86 kg, 2.86 kg, 2.59 kg, and 2.56 kg for the gestational age windows 14-18(+6) weeks, 19-23(+6) weeks, 24-28(+6) weeks, 29-33(+6) weeks, and 34-40(+0) weeks, respectively. Total mean weight gain at 40 weeks' gestation was 13.7 (SD 4.5) kg for 3097 eligible women with a normal BMI in the first trimester. Of all the weight measurements, 71.7% (10,639/14,846) and 94.9% (14,085/14,846) fell within the expected 1 SD and 2 SD thresholds, respectively. Data were used to determine fitted 3rd, 10th, 25th, 50th, 75th, 90th, and 97th smoothed GWG centiles by exact week of gestation, with equations for the mean and standard deviation to calculate any desired centiles according to gestational age in exact weeks. Weight gain in pregnancy is similar across the eight populations studied. Therefore, the standards generated in this study of healthy, well nourished women may be used to guide recommendations on optimal gestational weight gain worldwide. Published by the BMJ Publishing Group Limited. For permission to use (where not already granted under a licence) please go to <http://group.bmj.com/group/rights-licensing/permissions>.

Source: Medline

Full Text:

Available from *British Medical Journal (BMJ)* in [Patricia Bowen Library and Knowledge Service West Middlesex university Hospital](#)

Available from *Highwire Press* in [The BMJ](#)

Title: Pregnancy Outcomes Based on Pre-Pregnancy Body Mass Index in Japanese Women.

Citation: PLoS one, Jan 2016, vol. 11, no. 6, p. e0157081., 1932-6203 (2016)

Author(s): Enomoto, Kimiko, Aoki, Shigeru, Toma, Rie, Fujiwara, Kana, Sakamaki, Kentaro, Hirahara, Fumiki

Abstract: To verify whether body mass index (BMI) classification proposed by the Institute of Medicine (IOM) is valid in Japanese women. A study was conducted in 97,157 women with singleton pregnancies registered in the Japan Society of Obstetrics and Gynecology (JSOG) Successive Pregnancy Birth Registry System between January 2013 and December 2013, to examine pregnancy outcomes in four groups stratified by pre-pregnancy BMI category according to the 2009 criteria recommended by the Institute of Medicine (IOM). The groups comprised 17,724 underweight women with BMI <18.5, 69,126 normal weight women with BMI 18.5-24.9, 7,502 overweight women with BMI 25-29.9, and 2,805 obese women with BMI ≥30. The pregnancy outcomes were also compared among subgroups stratified by a gestational weight gain below, within, and above the optimal weight gain. The higher the pre-pregnancy BMI, the higher the incidences of pregnancy-induced hypertension, gestational diabetes mellitus, macrosomia, cesarean delivery, postpartum hemorrhage, and post-term birth, but the lower the incidence of small for gestational age (SGA). In all pre-pregnancy BMI category groups, excess gestational weight gain was associated with a higher frequency of large for gestational age and macrosomia; poor weight gain correlated with a higher frequency of SGA, preterm birth, preterm premature rupture of membranes, and spontaneous preterm birth; and optimal weight gain within the recommended range was associated with a better outcome. The BMI classification by the IOM was demonstrated to be valid in Japanese women.

Source: Medline

Full Text:

Available from *National Library of Medicine* in [PLoS ONE](#)

Available from *ProQuest* in [PLoS One](#)

Available from *National Library of Medicine* in [PLoS ONE](#)

Available from *Allen Press* in [PLoS One](#)

Title: Trimester-Specific Gestational Weight Gain and Infant Size for Gestational Age.

Citation: PLoS one, Jan 2016, vol. 11, no. 7, p. e0159500., 1932-6203 (2016)

Author(s): Sridhar, Sneha B, Xu, Fei, Hedderson, Monique M

Abstract: Gestational weight gain is known to influence fetal growth. However, it is unclear whether the associations between gestational weight gain and fetal growth vary by trimester. In a diverse cohort of 8,977 women who delivered a singleton between 2011 and 2013, we evaluated the associations between trimester-specific gestational weight gain and infant size for gestational age. Gestational weight gain was categorized per the 2009 Institute of Medicine (IOM) recommendations; meeting the recommendations was the

referent. Large for gestational age and small for gestational age were defined as birthweight > 90th percentile or <10th percentile, respectively, based on a national reference standard birthweight distribution. Logistic regression models estimated the odds of having a large or small for gestational age versus an appropriate for gestational age infant. Only gestational weight gain exceeding the IOM recommendations in the 2nd and 3rd trimesters independently increased the odds of delivering a large for gestational age infant (Odds Ratio (95% Confidence Interval): 1st: 1.17 [0.94, 1.44], 2nd: 1.47 [1.13, 1.92], 3rd: 1.70 [1.30, 2.22]). Gestational weight gain below the IOM recommendations increased the likelihood of having a small for gestational age infant in the 2nd trimester only (1.76 [1.23, 2.52]). There was effect modification, and gestational weight gain below the IOM recommendations increased the likelihood of having a small for gestational age infant in the 2nd trimester and only among women with a pre-pregnancy body mass index from 18.5-24.9 kg/m² (2.06 [1.35, 3.15]). These findings indicate that gestational weight gain during the 2nd and 3rd trimesters is more strongly associated with infant growth. Interventions to achieve appropriate gestational weight gain may optimize infant size at birth.

Source: Medline

Full Text:

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Available from *National Library of Medicine* in [PLoS ONE](#)

Available from *Allen Press* in [PLoS One](#)

Title: Is iom recommendations for gestational weight gain proper for korean women?

Citation: International Journal of Gynecology and Obstetrics, October 2015, vol./is. 131/(E360) (October 2015)

Author(s): Shin J., Park Y., Kim Y., Choi S.

