**Title:** Addressing cultural, racial and ethnic discrepancies in guideline discordant gestational weight gain: a systematic review and meta-analysis

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**Table S1. Sample Ovid MEDLINE search strategy**

|  |  |
| --- | --- |
| 1 | Pregnancy/ |
| 2 | Pregnant women/ |
| 3 | Pregnancy outcomes/ or pregnancy complications/ |
| 4 | (Pregnan\* or gestation\*).ti,ab. |
| 5 | or/1-4 |
| 6 | Exp body weight changes |
| 7 | (Weight adj2 chang\*).ti,ab. |
| 8 | (Weight adj2 (gain\* or increase\*)).ti,ab. |
| 9 | (Weight adj2 (loss or lose or losing or decrease\*)).ti,ab. |
| 10 | ((BMI or body mass index) adj2 (increase\* or decrease\* or change\* or loss\*)).ti,ab. |
| 11 | or/6-10 |
| 12 | 5 and 11 |
| 13 | Culture/ |
| 14 | Acculturation/ |
| 15 | Cross-cultural comparison/ |
| 16 | Cultural characteristics/ |
| 17 | Cultural diversity/ |
| 18 | Cultural evolution/ |
| 19 | Exp ethnic groups/ |
| 20 | Exp continental population groups/ |
| 21 | (Acculturation\* or sociocultural\* or socio-culture\* or cultural\* or ethnic\* or ancestry\* or ethnoracial\*).ti,ab. |
| 22 | or/13-23 |
| 23 | 12 and 22 |
| \*different variations/forms of the term | |

