

Pregnancy Health: Lifestyle Interventions to Reduce the Risk of Gestational Diabetes

Community Preventive Services Task Force Finding and Rationale Statement Ratified December 2017

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CPSTF Finding and Rationale Statement

Intervention Definition

Lifestyle interventions delivered during the first two trimesters of pregnancy aim to prevent gestational diabetes by actively encouraging women to eat a healthy diet and be physically active. Programs include one or more of the following components:

- Supervised exercise classes
- Diet education and counseling
- Physical activity education and counseling
- Diet activity (e.g., meal plan, food diary, individualized support)

CPSTF Finding (December 2017)

The Community Preventive Services Task Force (CPSTF) recommends lifestyle interventions delivered during the first two trimesters of pregnancy to reduce the risk of gestational diabetes. The CPSTF finds strong evidence of effectiveness for lifestyle interventions that provide supervised exercise classes, either alone or in combination with other components to reduce the risk of gestational diabetes. The CPSTF finds sufficient evidence of effectiveness for lifestyle interventions that provide education and counseling for diet or physical activity, diet activities, or a combination of these components to reduce the risk of gestational diabetes.

Rationale

Basis of Finding

The Community Preventive Services Task Force (CPSTF) recommendation is based on evidence from 29 studies identified in a recently published review by Song and colleagues (Song et al. 2016). The Community Guide review team (the Team) examined the review and included studies identified in the Song review for assessment. The Team drafted the intervention definition, abstracted study results and intervention and population characteristics. The team calculated effect estimates for each included study, and determined medians and interquartile intervals (IQR) for the summary effect estimates and stratified analyses.

The CPSTF recommendation on lifestyle interventions that provide supervised exercise classes, either alone or in combination with other components is based on evidence from 13 studies (search period through October 2015). Compared to usual care, lifestyle interventions that provided supervised exercise classes alone or in combination with other components reduced the risk of developing gestational diabetes by 32%.

The CPSTF recommendation for lifestyle interventions that provide education and counseling for diet or physical activity, diet activities, or a combination of these components is based on 16 studies (search period through October 2015). Compared to usual care, education and counseling for diet and physical activity reduced the risk of gestational diabetes by 31% (see Table 1).

Table 1. Impact of Lifestyle Interventions on Gestational Diabetes Risk

Outcome	Median Relative Risk (Interquartile Interval)
Overall relative risk of gestational diabetes (29 studies)	Median Relative Risk: 0.68 (IQR: 0.45 to 1.00)
Relative risk of gestational diabetes: supervised exercise classes alone or in combination (13 studies)	Median Relative Risk: 0.68 (IQR: 0.25 to 0.82)
Supervised exercise classes alone (10 studies)	Median Relative Risk: 0.69 (IQR: 0.17 to 0.80)
Supervised classes in combination with diet education and counseling (3 studies)	Median Relative Risk: 0.58 (IQR: 0.33 to 1.16)
Relative risk of gestational diabetes: education and counseling for diet only, diet activity, education and counseling for diet and physical activity (16 studies)	Median Relative Risk: 0.69 (IQR: 0.59 to 1.09)

IQR: Interquartile interval

Stratified analysis

The Community Guide review team performed stratified analyses to examine the potential influence of intervention and participant characteristics on relative risk for developing gestational diabetes (see Table 2). All 29 studies (13 for supervised exercise classes; 16 for other lifestyle components) were used in the analyses to allow for more robust findings.

Table 2. Gestational Diabetes Risk Stratified by Intervention Type and Participant Characteristics

Stratified Analyses	Median Relative Risk (Interquartile Interval)
By Participant characteristics	
Gestational age at recruitment ^a	
≤15 weeks (19 studies)	Median Relative Risk: 0.71 (IQR: 0.37 to 1.10)
>15 weeks (9 studies)	Median Relative Risk: 0.65 (IQR: 0.58 to 0.87)
Risk of developing gestational diabetes at recruitment ^b	
High risk for developing GDM (18 studies)	Median Relative Risk: 0.66 (IQR: 0.36 to 1.12)
Risk level not specified (11 studies)	Median Relative Risk: 0.71 (IQR: 0.53 to 0.85)
Pre-pregnancy BMI ^c	
Normal ($18.5 < \text{BMI} < 25 \text{kg/m}^2$) (10 studies)	Median Relative Risk: 0.74 (IQR: 0.19 to 1.08)
Overweight ($25 \leq \text{BMI} < 30 \text{kg/m}^2$) (7 studies)	Median Relative Risk: 0.75 (IQR: 0.58 to 1.52)
Obese ($\text{BMI} \geq 30 \text{kg/m}^2$) (12 studies)	Median Relative Risk: 0.70 (IQR: 0.60 to 1.15)
Overweight + Obese ($\text{BMI} \geq 25 \text{kg/m}^2$) (20 studies) ^d	Median Relative Risk: 0.71 (IQR: 0.60 to 1.21)
Maternal age	
<30 years (13 studies)	Median Relative Risk: 0.75 (IQR: 0.41 to 1.20)
≥30 years (15 studies)	Median Relative Risk: 0.68 (IQR: 0.37 to 0.85)

IQR: Interquartile interval

^a For gestational age reported as a range, median or mean values were used to calculate distribution

^b All studies judged risk level based on BMI (overweight or obese). Some studies had additional criteria, such as racial or ethnic groups at high-risk for developing gestational diabetes, glucose intolerance, macrosomia, family history of diabetes, age, and twin pregnancies

^c Two studies reported categorical BMI

^d Three studies provided data for overweight and obese participants

Lifestyle interventions reduced risk for developing gestational diabetes across the strata examined. Greater reductions were observed, however, for interventions that provided supervised exercise classes in combination with diet education and counseling. Greater reductions also were seen among participants who were recruited after the 15th gestational week, and participants who were at higher risk for developing gestational diabetes (as defined by study authors), obese pre-pregnancy, or 30 years or older.