Language: English

Abstract: Objectives: The purpose of the study was to propose the proper weight gain during pregnancy based on the World Health Organization prepregnancy BMI definitions for Asian populations. Method: We retrospectively reviewed the medical records of 1,482 singleton term pregnant women who had delivered babies at Seoul St. Mary's Hospital and Uijeongbu St. Mary's Hospital from January 2010 to December 2010. We used World Health Organization definitions for Asian populations of underweight (BMI <18.5), normal (18.5<BMI<23), overweight (23<BMI<25), and obese (25<BMI). We analyzed the influences of gestational weight gain on perinatal outcomes based on the prepregnancy, and these were analyzed on the basis of maternal and neonatal complications. Results: The mean prepregnancy BMI was 21.03+/-4.03 kg/m²; 174 subjects (11.7%) were underweight, 848 (57.2%) were normal, 194 (13.1%) were overweight, and 266 (18.0%) were obese. In normal weight group, the incidences of perinatal outcomes were significantly increased with excessively less or weight gain. The lower and upper cut-off values for weight gain were 13kg (OR 2.15; 95% CI= 1.306-3.536) and 17kg (OR 1.875; 95% CI= 1.919-3.628),

respectively. Other groups didn't show statistically significant cut-off values for weight gain. Conclusions: This study shows proper gestational weight gain for normal weight women based on the WHO BMI definitions for Asian populations. New guideline for gestational weight gain for Korean women is needed because IOM recommendation for gestational gain does not consider BMI definition for Asian population. Further researches including larger number of study populations are required to propose the gestational weight gain guidelines for underweight, overweight, and obese groups.

Publication Type: Journal: Conference Abstract

Source: EMBASE

Title: Gestational weight gain and risks for adverse perinatal outcomes: A retrospective cohort study based on the 2009 Institute of Medicine guidelines.

Citation: Taiwanese journal of obstetrics & gynecology, Aug 2015, vol. 54, no. 4, p. 421-425, 1875-6263 (August 2015)

Author(s): Hung, Tai-Ho, Chen, Szu-Fu, Hsu, Jenn-Jeih, Hsieh, T'sang-T'ang

Abstract: To investigate perinatal outcomes according to the 2009 Institute of Medicine (IOM) gestational weight gain (GWG) guidelines. A retrospective cohort study was conducted among all term, singleton, live births to women who delivered at the Taipei Chang Gung Memorial Hospital, Taipei, Taiwan between 2009 and 2014. Women were categorized into three groups based on prepregnancy body mass index and GWG relative to the IOM guidelines. Multivariable logistic regression analysis was used to assess the associations between GWG outside the IOM guidelines and adverse perinatal outcomes. Women with GWG within the guidelines served as the reference group. Of 9301 pregnancies, 2574 (27.7%), 4189 (45.0%), and 2538 (27.3%) women had GWG below, within, and above the IOM guidelines. Women with GWG above the IOM guidelines were at risk for preeclampsia [adjusted odds ratio (OR) 3.0, 95% confidence interval (CI) 1.9-4.7], primary cesarean delivery (adjusted OR 1.4, 95% CI 1.2-1.6) due to dysfunctional labor and cephalopelvic disproportion, large-for-gestational age (adjusted OR 1.8, 95% CI 1.5-2.1), and macrosomic neonates (adjusted OR 2.2, 95% CI 1.6-3.1). Women with GWG below the IOM guidelines were more likely to be diagnosed with gestational diabetes mellitus (adjusted OR 1.5, 95% CI 1.3-1.8) and were at higher risk for placental abruption (adjusted OR 1.7, 95% CI 1.1-2.5), small-for-gestational age (adjusted OR 1.6, 95% CI 1.4-1.9), and low birth weight neonates (adjusted OR 1.9, 95% CI 1.4-2.4). Women with GWG outside the 2009 IOM guidelines were at risk for adverse maternal and neonatal outcomes. Copyright © 2015. Published by Elsevier B.V.

Source: Medline

Full Text:

Available from *Free Access Content* in [Taiwanese Journal of Obstetrics and Gynecology](#)

Title: The recommendations of the American Institute of Medicine (IOM) for normal and underweight women to reduce the risk of low birth weight

Citation: Taiwanese Journal of Obstetrics and Gynecology, February 2015, vol./is. 54/1(1-7), 1028-4559;1875-6263 (01 Feb 2015)

Author(s): Tsai Y.-L., Chen L.-C., Seow K.-M., Chong K.-M.

Language: English

Abstract: Objective: The recommendations of the American Institute of Medicine (IOM) were revised recently in order to enhance maternal and neonatal health. The aim of our study was to investigate the risk of low birth weight (LBW) among women who follow the IOM recommendations. Materials and methods: Gestational weight gain (GWG) and rate of weight gain (RWG) across the different periods of pregnancy among women who delivered LBW fetuses were analyzed retrospectively. The logistic regression was used to analyze the risk of LBW and to identify recommendations. Results: From January 2008 to December 2009, 117 out of 4924 (2.4%) women delivered term LBW fetuses. After exclusions, 88 LBW and 91 control subjects were enrolled into the study. There was increased risk of cesarean delivery [odds ratio (OR) with 95% confidence interval (CI): 2.53 (1.33-4.83)] and neonatal asphyxia within 7 days of birth [OR 95% CI: 5.71 (1.21-26.83)] for the LBW group compared with the control group. Normal weight women [body mass index (BMI): 18.5-24.9kg/m²] who followed the GWG and RWG recommendations of the IOM had no increased risk of LBW. However, there was a two-to three-fold increased LBW risk among normal weight women who followed the IOM guidelines when, during the 2nd trimester, their GWG was <7kg [OR 95% CI: 2.21 (1.28-6.49)] or their RWG was <0.45kg/week [OR 95% CI: 3.14 (1.32-7.47)]. Among underweight women (BMI<18.5kg/m²), if, during the 2nd and 3rd trimesters, they followed the lower range of the GWG and RWG recommendations of the IOM there was a five-fold increased risk of LBW if the GWG was <13kg [OR 95% CI: 5.29 (1.61-25.51)]; or the RWG was <0.45kg/week [OR 95% CI: 5.35 (1.61-24.66)]. Conclusion: For underweight women, it is suggested that they follow the upper range of the IOM recommendation in order to avoid LBW. For normal weight women, although the IOM guidelines provide a good basis, it is suggested that they carefully follow the recommended GWG and the RWG values during the 2nd trimester, which is a very important period for fetal growth.

Publication Type: Journal: Article

Source: EMBASE

Full Text:

Available from *Free Access Content* in [Taiwanese Journal of Obstetrics and Gynecology](#)

Title: Evaluation of the institute of medicine guidelines for gestational weight gain

Citation: American Journal of Obstetrics and Gynecology, January 2015, vol./is. 212/1 SUPPL. 1(S93-S94), 0002-9378 (January 2015)

Author(s): Saade G.