**Table S2.** Study characteristics of studies that utilized alternative guidelines

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **First author, year** | **Country of study** | **Nanalyzed** | **Population description** | **Age (mean ± SD or range [%], years)** | **Racial/ethnic groups** |
| (Abrams, Carmichael, and Selvin 1995) | U.S. | 10,418 | General population | 28 (NR) | Asian, Hispanic, Black, White |
| (Ademowore, Courey, and Kime 1972) | U.S. | 345 | General population | Majority <21 years | White, Non-white |
| (Albers 1994) | U.S | 9,402 | General population | U.S.: <20 12.4%; 20-29 59.2%; >30 28.4% | Hispanic, Non-Hispanic |
| Southwest: <20 11.6%; 20-29 58.6%; >30 29.8% |
| New Mexico: <20 14.8%; 20-29 65.8%; >30 19.4% |
| (Allen et al. 1994) | Kenya | 3,011 | General population | Egyptian: 26.6 (NR) | Egyptian, Kenyan, Mexican |
| Kenyan: 30.6 (NR) |
| Mexican: 30.3 (NR) |
| (Bahadoer et al. 2015) | Netherlands | 6,444 | General population | Dutch: 31.2±4.5 | Dutch, Cape Verdeans, Dutch Antilleans, Moroccans, Surinamese-Creole, Surinamese-Hindustani, Turkish |
| Cape Verdean: 27.3±6.0 |
| Dutch Antillean: 26.3±5.5 |
| Moroccan: 28.1±5.3 |
| Surinamese-Creole: 27.9±6.5 |
| Surinamese-Hindustani: 27.6±4.9 |
| Turkish: 27.2±4.9 |
| (Bentley-Lewis et al. 2014) | U.S. | 1,043 | General population | No GDM: 30.3±6.1 | White, Black, Asian, Hispanic, Other |
| GDM: 32.2±5.4 |
| (L. Caulfield, Witter, and Stoltzfus 1996) | U.S. | 3,870 | Black or White women | Inadequate GWG: 24.1±6.2 | Black, White |
| Adequate GWG: 25.3±6.4 |
| Excessive GWG: 25.4±6.3 |
| (L. E. Caulfield, Stoltzfus, and Witter 1998) | U.S | 3,870 | Black or White women | Underweight: Black 21.7±4.8; White 27.1±6.6 | Hispanic, Black, White |
| Normal weight: Black 22.7±5.3; White 29.8±5.8 |
| Overweight: Black 24.9±6.0; White 28.2±5.5 |
| (Chasan-Taber et al. 2008) | U.S. | 770 | Self-identified Hispanic women | <20: 35.0% | Spanish, Non-Spanish |
| 20-24: 37.4% |
| 25-29: 17.9% |
| 20-29: 9.7% |
| (Ellerbe et al. 2013) | U.S. | 211,754 | General population | NWH: No DM 27.0±5.9; GDM 29.6±5.9 | NHW, NHB |
| NHB:  No DM 24.3±5.6;  GDM 27.5±6.2 |
| (Finch, Frank, and Hummer 2000) | U.S. | 13,247 | Oversampled Black infants and very low and low birth weight infants | 15-19: 12.8% | Black, White, Hispanic |
| 20-34: 79.4% |
| ≥35: 7.8% |
| (Frisbie, Forbes, and Hummer 1998) | U.S. | 9+ million | General population | <18: 3.04% | Five Hispanic groups (Mexican American, Puerto Ricans, Cubans, Central and South Americans, Other) |
| ≥18: 96.96% |
| (Romy Gaillard et al. 2013) | Netherlands | 6,959 | General population | Presented as Median (90% range) – 30.3 (20.4-37.9) | European vs. Non-European |
| (Hackley et al. 2010) | U.S. | 43 | Self-identified Hispanic women | Non-pregnant Nulliparous: 20.0±2.4 | Hispanic (compared English speaking vs. Spanish speaking) |
| Pregnant: 22.2±6.2 |
| Postpartum: 21.7±4.6 |
| (Hardy 1999) | U.S. | 213 | Women who were diagnosed with GDM | Age at GDM diagnosis: 28.51±5.57 | Black, White, Hispanic, Other (predominantly Asian) |
| (Heilemann et al. 2000) | U.S. | 773 | Self-identified Hispanic women | Mexico-oriented: 27±5.9 | Three Mexican groups (Born in Mexico/Spanish speaking, born in U.S./English speaking, born in Mexico/English speaking or born in U.S./Spanish speaking) |
| Intermediate: 2.5±6.0 |
| U.S.-oriented: 24.0±5.9 |
| (Hernandez-Rivas et al. 2013) | Spain | 456 | Women who were diagnosed with GDM | White: 33.37±5.21 | White, South Central Asians, Latin Americans, Moroccans, East Asians |
| Latin American: 31.38±5.35 |
| South-Central Asians: 31.72±6.03 |
| Moroccan: 33.92±4.85 |
| East Asian: 32.97±5.06 |
| (Hickey et al. 1990) | U.S. | 325 | General population | Black: 22.65±4.48 | Black, Hispanic |
| Hispanic: 23.18±4.78 |
| (Hickey et al. 1993)\* | U.S. | 1,518 | High risk women | Black: 25.2±4.4 | Black, White |
| White: 24.8±4.4 |
| (Hickey et al. 1995a)\* | U.S. |  | High risk women | Black: 24.8±4.3 | Black, White |
| White: 24.6±4.4 |
| (Hickey et al. 1995b)\* | U.S. | 1,014 | High risk women | Black: 24.8±4.4 | Black, White |