Applicability and Generalizability Issues

Intervention settings

Six of the included studies evaluated interventions in the United States. Remaining studies were conducted in Canada (2 studies), Australia (2 studies), the United Kingdom (1 study), the European Union (16 studies), and India (1 study). Studies were conducted in clinics (12 studies) and hospitals (16), and one study did not report the intervention setting.

Demographic characteristics

Overall, study participants had a median age of 30.2 years (28 studies) and a median BMI of 26.8 kg/m² (27 studies). The majority of studies recruited participants with mean or median gestational age ≤15 weeks (19 studies) while 9 studies reported mean or median gestational age to be >15 weeks. Eighteen studies specifically recruited women at high risk for gestational diabetes, while 11 studies did not specify the risk level of participants. Studies reported recruiting women with pre-pregnancy BMI categorized as normal (8 studies), overweight (8 studies), or obese (11 studies).

Intervention characteristics

Intervention providers:

Studies reported the involvement of many intervention providers, including dietitian (11 studies), fitness specialist (5 studies), health coach/trainer (4 studies), obstetrician or gynecologist (3 studies), food technologist (1 study), and nutritionist (1 study). Interventions included one (17 studies) or two intervention providers (9 studies). Three studies did not report information about who delivered the intervention.

Intervention type:

Interventions aimed to improve participants' diet and physical activity through education, counseling, diet activities, and exercise classes. Education and counseling components involved educating participants on the importance of healthy eating and physical activity, but did not engage participants in healthy eating or physical activity. When interventions offered diet activities, participants were placed on a nutrition plan and recorded their adherence to the diet.

Interventions provided education and counseling for diet alone (3 studies), physical activity education and counseling alone (1 study), meal plan for diet alone (2 studies), education and counseling for diet and physical activity (7 studies), supervised exercise classes alone (10 studies), or a combination of the above (6 studies).

Provided materials:

Participants received pedometers only (5 studies), a dietary tool only (e.g., Food Choice Map, handbook with recommended foods and recipes, logbook to record goals; 4 studies), or both (2 studies).

Data Quality Issues

All studies were randomized control trials.

Song et al. used reporting criteria set by the Preferred Reporting Items Systematic Reviews and Meta-Analyses (PRISMA) Guidelines and Cochrane (Liberati et al., 2009). The authors included details on the quality of included studies, looking at six criteria:

- Population representativeness
- Adequacy of sequence generation
- Selection bias
- Intention to treat
- Complete outcome data
- Loss to follow-up

Other Benefits and Harms

Any physical activity is beneficial to a person's health, especially if sustained post-pregnancy (Artal et al., 2003).

No additional benefits or harms were identified in the included studies or in the broader literature.

Considerations for Implementation

Based on the current body of evidence, the CPSTF recommends lifestyle interventions to reduce the risk for developing gestational diabetes. This finding is reinforced by another published systematic review that reported similar findings (Shepherd et al., 2017).

Most of the included studies were implemented before the 24th week of gestation, which is when the United States Preventive Services Task Force (USPSTF) recommends screening for gestational diabetes (Grade B recommendation; USPSTF 2016). Evidence showed interventions were slightly more effective when implemented with women who were recruited after the 15th gestational week, and women who were at higher risk for developing gestational diabetes. Implementers may choose to offer interventions to pregnant women who are at higher risk for developing gestational diabetes early during pregnancy.

Lifestyle interventions that included supervised exercise classes led to greater effects. Interventions considered in this review typically provided 50-60 minute, supervised exercise classes, three times per week. Classes were of moderate intensity and included land or aquatic exercises.

Supervised exercise classes can be resource-intensive. Implementers should consider who will supervise participants, the possibility of work compensation for time spent in classes, and whether childcare will be needed. Programs should have protocols in place for classes that offer intense exercise during pregnancy to prevent injury and adverse pregnancy outcomes. When healthcare professionals are involved, reimbursement should be considered as well.

It is important to consider where classes will be held. Some of the included studies provided exercise classes in private gyms and gave participants free access to the facilities. This may not be the case when programs are implemented outside of research settings. Implementers need to identify settings that take into account distance and accessibility to potential participants. Possible settings could range from free or low priced community centers to private gyms.

Implementers may want to develop a protocol and provide support elements to help transition participants into a sustainable exercise routine. This would be especially important for patients who did not engage in regular exercise prior to the intervention.

Evidence Gaps

Additional research and evaluation are needed to answer the following questions and fill existing gaps in the evidence base.

- Among those who did not develop gestational diabetes, did lifestyle interventions lead to other health benefits?
- Besides education and counseling, what else needs to be covered (e.g. goal setting, action plan, follow-up monitoring of progress)?
- Does intervention effectiveness vary in different populations, including low-income and predominantly racial or ethnic minority populations?

References

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Disclaimer

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