Language: English

Abstract: OBJECTIVE: The Institute of Medicine guidelines (IOMg) on gestational weight gain (GWG) are based on limited data and do not address pregnancy outcomes. Our objective was to evaluate pregnancy outcomes in relation to GWG, and to determine appropriate GWG for normal pregnancy in a large, geographically-diverse cohort. STUDY DESIGN: Trained chart abstractors at 25 hospitals obtained data for all deliveries on randomly selected days over 3 years (2008- 2011). GWG was derived using weight at delivery minus weight pre-pregnancy or at 1st prenatal visit <13 wks and categorized as below, within or above IOMg. Pregnancies at term with no diabetes and normal outcomes were used to create a GWG nomogram by race/ ethnicity. We investigated the relation between GWG and pregnancy outcomes. RESULTS: 29,861 were included; 17,962 had normal pregnancies. There was a positive trend between GWG category by IOMg and gestational hypertension/preeclampsia (GH/P), cesarean delivery, 3- 4 degree vaginal tears, shoulder dystocia, macrosomia, and neonatal hypoglycemia, but a negative trend for preterm birth, and perinatal mortality ($p < 0.01$). In multivariable analysis, GWG above IOMg was associated with GH/P, cesarean delivery, shoulder dystocia, macrosomia, and neonatal hypoglycemia compared to GWG within IOMg. GWG below IOMg was associated with preterm birth. Only 1/3 of normal pregnancies gained weight within IOMg. Non-Hispanic blacks and whites had the highest % of GWG above IOMg (42% and 41% respectively). Median GWG in the normal cohort was 29 lb. Median and interquartile ranges (IQR) by BMI are shown in the figure. GWG in overweight and obese women in the normal cohort exceeded IOMg but was lower than those with adverse health and pregnancy outcomes. CONCLUSION: In a large, diverse US population with prospectively collected data, inappropriate GWG is associated with adverse pregnancy outcomes. IOM GWG ranges are not applicable to normal pregnancy, particularly for overweight and obese, since the majority of women with normal outcomes did not adhere to them. (Figure Presented).

Publication Type: Journal: Conference Abstract

Source: EMBASE

Title: Maternal pre-pregnancy underweight and fetal growth in relation to institute of medicine recommendations for gestational weight gain

Citation: Journal of Maternal-Fetal and Neonatal Medicine, June 2014, vol./is. 27/(334), 1476-7058 (June 2014)

Author(s): Roje D., Jeric M., Medic N., Vulic M., Mestrovic Z.

Language: English

Abstract: Brief Introduction: Maternal nutritional status is one of the most important factors of fetal growth and development. Consequently, the currently increasing prevalence of underweight women worldwide has come in the focus of interest of perinatal medicine. The aim of the study was to assess the effect of low pre-pregnancy body mass index (BMI) on fetal growth. Materials & Methods: Data on 4678 pregnant women and their neonates were retrospectively analyzed. Pre-pregnancy BMI of study women was categorized according to the WHO standards. Fetal growth was assessed by birth weight and birth length, birth weight for gestational age, and ponderal index. Clinical Cases or Summary Results: Study group included 351 (7.6%) women with pregestational BMI ≤ 18.5 kg/m², while all women with pregestational BMI 18.5-25 kg/m² (N = 3688; 78.8%) served as a control group. The mean birth weight and birth length of neonates born to underweight mothers were by 167 g and 0.8 cm lower in comparison with the neonates born to mothers of normal nutritional status, respectively (p<0.001 both). The prevalence of small for gestational age (SGA) births was twofold that found in the control group of mothers of normal nutritional status (9.7% vs. 4.9%; p<0.001). The inappropriately low gestational weight gain additionally increased the rate of SGA infants in the group of mothers with low pre-pregnancy BMI (21.4% vs. 10.4%; p = 0.02). Pre-pregnancy BMI category did not influence neonatal growth symmetry. Conclusions: Low maternal pregestational BMI is associated with fetal growth assessment. Improvement of the maternal nutritional status before pregnancy can increase the likelihood of perinatal outcome.

Publication Type: Journal: Conference Abstract

Source: EMBASE

Full Text:

Available from *Taylor & Francis* in [Journal of Maternal-Fetal and Neonatal Medicine, The](#)

Title: Determining optimal gestational weight gain in a multiethnic Asian population

Citation: Journal of Obstetrics and Gynaecology Research, April 2014, vol./is. 40/4(1002-1008), 1341-8076;1447-0756 (April 2014)

Author(s): Ee T.X., Allen Jr. J.C., Malhotra R., Koh H., Ostbye T., Tan T.C.

Language: English

Abstract: Aim: To define the optimal gestational weight gain (GWG) for the multiethnic Singaporean population. Methods: Data from 1529 live singleton deliveries was analyzed. A multinomial logistic regression analysis, with GWG as the predictor, was conducted to determine the lowest aggregated risk of a composite perinatal outcome, stratified by Asia-specific body mass index (BMI) categories. The composite perinatal outcome, based on a combination of delivery type (cesarean section [CS], vaginal delivery [VD]) and size for gestational age (small [SGA], appropriate [AGA], large [LGA]), had six categories: (i) VD with LGA; (ii) VD with SGA; (iii) CS with AGA; (iv) CS with SGA; (v) CS with LGA; (vi) and VD with AGA. The last was considered as the 'normal' reference category. In each BMI category, the

GWG value corresponding to the lowest aggregated risk was defined as the optimal GWG, and the GWG values at which the aggregated risk did not exceed a 5% increase from the lowest aggregated risk were defined as the margins of the optimal GWG range. Results: The optimal GWG by pre-pregnancy BMI category, was 19.5 kg (range, 12.9 to 23.9) for underweight, 13.7 kg (7.7 to 18.8) for normal weight, 7.9 kg (2.6 to 14.0) for overweight and 1.8 kg (-5.0 to 7.0) for obese. Conclusion: The results of this study, the first to determine optimal GWG in the multiethnic Singaporean population, concur with the Institute of Medicine (IOM) guidelines in that GWG among Asian women who are heavier prior to pregnancy, especially those who are obese, should be lower. However, the optimal GWG for underweight and obese women was outside the IOM recommended range. © 2014 Japan Society of Obstetrics and Gynecology.

Publication Type: Journal: Article

Source: EMBASE

Full Text:

Available from *John Wiley and Sons* in [Journal of Obstetrics and Gynaecology Research](#)

Title: Associations of maternal pre-pregnancy underweight with small-for-gestational-age and spontaneous preterm birth, and optimal gestational weight gain in Japanese women.