| White: 24.4±4.4 |
| (Hickey et al. 1996)\* | U.S. | 415 | High risk women of low & normal weight status | Black: 25.8±4.2 | Black, White |
| White: 25.2±4.3 |
| (Hickey et al. 1997a)\* | U.S. | 806 | High risk women | Black: 24.8±4.3 | Black, White |
| White: 24.6±4.4 |
| (Hickey et al. 1997b) | U.S. | 5,918 | General population | Black: 23.7±5.0 | Black, White |
| White: 23.4±4.6 |
| (Hickey et al. 1999) | U.S. | 19,017 | General population | 18-20: 30.4% | Black, White |
| 21-25: 39.8% |
| 26-35: 26.8% |
| ≥36: 3.0% |
| (Huynh, Borrell, and Chambers 2014) | U.S. | 56, 911 | General population | 20-24: 38.6% | NHB, NHW, Hispanic |
| 25-29: 27.9% |
| 30-34: 22.2% |
| ≥35: 11.2% |
| (Koh et al. 2013) | Singapore | 1,166 | Chinese, Malay, or Indian women | ≤19: 2.3% | Chinese, Malay, Indian |
| 20-30: 51.0% |
| ≥31: 46.7% |
| (Margerison-Zilko et al. 2012) | U.S. | 3,070 | General population | 27.8±5.7 | Black, White, Other |
| (Misra, Hobel, and Sing 2010) | U.S. | 435 | General population | Black: <21 12.3%; 21-30 58.8%; >30 28.9% | Black, Non-Black |
| Non-Black: <21 9.3%; 21-30 51.2%; >30 39.5% |
| (Morling, Kitayama, and Miyamoto 2003) | Japan & U.S. | 158 | General population | U.S.: 29.4 (NR) | American, Japanese |
| Japan: 29.4 (NR) |
| (Neser 1963) | South Africa | 389 | General population | NR | Bantu, White (five groups: New York, Washington, Eugene, Ann Arbor, Jersey City, East Orange) |
| (Niswander et al. 1969) | U.S. | 15,204 | General population | NR | White, Black |
| (Ochsenbein-Kollble et al. 2007) | Switzerland | 4,034 | General population | White: 28.6±5.7 | White, Black, Asian |
| Asian: 29.3±5.0 |
| Black: 28.2±5.5 |
| (Petitti, Croughan-Minihane, and Hiatt 1991) | U.S. | 308 | General population | NR | White, Black |
| (Rosenberg et al. 2005) | U.S. | 373,325 | General population | NHB: 27.5 (NR) | NHB, NHW, NHA, Hispanic |
| NHW: 30.6 (NR) |
| NHA: 29.7 (NR) |
| Hispanic: 26.4 (NR) |
| (Sackoff and Yunzal-Butler 2014) | U.S. | 115,651 | General population | Black non-Hispanic: 24.3±5.2 | Black non-Hispanic, White non-Hispanic, Asian/Pacific Islander |
| Hispanic: 23.8±4.8 |
| White non-Hispanic: 28.1±5.4 |
| Asian/Pacific Islander: 27.3±4.5 |
| (Savitz et al. 2011) | U.S. | 3,872 | General population | NR | NHW, NHB, Hispanic, Asian |
| ( Schieve, Cogswell, and Scanlon 1998a) | U.S. | 126,605 | General population | Range 10-55; Majority 20-29 | NHB, NHW, Hispanic, Asian, Native American |
| (Schieve, Cogswell, and Scanlon 1998b) | U.S. | 173,066 | General population | NR | White, Black, Hispanic |
| (Sparks 2009) | U.S. | ~7,800 | General population | NHW: <20 5.17%; 20-34 74.84%; >34 19.99% | NHW, Mexico-born Mexican, U.S.-born Mexican, NHB, Native American, Asian, ‘Other’ Hispanics |
| Mexico-born Mexican: <20 7.83%; 20-34 74.84%; >34 13.43% |
| U.S.-born Mexican: <20 14.57%; 20-34 76.43%; >34 9.00% |
| NHB: <20 12.66%; 20-34 74.14%; >34 13.20% |
| Native American: <20 11.80%; 20-34 79.85%; >34 8.35% |
| Asian: <20 3.22%; 20-34 73.74%; >34 23.04% |
| ‘Other’ Hispanics: <20 8.99%; 20-34 77.39%; >34 13.62% |
| ( Stotland et al. 2005) | U.S. | 1,198 | General population | 18-23: 14.9% | Asian, Black, Latino, White |
| 24-29: 30.1% |
| 30-35: 37.6% |
| 36-47: 17.4% |
| ( Stotland et al. 2006) | U.S. | 15,101 | General population | White: 29.43 (NR) | White, Black, Latino, Asian |
| Black: 24.25 (NR) |
| Latina: 26.17 (NR) |
| Asian: 29.10 (NR) |
| (Taffel, Keppel, and Jones 1993) | U.S. | 9, 953 | General population | >15 | White, Blacks, |
| (Walker and Kim 2002) | U.S. | 305 | General population | White: 22.6±4.3 | White, Black, Hispanic |
| Black: 22.4±3.4 |
| Hispanic: 21.9±3.4 |
| (Wells et al. 2006) | U.S. | 4,944 | General population | 15-19: 11.2% | NHW, Hispanic, Black, Other |
| 20-24: 23.5% |
| 25-43: 51.1% |
| 35+: 14.2% |
| (Widen et al. 2015) | U.S | 302 | African American or Dominican women | Enrolled cohort with pregnancy weight-gain: 25.0±4.9 | Black, Dominican |
| Excluded because of loss to follow-up or missing covariate data: 25.6±5.9 |