Citation: The journal of obstetrics and gynaecology research, Apr 2014, vol. 40, no. 4, p. 988-994, 1447-0756 (April 2014)

Author(s): Fujiwara, Kana, Aoki, Shigeru, Kurasawa, Kentaro, Okuda, Mika, Takahashi, Tsuneo, Hirahara, Fumiki

Abstract: To determine associations of maternal pre-pregnancy underweight with poor outcomes and evaluate how gestational weight gain affects risks for such outcomes in pre-pregnancy underweight Japanese women. By analyzing the January 2001-December 2012 hospital database, we retrospectively identified 6954 women with pre-pregnancy normal weights (body mass index, 18.5-24.9 kg/m²) and 1057 pre-pregnancy underweight women (body mass index, <18.5 kg/m²) who delivered at the Perinatal Maternity and Neonatal Center of Yokohama City University. These women were stratified by weekly weight gain during the second/third trimesters to investigate associations of gestational weight gain with spontaneous preterm birth and small for gestational age (SGA). Spontaneous preterm birth and SGA incidences were compared with those of women meeting Institute of Medicine (IOM) guidelines to determine optimal weight gain in Japanese women. Preterm birth and SGA incidences were significantly higher in pre-pregnancy underweight than in pre-pregnancy normal weight women (4.6% vs 2.4% [P=0.005] and 13.9% vs 9.7% [P = 0.003], respectively). For pre-pregnancy normal weight women, preterm birth incidence was significantly higher in those with weight gain of less than 0.2 kg/week than in those IOM guidelines. For pre-pregnancy underweight women, preterm birth and SGA incidences were significantly higher in those with weight gain of less than 0.3 kg/week than in those meeting IOM guidelines. Preterm birth and SGA incidences did not differ significantly between pre-pregnancy normal weight women with weight gain of 0.2 kg/week or more and pre-

pregnancy underweight women with weight gain of 0.3 kg/week or more, as compared to women meeting IOM guidelines. These results suggest that IOM guidelines for gestational weight gain may lack external validity in Japanese women. © 2014 The Authors. Journal of Obstetrics and Gynaecology Research © 2014 Japan Society of Obstetrics and Gynecology.

Source: Medline

Full Text:

Available from *John Wiley and Sons* in [Journal of Obstetrics and Gynaecology Research](#)

Title: Determining optimal gestational weight gain in a multiethnic Asian population.

Citation: The journal of obstetrics and gynaecology research, Apr 2014, vol. 40, no. 4, p. 1002-1008, 1447-0756 (April 2014)

Author(s): Ee, Tat Xin, Allen, John Carson, Malhotra, Rahul, Koh, Huishan, Østbye, Truls, Tan, Thiam Chye

Abstract: To define the optimal gestational weight gain (GWG) for the multiethnic Singaporean population. Data from 1529 live singleton deliveries was analyzed. A multinomial logistic regression analysis, with GWG as the predictor, was conducted to determine the lowest aggregated risk of a composite perinatal outcome, stratified by Asia-specific body mass index (BMI) categories. The composite perinatal outcome, based on a combination of delivery type (cesarean section [CS], vaginal delivery [VD]) and size for gestational age (small [SGA], appropriate [AGA], large [LGA]), had six categories: (i) VD with LGA; (ii) VD with SGA; (iii) CS with AGA; (iv) CS with SGA; (v) CS with LGA; (vi) and VD with AGA. The last was considered as the 'normal' reference category. In each BMI category, the GWG value corresponding to the lowest aggregated risk was defined as the optimal GWG, and the GWG values at which the aggregated risk did not exceed a 5% increase from the lowest aggregated risk were defined as the margins of the optimal GWG range. The optimal GWG by pre-pregnancy BMI category, was 19.5 kg (range, 12.9 to 23.9) for underweight, 13.7 kg (7.7 to 18.8) for normal weight, 7.9 kg (2.6 to 14.0) for overweight and 1.8 kg (-5.0 to 7.0) for obese. The results of this study, the first to determine optimal GWG in the multiethnic Singaporean population, concur with the Institute of Medicine (IOM) guidelines in that GWG among Asian women who are heavier prior to pregnancy, especially those who are obese, should be lower. However, the optimal GWG for underweight and obese women was outside the IOM recommended range. © 2014 The Authors. Journal of Obstetrics and Gynaecology Research © 2014 Japan Society of Obstetrics and Gynecology.

Source: Medline

Full Text:

Available from *John Wiley and Sons* in [Journal of Obstetrics and Gynaecology Research](#)

Title: Pregnancy outcomes with weight gain above or below the 2009 Institute of Medicine guidelines.

Citation: Obstetrics and gynecology, May 2013, vol. 121, no. 5, p. 969-975, 1873-233X (May 2013)

Author(s): Johnson, Julie, Clifton, Rebecca G, Roberts, James M, Myatt, Leslie, Hauth, John C, Spong, Catherine Y, Varner, Michael W, Wapner, Ronald J, Thorp, John M, Mercer, Brian M, Peaceman, Alan M, Ramin, Susan M, Samuels, Philip, Sciscione, Anthony, Harper, Margaret, Tolosa, Jorge E, Saade, George, Sorokin, Yoram, Eunice Kennedy Shriver National Institute of Child Health, Human Development (NICHD) Maternal-Fetal Medicine Units (MFMU) Network

Abstract: To evaluate pregnancy outcomes according to 2009 Institute of Medicine (IOM) gestational weight gain guidelines. This study is a secondary analysis of a preeclampsia prevention trial among nulliparas carrying singletons. Odds ratios and 95% confidence intervals (adjusted for maternal age, race, smoking, and treatment group) were calculated based on total weight gain below or above the IOM guidelines stratified by prepregnancy body mass index (BMI). The referent group was weight gain within the guidelines. Of 8,293 pregnancies, 9.5% had weight gain below, 17.5% within, and 73% above IOM guidelines. With excess weight gain, all BMI categories had an increased risk of hypertensive disorders; normal weight and overweight women also had increased risk of cesarean delivery and neonatal birth weight at or above the 90 centile but a decreased risk of weight below the 10 centile. There were no consistent associations with insufficient weight gain and adverse outcomes. Excess weight gain was prevalent and associated with an increased risk of hypertensive disorders, cesarean delivery, and large-for-gestational-age neonates.