NHB = non-Hispanic Black; NHW = non-Hispanic White; U.S. = United States; NR = not reported; DM = Diabetes; GDM = Gestational Diabetes Mellitus

**Table S3.** Pre-pregnancy BMI by racial/ethnic groups from articles using 2009 IOM guidelines, listed in alphabetical order by author

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author, year** | **Pre-pregnancy BMI, (kg/m2****mean ± SD or classification [%])** | | | |
| **NHW/White** | **NHB/Black** | **Hispanic** | **Asian** |
| (Badreldin et al. 2018) | Not reported | | | |
| (Berggren, Stuebe, and Boggess 2015) | Not reported | | | |
| (Bodnar et al. 2011) | Normal weight | Normal weight |  |  |
| (Bowers et al. 2013) | 24.6±5.7 | 27.4±7.3 | 25.5±5.6 |  |
| (Cavicchia et al. 2014) | UW: 5.1% | UW: 3.6% | UW: 3.5% |  |
| NW: 48.5% | NW: 33.7% | NW: 45.9% |
| OW: 24.0% | OW: 26.3% | OW: 31.3% |
| OB: 22.6% | OB: 36.5% | OB: 19.3% |
| (Chaffee et al. 2015) | 22.4±4.2 | 22.6±4.3 | 22.8±3.8 |  |
| (Chang et al. 2017) | Not reported | | | |
| (Cheng et al. 2015) | UW: 4.7% |  |  | UW: 10.4% |
| NW: 54.0% | NW: 69.6% |
| OW: 23.0% | OW: 15.5% |
| OB: 18.3% | OB: 4.4% |
| (Chihara et al. 2014) | Not reported | | | |
| (Cohen et al. 2016) | Not reported | | | |
| (Cox Bauer et al. 2016) | Not reported | | | |
| (Fontaine et al. 2012) | UW: 2% | UW: 3% |  |  |
| NW: 47% | NW: 33% |
| OW: 28% | OW: 30% |
| OB: 24% | OB: 34% |
| (Haile et al. 2017) | Not reported | | | |
| (Harris et al. 2015) | Not reported | | | |
| (I. Headen et al. 2015) | UW: 8.0% | UW: 7.0% | UW: 5.4% |  |
| NW: 68.0% | NW: 60.0% | NW: 63.9% |
| OW: 15.4% | OW: 20.0% | OW: 21.9% |
| OB: 8.6% | OB: 12.9% | OB: 6.8% |
| (Herring et al. 2008) | Not reported | | | |
| (Hunt et al. 2013) | UW: 0.0% | UW: 0.0% |  |  |
| NW: 34.3% | NW: 50.8% |
| OW: 27.1% | OW: 25.7% |
| OB: 38.6% | OB: 24.0% |
| (Kim et al. 2014) | UW: 5.3% | UW: 3.7% | UW: 3.6% | UW: 11.4% |
| NW: 54.7% | NW: 38.5% | NW: 51.4% % | NW: 67.4% |
| OW: 22.2% | OW: 27.6% | OW: 26.6% | OW: 16.1% |
| OB: 17.8% | OB: 30.2% | OB: 18.4% | OB: 5.2% |
| (Krukowski et al. 2013) | Not reported | | | |
| (Larouche et al. 2010) | Not reported | | | |
| (Leonard et al. 2017) | UW: 7.6% | UW: 6.6% | UW: 4.3% |  |
| NW: 66.8% | NW: 61.6% | NW: 64.8% |
| OW: 16.1% | OW: 19.9% | OW: 22.6% |
| OB: 9.5% | OB: 11.8% | OB: 8.3% |
| (Magriples et al. 2013) | UW: 6.1% | UW: 6.3% |  |  |
| NW: 43.4% | NW: 43.1% |
| OW: 20.9% | OW: 21.3% |
| OB: 25.0% | OB: 24.7% |
| (Mendez et al. 2014) | UW: 4.2% | UW: 3.6% |  |  |
| NW: 57.5% | NW: 43.5% |
| OW: 21.8% | OW: 26.8% |
| OB: 16.5% | OB: 26.0% |
| (Mendez et al. 2016) | UW: 4.1% | UW: 3.6% |  |  |
| NW: 57.1% | NW: 42.8% |
| OW: 21.9% | OW: 26.5% |
| OB: 16.9% | OB: 27.1% |
| (Pawlak et al. 2013) | UW: 4.3% | UW: 4.5% | UW: 3.9% |  |
| NW:53.4% | NW: 46.0% | NW: 45.5% |
| OW: 23.1% | OW: 27.1% | OW: 28.1% |
| OB:17.7% | OB: 22.7% | OB: 22.5% |
| (Shieh and Wu 2014) |  | 28±6.9 | 26.2±4.8 |  |
| (Sridhar et al. 2014) | Not reported | | | |
| (Torloni et al. 2012) | UW: 4.7% | UW: 2.4% |  |  |
| NW: 46.8% | NW: 36.6% |
| OW: 25.1% | OW: 25.8% |
| OB: 23.4% | OB: 35.2% |

UW = underweight, NW = normal weight, OW = overweight, OB = obese

**Table S4.** Summary of how GWG was calculated in studies that utilized the 2009 IOM guidelines

|  |  |
| --- | --- |
| **First author, year** | **Gestational Weight Gain** |
| (Badreldin et al. 2018) | Weight at delivery minus pre-pregnancy weight |
| (Berggren, Stuebe, and Boggess 2015) | Weight at last prenatal visit (≥ 35 weeks gestation and within 2 weeks of delivery) minus pre-pregnancy weight or first prenatal visit weight (<20 weeks gestation) |
| (Bodnar et al. 2011) | Weight at last prenatal visit minus pre-pregnancy weight |
| (Bogaerts et al. 2012) | Weight at delivery minus pre-pregnancy weight |
| (Bowers et al. 2013) | Obtained from patient electronic medical records |
| (Cavicchia et al. 2014) | Obtained from birth certificates |
| (Chaffee et al. 2015) | Weight at delivery minus pre-pregnancy weight |
| (Chang et al. 2017) | Obtained from medical rcords |
| (Chasan-Taber et al. 2016a) | Last weight prior to delivery minus pre-pregnancy weight |
| (Cheng et al. 2015) | Body weight at birth minus pre-pregnancy weight |
| (Chihara et al. 2014) | Weight at delivery minus pre-pregnancy weight |
| (Cohen et al. 2016) | Weight at delivery minus pre-pregnancy weight |
| (Cox Bauer et al. 2016) | Weight at admission prior to delivery minus pre-pregnancy weight |
| (Deputy et al. 2015) | Obtained from birth certificate |
| (Fontaine et al. 2012) | Last measured prenatal weight (did not define time point) minus baseline weight (did not define when ‘baseline’ was) |
| (Rothberg et al. 2011) | Weight at last prenatal care visit minus pre-pregnancy weight |
| (Haile et al. 2017) | Weight at delivery minus pre-pregnancy weight |
| (Harris et al. 2015) | Weight at delivery minus pre-pregnancy weight |
| (I. Headen et al. 2015) | Weight at delivery minus pre-pregnancy weight. When a woman delivered prior to term, GWG adequacy was calculated (an estimated ratio of a woman's expected and observed amounts of weight gain at each week of gestation |
| (Hedderson and Ferrara 2010) | Weight at glucose screening test minus pre-pregnancy weight, divided by the weeks of gestation at the time of the screening test (did not measure total GWG) |
| (Herring et al. 2008) | Last measured weight prior to delivery (mean 1.2 weeks before gestation) minus first measured weight during early pregnancy (<14 weeks gestation) |
| (Hunt et al. 2013) | Weight at delivery minus pre-pregnancy weight |
| (Kim et al. 2014) | Weight at delivery minus pre-pregnancy weight |
| (Kinnunen et al. 2016) | Information on total GWG was self-reported at a visit at 14 weeks postpartum (did not explain calculation) |
| (Koleilat and Whaley 2013) | Weight at last clinic visit (1 month or less of delivery date) minus weight at first trimester (did not define time point) |
| (Kowal, Kuk, and Tamim 2012) | Obtained from Canadian Maternity Experience Survey |
| (Krukowski et al. 2013) | Derived from a data set (did not explain calculation) |
| (Larouche et al. 2010) | Extrapolated total GWG from weight gain documented between the first and last prenatal visits (did not define time point) |
| (Leonard et al. 2017) | Weight at delivery minus pre-pregnancy weight |
| (Lindberg et al. 2016) | Last weight prior to delivery minus pre-pregnancy weight |
| (Magriples et al. 2013) | Weight recorded during third trimester of pregnancy (mean = 34.5 weeks’ gestation) minus pre-pregnancy weight |
| (Mendez et al. 2014) | Weight at delivery minus pre-pregnancy weight |
| (Mendez et al. 2016) | Weight at delivery minus pre-pregnancy weight |
| (Pawlak et al. 2013) | Weight at delivery minus pre-pregnancy weight |
| (Shieh and Wu 2014) | Weight at time of data collection (did not define time point; cross-sectional data collection) minus pre-pregnancy weight |
| (Sommer et al. 2014) | Weight at second visit during gestation (28 ± 2 weeks) minus weight at first visit during gestation (<20 weeks gestation, mean =12 (3)) |
| (Sridhar et al. 2014) | Last measured pregnancy weight (did not define time point) minus pre-pregnancy weight (recorded 12 months before pregnancy) |
| (Torloni et al. 2012) | Weight at delivery minus pre-pregnancy weight |
| (Tovar et al. 2012) | Weight at delivery minus pre-pregnancy weight |
| (Walker, Cheng, and Brown 2014) | Weight at the end of pregnancy (did not define time point) minus pre-pregnancy weight |