Source: Medline

Full Text:

Available from *Obstetrics and Gynecology* in [Patricia Bowen Library and Knowledge Service West Middlesex university Hospital](#)

Available from *Ovid* in [Obstetrics and Gynecology](#)

Available from *Ovid* in [Obstetrics and gynecology.](#)

Title: Maternal pre-pregnancy underweight and fetal growth in relation to institute of medicine recommendations for gestational weight gain.

Citation: Early human development, May 2013, vol. 89, no. 5, p. 277-281, 1872-6232 (May 2013)

Author(s): Jeric, Milka, Roje, Damir, Medic, Nina, Strinic, Tomislav, Mestrovic, Zoran, Vulic, Marko

Abstract: Maternal nutritional status is one of the most important factors of fetal growth and development. Consequently, the currently increasing prevalence of underweight women worldwide has come in the focus of interest of perinatal medicine. The aim of the study was to assess the effect of low pre-pregnancy body mass index (BMI) on fetal growth. Data on 4678 pregnant women and their neonates were retrospectively analyzed. Pre-pregnancy BMI of study women was categorized according to the WHO standards. Fetal

growth was assessed by birth weight and birth length, birth weight for gestational age, and ponderal index. Study group included 351 (7.6%) women with pregestational BMI<18.5kg/m(2), while all women with pregestational BMI 18.5-25kg/m(2) (n=3688; 78.8%) served as a control group. The mean birth weight and birth length of neonates born to underweight mothers were by 167g and 0.8cm lower in comparison with the neonates born to mothers of normal nutritional status, respectively (P<0.001 both). The prevalence of small for gestational age (SGA) births was twofold that found in the control group of mothers of normal nutritional status (9.7% vs. 4.9%; P<0.001). The inappropriately low gestational weight gain additionally increased the rate of SGA infants in the group of mothers with low pre-pregnancy BMI (21.4% vs. 10.4%; P=0.02). Pre-pregnancy BMI category did not influence neonatal growth symmetry. Low maternal pregestational BMI is associated with fetal growth assessment. Improvement of the maternal nutritional status before pregnancy can increase the likelihood of perinatal outcome. Copyright © 2012 Elsevier Ltd. All rights reserved.

Source: Medline

Title: Committee opinion No. 548: Weight gain during pregnancy

Citation: *Obstetrics and Gynecology*, January 2013, vol./is. 121/1(210-212), 0029-7844;1873-233X (January 2013)

Author(s): anonymous

Language: English

Abstract: The updated guidelines by the Institute of Medicine regarding gestational weight gain provide clinicians with a basis for practice. Health care providers who care for pregnant women should determine a woman's body mass index at the initial prenatal visit and counsel her regarding the benefits of appropriate weight gain, nutrition and exercise, and, especially, the need to limit excessive weight gain to achieve best pregnancy outcomes. Individualized care and clinical judgment are necessary in the management of the overweight or obese woman who is gaining (or wishes to gain) less weight than recommended but has an appropriately growing fetus. © 2012 by The American College of Obstetricians and Gynecologists. Published by Lippincott Williams & Wilkins.

Publication Type: Journal: Review

Source: EMBASE

Full Text:

Available from *Obstetrics and Gynecology* in [Patricia Bowen Library and Knowledge Service West Middlesex university Hospital](#)

Available from *Ovid* in [Obstetrics and Gynecology](#)

Available from *Ovid* in [Obstetrics and gynecology.](#)

Title: Is the U.S. Institute of Medicine recommendation for gestational weight gain suitable for Thai singleton pregnant women?

Citation: Journal of the Medical Association of Thailand = Chotmaihet thangphaet, Jan 2013, vol. 96, no. 1, p. 1-6, 0125-2208 (January 2013)

Author(s): Titapant, Vitaya

Abstract: To compare the gestational weight gain of healthy Thai singleton pregnant women with the U.S. Institute of Medicine (IOM) recommendation. One thousand eight hundredforty nine medical records of uncomplicated singleton pregnant women who delivered at Siriraj Hospital between January 2007 and November 2010 were reviewed. All subjects were divided into four subgroups according to their pre-pregnancy body mass index (BMI): underweight (<18.5 kg/m²), normal weight (18.5-24.9 kg/m²), overweight (25.0-29.9 kg/m²), and obese group (> or =30 kg/m²). Their baseline characteristics and gestational weight gain were collected and reported. One-way analysis of variance test was used to compare continuous data and Chi-squared test was used to compare discrete data among groups. Mean gestational weight gain of normal weight, underweight, overweight, and obese women were 14.2±4.7 kg, 14.1±4.3 kg, 12.4±4.7 kg, and 10.8±4.3 kg and gestational weight gain between 25th to 75th percentile were 11.0 to 17.0 kg, 11.0 to 16.5 kg, 10.0 to 15.0 kg, and 8.0 to 13.0 kg for pregnant women with pre-pregnancy normal weight, underweight, overweight and obesity respectively. Significant difference of maternal age, gestational weight gain, neonatal birth weight, and parity were found among groups (p<0.05). About one-third of pre-pregnancy normal BMI (39.2%), overweight (36.6%), and obese (31.9%) as well as nearly half of pre-pregnancy underweight group (47.6%) gained the appropriate weight based on the US IOM recommendation. About one-third of pre-pregnancy underweight (37.9%) and normal BMI group (30.6%) gained less than the recommendation. Majority of pre-pregnancy overweight (52.3%) and obese (63.8%) group gained more weight than the recommendation. Although pregnancy outcomes were normal, less than half of Thai pregnant women gained the appropriate weight based on the U.S. IOM recommendation.

Source: Medline

Title: Infant size and body composition in relation to the institute of medicine gestational weight gain recommendations

Citation: Annals of Nutrition and Metabolism, 2013, vol./is. 63/(739), 0250-6807 (2013)

Author(s): Forsum E., Eriksson B., Henriksson P., Lof M.