**Table S5.** Risk of Bias assessment, using the Modified Cochrane Tool, of studies that used the 2009 IOM guidelines

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **First author, year** | **Selection Bias** | **Performance Bias** | **Detection Bias** | **Selective Reporting Bias** | **Attrition Bias** | **Other Bias** |
| (Badreldin et al. 2018) | High | Low | Unclear | Unclear | Unclear | Unclear |
| (Berggren, Stuebe, and Boggess 2015) | High | Low | Unclear | Unclear | Unclear | Low |
| (Bodnar et al. 2011) | High | Low | Low | Low | Low | Low |
| (Bogaerts et al. 2012) | High | Low | High | Low | Unclear | High |
| (Bowers et al. 2013) | High | Low | Low | Low | Unclear | Low |
| (Cavicchia et al. 2014) | High | Low | Low | Low | Low | Low |
| (Chaffee et al. 2015) | Low | Unclear | Low | Low | Low | Low |
| (Chang et al. 2017) | Low | Unclear | High | Unclear | Unclear | High |
| (Chasan-Taber et al. 2016a) | High | Low | High | High | Low | Low |
| (Cheng et al. 2015) | Low | Low | High | Unclear | Low | Low |
| (Chihara et al. 2014) | High | Low | Low | Unclear | Unclear | Low |
| (Cohen et al. 2016) | Low | Low | High | Unclear | Unclear | Low |
| (Cox Bauer et al. 2016) | Low | Low | Unclear | Low | Low | Low |
| (Deputy et al. 2015) | Low | Low | High | Low | High | Low |
| (Fontaine et al. 2012) | Low | Low | Low | High | Low | Low |
| (Rothberg et al. 2011) | Low | Low | High | Unclear | Low | Low |
| (Haile et al. 2017) | High | Unclear | Low | Unclear | Unclear | Low |
| (Harris et al. 2015) | Low | Low | High | Low | Low | Low |
| (I. Headen et al. 2015) | Low | Low | High | Unclear | High | High |
| (Hedderson, EP, and Ferrara 2010) | Low | Low | Low | Unclear | Low | High |
| (Herring et al. 2008) | High | Low | High | Low | Low | Low |
| (Hunt et al. 2013) | Low | Low | Low | Unclear | High | Low |
| (Kim et al. 2014) | Low | Low | High | Unclear | Unclear | Low |
| (Kinnunen et al. 2016) | Low | Low | Low | Low | Low | Low |
| (Koleilat and Whaley 2013) | Low | Low | Low | Unclear | Unclear | High |
| (Kowal, Kuk, and Tamim 2012) | Low | Low | High | Low | High | Low |
| (Krukowski et al. 2013) | Low | Low | High | Low | High | Low |
| (Larouche et al. 2010) | Low | Low | High | Unclear | Unclear | High |
| (Leonard et al. 2017) | Low | Unclear | High | Unclear | Low | High |
| (Lindberg et al. 2016) | Low | Low | High | Unclear | Unclear | High |
| (Magriples et al. 2013) | High | Low | Low | Low | Low | High |
| (Mendez et al. 2014) | Low | High | High | Unclear | Low | Low |
| (Mendez et al. 2016) | Low | Low | High | Low | Low | Low |
| (Pawlak et al. 2013) | Low | Low | High | Unclear | Unclear | Low |
| (Shieh and Wu 2014) | High | Low | Low | Low | High | High |
| (Sommer et al. 2014) | Low | Low | High | Low | Low | Low |
| (Sridhar et al. 2014) | Low | Low | High | Low | Unclear | Low |
| (Torloni et al. 2012) | Low | Low | High | Low | Unclear | Low |
| (Tovar et al. 2012) | High | Low | High | Low | High | High |
| (Walker, Cheng, and Brown 2014) | Low | Low | Low | Low | Low | Low |