Language: English

Abstract: Background and objectives: Body composition at birth may be important for later health. Effects of high or low gestational weight gains (GWG) on newborn body composition are incompletely known. The institute of medicine (IOM) provides recommendations

regarding GWG for women with different body mass index before pregnancy. We investigated relationships between GWG and infant size and body composition at 1 week of age. Methods: We measured height of 312 pregnant Swedish women who also reported their weight before conception and their gestational weight gain. Body composition of their healthy, full term, singleton infants was measured using air displacement plethysmography at 7+/-2 days of age. GWG less than (GWG<IOM) and higher than (GWG>IOM) the IOM recommendations were independent variables in multiple regression models with GWG within the recommendation as reference. Results: 57, 114 and 141 women gained below, within and above the IOM recommendations, respectively. GWG>IOM was associated with higher infant weight (156 g, p = 0.008), fat-free mass (101 g, p = 0.022), fat mass (55 g, 1.1 %, p = 0.016- 0.028) but not with longer infants. GWG<IOM was associated with shorter infants (0.9 cm, p = 0.003), with less weight (206 g, p = 0.007) and fat-free mass (152 g, p = 0.007), but had no effect on fat mass (g, %). When adjusted for infant length, GWG<IOM was not associated with lower weight or less fatfree mass in infants. Conclusions: Infants born to women with GWG above the IOM recommendations were heavier and fatter than infants born to women with GWG within these recommendations. Furthermore, women with GWG below the IOM recommendations had shorter infants with less fat-free mass when compared to infants of women with the recommended GWG. The lower infant weight and fat-free mass associated with GWG below the IOM recommendation was probably due to a decreased infant length.

Publication Type: Journal: Conference Abstract

Source: EMBASE

Full Text:

Available from *ProQuest* in [Annals of Nutrition and Metabolism](#)

Title: Do trimester-specific cutoffs predict whether women ultimately stay within the Institute of Medicine/National Research Council guidelines for gestational weight gain? Findings of a retrospective cohort study

Citation: American Journal of Clinical Nutrition, June 2012, vol./is. 95/6(1432-1437), 0002-9165;1938-3207 (01 Jun 2012)

Author(s): Chmitorz A., Von Kries R., Rasmussen K.M., Nehring I., Ensenauer R.

Language: English

Abstract: Background: It is unknown how well the trimester-specific recommendations for gestational weight gain (GWG) given by the Institute of Medicine/National Research Council (IOM/NRC) identify women at risk of GWG outside IOM/NRC recommendations for total GWG. Objective: We assessed the prognostic value of trimester-specific cutoffs for inadequate or excessive total GWG in term pregnancies. Design: Data on prepregnancy weight and the temporal course of GWG were collected from medical records. A total of 7962 women were included in the final analysis. Main outcome measures were inadequate or excessive total GWG as defined by criteria of the IOM/NRC. Main exposures were GWG

outside the IOM/NRC week-specific recommendations in the first, second, and third trimesters. Results: The prediction of gaining weight within the GWG recommendations increased with gestational age and was related to the maternal weight category and outcome. In the second trimester, inadequate GWG was predicted with a sensitivity of 49% and 60.2% and a positive predictive value (PPV) of 72.1% and 68.3% in underweight and normal-weight mothers, respectively. Excessive GWG was predicted with a sensitivity of 72.7% and 70.4% and a PPV of 94.3% and 93.3% in overweight and obese mothers, respectively. Conclusions: On the basis of second-trimester-specific guidelines, inadequate GWG can be predicted in underweight and normal-weight mothers, whereas excessive GWG can be predicted in over-weight and obese mothers. Therefore, it appears possible to identify women at risk of gaining outside of the guideline as early as the second trimester. © 2012 American Society for Nutrition.

Publication Type: Journal: Article

Source: EMBASE

Full Text:

Available from *Highwire Press* in [American Journal of Clinical Nutrition, The](#)
Available from *Free Access Content* in [American Journal of Clinical Nutrition](#)

Title: The influence of maternal body composition on birth weight.

Citation: European journal of obstetrics, gynecology, and reproductive biology, Jul 2011, vol. 157, no. 1, p. 14-17, 1872-7654 (July 2011)

Author(s): Farah, Nadine, Stuart, Bernard, Donnelly, Valerie, Kennelly, Mairead M, Turner, Michael J

Abstract: To identify the maternal body composition parameters that independently influence birth weight. A longitudinal prospective observational study in a large university teaching hospital. One hundred and eighty-four non-diabetic caucasian women with a singleton pregnancy were studied. In early pregnancy maternal weight and height were measured digitally in a standardised way and the body mass index (BMI) was calculated. At 28 and 37 weeks' gestation maternal body composition was assessed using segmental multifrequency bioelectrical impedance analysis. At delivery the baby was weighed and the clinical details were recorded. Of the women studied, 29.2% were overweight and 34.8% were obese. Birth weight did not correlate with maternal weight or BMI in early pregnancy. Birth weight correlated with gestational weight gain (GWG) before the third trimester ($r=0.163$, $p=0.027$), but not with GWG in the third trimester. Birth weight correlated with maternal fat-free mass, and not fat mass at 28 and 37 weeks gestation. Birth weight did not correlate with increases in maternal fat and fat-free masses between 28 and 37 weeks. Contrary to previous reports, we found that early pregnancy maternal BMI in a non-diabetic population does not influence birth weight. Interestingly, it was the GWG before the third trimester and not the GWG in the third trimester that influenced birth weight. Our findings have implications for the design of future intervention studies aimed at optimising

gestational weight gain and birth weight. Maternal fat-free mass and gestational weight gain both influence birth weight. Copyright © 2011 Elsevier Ireland Ltd. All rights reserved.

Source: Medline

Title: Assessment of the Institute of Medicine recommendations for weight gain during pregnancy: Florida, 2004-2007.