**Table S6.** Main findings from articles using alternative guidelines, listed in alphabetical order by author

|  |  |  |
| --- | --- | --- |
| **First author, year** | **Main Outcome** | **Summary of GWG Results** |
| (Abrams, Carmichael, and Selvin 1995) | Rate of GWG per trimester | * Compared to NHW women, NHB women gained significantly faster during first trimester and slower during last two trimesters * Hispanic women gained more slowly than NHW women during the first two trimesters and significantly faster during the third |
| (Ademowore, Courey, and Kime 1972) | Mean maternal weight gain | * Non-white women had lower GWG than white counterparts |
| (Albers 1994) | Low birth weight infants | * New Mexico women had a 10% higher mean GWG than other American women * In the whole USA, no significant difference in GWG between Hispanic and non-Hispanic women * In New Mexico, Hispanic women had an 88.2% chance of gaining over 25lb compared to 69.0% for non-Hispanics |
| (Allen et al. 1994) | BMI | * GWG did not differ by country/nationality (Mexican, Kenyan, Egyptian) |
| (Bahadoer et al. 2015) | Pre-pregnancy obesity and GWG | * Compared to Dutch-origin women, Surinamese-Hindustani-origin women (OR:0.40) and Moroccan-origin women (OR: 0.48) had lower risks of EGWG * Compared to Dutch-origin women, total GWG was lower in all ethnic minority groups, except for Cape Verdean-origin and Surinamese-Creole-origin women (*p*-values <0.05). |
| (Bentley-Lewis et al. 2014) | Hypertension | * A relationship between GWG and ethnicity existed across entire study population |
| (Caulfield, Witter, and Stoltzfus 1996) | GWG | * Black women were at increased risk of under-gain compared with white women * Black women were as likely as white women to have adequate GWG |
| (Caulfield, Stoltzfus, and Witter 1998) | Risk of delivering LGA or SGA infant | * Within each BMI stratum, black women were more likely to gain less total weight than white women |
| (Chasan-Taber et al. 2008) | GWG | * Women with < 10 yrs of residence in the United States were 50% less likely to gain above the IOM range as compared to third-generation women (95% CI o.3, 0.9). * Among Hispanic women, the prevalence of excessive GWG was higher in the English-only speakers compared to the English and Spanish speakers and Spanish-only speakers. |
| (Ellerbe et al. 2013) | Upper quartiles of birth weight | * NHW women without GDM gained slightly more weight on average than NHB with and without GDM and NHW women with GDM. |
| (Finch, Frank, and Hummer 2000) | Adverse birth outcomes (infant mortality) | * NHB women were more likely than NHW women to gain <15 pounds * NHB women had the highest mean GWG |
| (Frisbie, Forbes, and Hummer 1998) | Adverse birth outcomes (infant mortality, low birth weight, and prematurity) | * Among American Hispanics, Mexican Americans and Puerto Ricans have the lowest GWG, Anglo and Cuban Hispanics have the highest GWG |
| (Romy Gaillard et al. 2013) | EGWG | * European ethnicity had higher risk of EGWG than non-European women |
| (Hackley et al. 2010) | GWG and post-partum weight loss | * Spanish-speaking women had better adherence to GWG guidelines, however, language was not statistically associated with achieving GWG guidelines |
| (Hardy 1999) | Macrosomia | * Black women had higher mean GWG than White and Hispanic counterparts * White women had higher mean GWG than Hispanic counterparts |
| (Heilemann et al. 2000) | Prenatal and labour outcomes | * U.S born women of Mexican descent were more likely to have EGWG than Mexican-born women * Mexican-born women were more likely to have IGWG |
| (Hernandez-Rivas et al. 2013) | GDM | * GWG did not differ across cultures |
| Hickey, 1990(C A Hickey et al. 1990) | Weight for Height Z scores | * GWG did not differ by ethnicity |
| Hickey, 1993\*(C. Hickey et al. 1993) | Birth weight | * Similar proportions of black and white women had IGWG |
| Hickey et al. 1995a\*(C A Hickey et al. 1995) | Low prenatal weight gain | * 33-40% of black and white women had IGWG |
| Hickey, 1995b\*(C. Hickey et al. 1995) | Spontaneous preterm delivery | * A wide range in total GWG was observed among women in both ethnic groups |
| Hickey, 1996\*(Carol A. Hickey et al. 1996) | Birth weight | * GWG did not differ by race-ethnicity |
| Hickey, 1997a\*(C A Hickey et al. 1997) | Low GWG | * 27.0% of low-income black women gained less than or equal to 10kg vs. 22.2% for low income white women * Low income black women gained less than low income white women |
| Hickey, 1997b(Carol A. Hickey et al. 1997) | Prenatal weight gain in the upper and lower halves of the recommended range of gain | * Approximately half of the women whose weight gain was within the recommended ranges had gains in the lower portion of the recommended range, regardless of ethnicity * The incidence of low prenatal weight gain was highest among black women and among women with low pregravid BMI in both ethnic groups * The incidence of high prenatal weight gain was highest among white women and among women with high pregravid BMI in both ethnic groups.\ |