Citation: Maternal and child health journal, Apr 2011, vol. 15, no. 3, p. 289-301, 1573-6628 (April 2011)

Author(s): Park, Sohyun, Sappenfield, William M, Bish, Connie, Salihu, Hamisu, Goodman, David, Bensyl, Diana M

Abstract: We investigated the association between 2009 IOM recommendations and adverse infant outcomes by maternal prepregnancy body mass index (BMI). Birth outcomes for 570,672 women aged 18-40 years with a singleton full-term live-birth were assessed using 2004-2007 Florida live-birth certificates. Outcomes included large-for-gestational-age (LGA) and small-for-gestational-age (SGA). Associations between gestational weight change and outcomes were assessed for 10 BMI groups by calculating proportions, and logistic regression modeling was used to produce adjusted odds ratios (aORs) to account for the effect of confounders. We created comparison categories below and above recommendations using 2009 IOM recommendations as a reference. Of importance, 41.6% of women began pregnancy as overweight and obese and 51.2% gained weight excessively during pregnancy on the basis of 2009 IOM recommendations. Proportions of LGA were higher among obese women and increased with higher weight gain. Compared with recommended weight gain, aORs for LGA were lower with less than recommended gain (aOR range: 0.27-0.77) and higher with more than recommended gain (aOR range: 1.27-5.99). However, SGA was less prevalent among obese women, and the proportion of SGA by BMI was similar with higher weight gain. Gain less than recommended was associated with increased odds of SGA (aOR range: 1.11-2.97), and gain greater than recommended was associated with decreased odds of SGA (aOR range: 0.38-0.83). Gestational weight gain influenced the risk for LGA and SGA in opposite directions. Minimal weight gain or weight loss lowered risk for LGA among obese women. Compared with 1990 IOM recommendations, 2009 recommendations include weight gain ranges that are associated with lower risk of LGA and higher risk of SGA. Awareness of these tradeoffs may assist with clinical implementation of the 2009 IOM gestational weight gain recommendations. However, our results did not consider other maternal and infant outcomes related to gestational weight gain; therefore, the findings should be interpreted with caution.

Source: Medline

Full Text:

Available from *EBSCOhost* in [Maternal & Child Health Journal](#)

Available from *ProQuest* in [Maternal and Child Health Journal](#)

Available from *Springer Link Journals* in [Maternal and Child Health Journal](#)

Title: Changes in guidelines-migration patterns in BMI and gestational weight gain adherence and associations with growth affected neonates

Citation: Reproductive Sciences, March 2011, vol./is. 18/3 SUPPL. 1(266A), 1933-7191 (March 2011)

Author(s): Garrison A., Simas T.M., Liao X., Howard A., Hardy J.

Language: English

Abstract: Objectives: To investigate women's migration in: (1) BMI categories and (2) adherence to gestational weight gain (GWG) with 1990 to 2009 changes in Institute of Medicine (IOM) recommendations. To determine distribution of small (SGA) and large for gestational age (LGA) neonates by BMI and GWG adherence. Methods: Study population of 14,128 women defined with singleton, live-birth, non-anomalous gestations from 4/1/06-9/30/09. Deliveries without information on maternal pre-pregnancy weight, height, GWG, neonatal birthweight or sex excluded from analyses. Deliveries missing GA or GA <22 or >43 weeks excluded from birthweight analyses. BMI groups evaluated were underweight (UW), normal weight (NW), overweight (OW) and obese (OB). Subjects further categorized as under- (UG), appropriate-(AG) or over-gainers (OG). SGA and LGA neonates defined as birthweights <10% and >90%, respectively. Results: Final cohort included 11,659 women mean age 28.9(+/-6.1) years, parity 1.0(+/-1.1), delivery GA 38.9(+/-2.2) weeks and neonate birthweight 3320(+/-612) grams. By 2009 IOM guidelines, 3.9%, 51.4%, 24.5% and 20.3% gravidas were UW, NW, OW and OB respectively; and 16.7%, 30.8% and 52.6% were UG, AG and OG, respectively. Recommendation changes from 1990 to 2009 resulted in 16.7% gravidas changing BMI categories and thus requiring a change in recommended gain. By 2009 guidelines, the proportion of growth affected neonates for UW, NW, OW and OB women was 13.7%, 9.0%, 7.9% and 7.8% for SGA and 3.7%, 6.8%, 10.4% and 13.4% for LGA neonates, respectively (p<0.001). The proportion of growth affected neonates for UG, AG and OG was 13.9%, 9.1% and 5.8% for SGA neonates and 4.5%, 6.1% and 13.1% for LGA neonates, respectively (p<0.001). Interaction between BMI and GWG was significant for SGA but not LGA. Multivariate-models revealed significant associations of weight parameters with SGA and LGA. Conclusions: Changes in IOM GWG recommendations alter gravidas' pre-pregnancy BMI category and thus recommended GWG. Counseling should reflect these changes especially as neonatal growth is independently affected by both BMI and GWG. Given association of modifiable maternal weight parameters on immediate and subsequent future health parameters for both mothers and babies, developing public health interventions to promote achievement of recommended weight prior to, and of GWG, should be the focus of future research efforts.

Publication Type: Journal: Conference Abstract

Source: EMBASE

Title: Outcomes associated with failure to achieve the 2009 Institute of Medicine (IOM) guidelines for weight gain in pregnancy

Citation: American Journal of Obstetrics and Gynecology, January 2011, vol./is. 204/1 SUPPL.(S232), 0002-9378 (January 2011)

Author(s): Johnson J.

Language: English

Abstract: OBJECTIVE: The new IOM gestational weight gain guidelines are 1.1- 4.4 lbs for all women in the first trimester. In the second and third trimesters, the recommendation is for a range of 1-1.3, 0.8-1, 0.5-0.7, and 0.4-0.6 lbs per week for underweight, normal weight, overweight, and obese pre-pregnancy body mass index (BMI) categories, respectively. We evaluated the risk of selected maternal and perinatal outcomes if these guidelines were not met. STUDY DESIGN: Secondary analysis of a multicenter trial of preeclampsia prevention among nulliparas carrying singletons. Women were included if self reported pre-pregnancy weight, height and weight within 2 weeks of delivery were recorded. ORs and 95% CIs were calculated based on total weight gain below or above the IOM guidelines. The referent group was weight gain within the guidelines. ORs were adjusted for maternal age, race, smoking, and treatment group (vitamins or placebo). RESULTS: 8,293 pregnancies were analyzed. Nine percent had weight gain below, 18% within and 73% above IOM guidelines. There were no consistent patterns of association between weight gain below the guidelines and adverse pregnancy outcomes. Outcomes for those with weight gain above the guidelines are presented in the table. CONCLUSIONS: Across BMI categories, gestational weight gain above IOM guidelines was highly prevalent and associated with an increased risk of hypertensive disorders, cesarean delivery and birth weight >90th centile, but a reduced risk of birth weight <10th centile. (Table presented).

Publication Type: Journal: Conference Abstract

Source: EMBASE

Title: Within-population average ranges compared with institute of medicine recommendations for gestational weight gain

Citation: Obstetrics and Gynecology, November 2010, vol./is. 116/5(1111-1118), 0029-7844 (November 2010)

Author(s): Beyerlein A., Lack N., Von Kries R.

Language: English

Abstract: Objective: To compare the risk for pregnancy outcomes by gestational weight gain with the Institute of Medicine criteria and empirically established average ranges of gestational weight gain. Methods: In a population-based data set comprising 678,560

singleton deliveries in Bavarian obstetric units from 2000 to 2007, we calculated the prevalence of adverse short-term pregnancy outcomes within the gestational weight-gain ranges recommended by the Institute of Medicine. We then compared these for gestational weight gain within data-based interquartile ranges (25th to 75th percentile) and interdecile ranges (10th to 90th percentile) of gestational weight gain by maternal weight category (underweight, normal weight, overweight, and obese). Results: In underweight and normal-weight mothers, adherence to Institute of Medicine criteria was significantly associated with fewer preterm deliveries and small-for-gestational-age births (prevalence [95% confidence interval] for preterm delivery in normal-weight women: 5.33 [5.23-5.43] within Institute of Medicine criteria compared with 5.45 [5.36-5.54] in interquartile range). Overweight and obese mothers gaining weight within the Institute of Medicine recommendations had less preeclampsia and nonelective caesarean deliveries but had higher risks for gestational diabetes, small-for-gestational-age births, preterm delivery, and perinatal mortality compared with gestational weight gain within the respective interquartile ranges and interdecile ranges (prevalence for preterm delivery in overweight women: 8.14% [7.87-8.42] within Institute of Medicine criteria compared with 5.77% [5.60-5.93] in interquartile range). Conclusion: Although underweight and normal-weight women should be encouraged to aim for a gestational weight gain according to Institute of Medicine guidelines, different gestational weight gain recommendations in overweight and obese women might lessen some adverse short-term pregnancy outcomes. © 2010 by The American College of Obstetricians and Gynecologists.

Publication Type: Journal: Article

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Title: Optimal gestational weight gain ranges for the avoidance of adverse birth weight outcomes: a novel approach.

Citation: The American journal of clinical nutrition, Dec 2009, vol. 90, no. 6, p. 1552-1558, 1938-3207 (December 2009)

Author(s): Beyerlein, Andreas, Schiessl, Barbara, Lack, Nicholas, von Kries, Rüdiger

Abstract: Gestational weight gain (GWG) has been shown to be directly associated with birth weight. We aimed to define ranges for optimal GWG with respect to the risk of either small- or large-for-gestational-age offspring by using a new statistical approach. For the purpose of an observational study, data on n = 177,079 mature singleton deliveries in Bavaria between 2004 and 2006 were extracted from a standard data set that is regularly collected for national benchmarking of obstetric units in terms of clinical performance. Joint predicted risks of either small- or large-for-gestational-age births in relation to GWG

(continuous measurement) were estimated by logistic regression models with adjustment for potential confounders. The estimated optimal GWG ranges as defined by a joint predicted risk of $\leq 20\%$ were substantially wider than those recommended by the Institute of Medicine for underweight (8-25 compared with 12.5-18.0 kg) and normal-weight (2-18 compared with 11.5-16.0 kg) women. Overweight and obese women's optimal GWG ranged from -7 to 12 and -15 to 2 kg, respectively (Institute of Medicine recommendations: 7.0-11.5 and 5.0-9.0 kg, respectively). We observed considerable effect modifications by parity and smoking in pregnancy. In normal-weight primiparae, for example, the optimal GWG range was 10-26 kg for nonsmokers compared with 23-27 kg for smokers. Considerably wider optimal GWG ranges than recommended by the Institute of Medicine might be tolerated with respect to avoidance of adverse birth weight outcome. Stratification by maternal body mass index category alone might not be sufficient.

Source: Medline

Full Text:

Available from *Highwire Press* in [American Journal of Clinical Nutrition, The](#)
Available from *Free Access Content* in [American Journal of Clinical Nutrition](#)

Title: A systematic review of outcomes of maternal weight gain according to the Institute of Medicine recommendations: birthweight, fetal growth, and postpartum weight retention.

Citation: American journal of obstetrics and gynecology, Oct 2009, vol. 201, no. 4, p. 339.e1, 1097-6868 (October 2009)

Author(s): Siega-Riz, Anna Maria, Viswanathan, Meera, Moos, Merry-K, Deierlein, Andrea, Mumford, Sunni, Knaack, Julie, Thieda, Patricia, Lux, Linda J, Lohr, Kathleen N

Abstract: This systematic review focuses on outcomes of gestational weight gain, specifically birthweight, fetal growth, and postpartum weight retention, for singleton pregnancies with respect to the 1990 Institute of Medicine weight gain recommendations. A total of 35 studies met the inclusion criteria and were reviewed. There was strong evidence to support associations between excessive gestational weight gain and increased birthweight and fetal growth (large for gestational age) as well as inadequate gestational weight gain and decreased birthweight and fetal growth (small for gestational age). There was moderate evidence to support the association between excessive gestational weight gain and postpartum weight retention. Clear clinical recommendations based on this review are challenging because of several limitations in the literature. Improvements in future research include the use of consistent definitions of gestational weight gain and outcomes of interest, assessment of confounders, and better collection of weight and weight gain data.

Source: Medline

Title: Optimal gestational weight gain for body mass index categories.

Citation: Obstetrics and gynecology, Oct 2007, vol. 110, no. 4, p. 759-764, 0029-7844 (October 2007)

Author(s): Cedergren, Marie I

Abstract: To establish optimal gestational weight gain for each maternal body mass index (BMI) category based on significant risk estimates of adverse maternal and fetal outcome. The study population consisted of 298,648 singleton pregnancies delivered in Sweden between January 1, 1994, and December 31, 2004. The number of individuals in each weight gain class was compared with the number of individuals in all other weight gain classes in the same BMI group with regard to adverse maternal and fetal outcome. Odds ratios were calculated after suitable adjustments. The optimal gestational weight gain in women by prepregnancy BMI was 9-22 lb (4-10 kg) for BMI less than 20; 5-22 lb (2-10 kg) for BMI 20-24.9; less than 20 lb (less than 9 kg) for BMI 25-29.9; and less than 13 lb (less than 6 kg) for BMI of 30 or more. The gestational weight gain limits for BMI categories determined in this large population-based cohort study from Swedish Medical Registers showed that a decreased risk of adverse obstetric and neonatal outcomes was associated with lower gestational weight gain limits than was earlier recommended, especially among obese women.

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