| Hickey, 1999(C A Hickey et al. 1999) | Low GWG | * The incidence of low weight gain was increased among Black women who had < 12 yrs of education, were single, anemic, had low or normal pre-pregnancy body mass index, increased parity, interpregnancy intervals < 24 months, used tobacco or alcohol or entered prenatal care or WIC programs after the first trimester. |
| Huynh, 2013(Huynh, Borrell, and Chambers 2014) | EGWG | * NHB and Hispanic women were more likely to have EGWG than their NHW counterparts |
| Koh, 2013(Koh et al. 2013) | Discordant GWG | * Malay ethnicity was associated with higher EGWG and inadequate GWG in comparison to Chinese women |
| Margerison, 2012(Margerison-Zilko et al. 2012) | Birth weight for gestational age and BMI at age 5 | * Black women had higher GWG throughout pregnancy |
| Misra, 2010(Misra, Hobel, and Sing 2010) | Variation and rate of weight gain | * The rate of weight gain in the first half of pregnancy for African-American women was an average of 0.30 kg/week compared to 0.24 kg/week for non-African-American women |
| Morling, 2003(Morling, Kitayama, and Miyamoto 2003) | Coping strategies | * American women gained significantly more (mean 16.2 kg) than Japanese women (mean 9.6 kg) p < 0.0001 |
| Neser, 1963(Neser 1963) | GWG | * The average GWG of the Bantu women did not differ significantly from the literature values for white women on a rigidly restricted diet |
| Niswander, 1969(Niswander et al. 1969) | Birth weight | * The average GWG for black and white women did not differ (22.8 lb vs. 22.5 lb) * Black women had more inadequate and excessive GWG than white women |
| Ochsenbein-Kolbe, 2007(Ochsenbein-Kollble et al. 2007) | GWG | * Asian and Black women had consistent and significantly lower GWG compared to White women |
| Petitti, 1991(Petitti, Croughan-Minihane, and Hiatt 1991) | GWG | * GWG did not differ by race |
| Rosenberg, 2005(Rosenberg et al. 2005) | Adverse birth outcomes (caesarean section, preterm birth, LBW) | * NHB (20.3%) and Hispanic (20.9%) women were more likely to exhibit EGWG than NHW (16.8%) and Asian women (10.8%) |
| Sackoff, 2015(Sackoff and Yunzal-Butler 2014) | Interconception weight change | * NHW, NHB and Hispanic women had similar mean GWG (32.1 lb – 32.9 lb) and rates of EGWG (27-29%) * Asian/Pacific Islander has significantly lower mean GWG (30.2 lb) and rate of EGWG (18.0%) |
| Savitz, 2011(Savitz et al. 2011) | Association between GWG, preterm birth, SGA, LGA and birth method | * GWG did not differ by race |
| Schieve, 1998a(L. Schieve, Cogswell, and Scanlon 1998) | GWG | * Discordant GWG by culture changed between 1990-1996 * White women had the highest amount of GWG from 1990-1994, however, Native American women had the highest from 1995-1996. |
| Schieve, 1998b(L. A. Schieve, Cogswell, and Scanlon 1998) | Discordant GWG | * White women were less likely to report IGWG and more likely to report EGWG * White women averaged higher GWG than their black and Hispanic counterparts * GWG among obese women was similar across race-ethnicity groups |
| Sparks, 2009(Sparks 2009) | LBW | * U.S. born, Hispanic women are more at risk for EGWG than foreign born, Hispanic women. * NHW women had the highest odds of EGWG |
| Stotland, 2005(N. E. Stotland et al. 2005) | GWG by pre-pregnancy BMI | * Black and Latina women were more likely than white women to report target weight gain below the IOM guidelines, even when controlling for education status |
| Stotland, 2006(N. Stotland et al. 2006) | Spontaneous preterm birth | * Black women were most likely to gain less than 0.27kg/wk * % of women gaining above 0.52kg/wk lowest for Asians (13.8%), higher for white (24.6%) and African American (23.0%) |
| Taffel, 1993(Taffel, Keppel, and Jones 1993) | Prenatal care provider advice on GWG | * African American women were more likely to have inadequate GWG than White women |
| Walker, 2002(Walker and Kim 2002) | Psychosocial thriving | * GWG did not significantly differ by race |
| Wells, 2006(Wells et al. 2006) | Discordant GWG | * Hispanic women were more likely to have IGWG * NHW and NHB women were positively associated with EGWG |
| Widen, 2015(Widen et al. 2015) | Long term fat and weight retention | * EGWG did not differ by race-ethnicity |

\*=used same data set. Abbreviations: BMI = body mass index, EGWG = excessive gestational weight gain; GWG = gestational weight gain, IGWG = inadequate gestational weight gain; IOM = Institute of Medicine; NHB = Non-Hispanic Black, NHW = non-Hispanic White, OB = obese, OW = overweight; OR = Odds ratio; WIC = Special Supplemental Nutrition Program for Women, Infants and Children; U.S = United States