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Dietary Self Efficacy predicts AHEI Diet Quality in Women with previous Gestational Diabetes

Erin Poe Ferranti, PhD, MPH, RN,
Nell Hodgson Woodruff School of Nursing, Emory University, 1520 Clifton Road, NE, Atlanta, GA, Ph: 404-808-3685, Fax: 404-727-6945, epoe@emory.edu

K. M. Venkat Narayan, MD, MSc, MBA,
Rollins School of Public Health and School of Medicine, Emory University Atlanta, GA

Carolyn M. Reilly, PhD, RN, FAHA,
Nell Hodgson Woodruff School of Nursing, Emory University Atlanta, GA

Jennifer Foster, CNM, MPH, PhD, FACNM,
Nell Hodgson Woodruff School of Nursing, Emory University Atlanta, GA

Marjorie McCullough, ScD, RD,
American Cancer Society, Inc. Atlanta, GA

Thomas R. Ziegler, MD,
School of Medicine, Emory University Atlanta, GA

Ying Guo, PhD, and
Rollins School of Public Health and Nell Hodgson Woodruff School of Nursing, Emory University Atlanta, GA

Sandra B. Dunbar, RN, PhD, FAAN, FAHA
Nell Hodgson Woodruff School of Nursing, Emory University Atlanta, GA

The incidence of gestational diabetes mellitus (GDM) has more than doubled in the past decade[1] and affects at least 7% of all pregnancies, or 200,000 women per year in the US.[2,3] GDM is the most common complication of pregnancy, with incidence paralleling that of type 2 diabetes (T2DM) prevalence in the general population.[4] Women with previous gestational diabetes (pGDM) are at elevated risk for cardiovascular disease[5] and have a seven-fold increased chance of developing T2DM,[6] most commonly within five years following delivery.[7] Despite intensive dietary counseling[8] for women with GDM during pregnancy, there is poor adherence to general dietary recommendations following delivery. Fruit and vegetable consumption is low in this population,[9] with only 5% consuming at least five servings per day of fruit or vegetables.[10]

Intensive lifestyle interventions with a combined focus on diet and physical activity aimed at moderate weight loss resulted in a 53% reduction in T2DM risk among the cohort of women with pGDM in the Diabetes Prevention Program trial.[11] Furthermore, more recent studies

Correspondence to: Erin Poe Ferranti.

have shown that adherence to healthy dietary patterns alone provides protection for T2DM risk in the pGDM population.[12,13] Protection was most considerable through the pattern characterized by the Alternate Healthy Eating Index (AHEI) demonstrating a 57% lower T2DM risk.[12]

The AHEI dietary index, created in 2002, evolved from the Healthy Eating Index as an alternative dietary index to better predict chronic disease risk.[14] In addition to the T2DM risk reduction associated with AHEI adherence in women with pGDM, the AHEI dietary pattern has been associated with decreased risk for diabetes,[12,15] lower risk for cardiovascular disease,[16] cancer,[17] and the reversal of metabolic syndrome in other populations.[18] Identifying the factors that can be modified to improve adherence to the AHEI dietary pattern is an important next step in mitigating risk reduction. Few studies have examined intrapersonal influences of diet quality in the pGDM population and no study to date has specifically examined the variables that may contribute to greater concordance with the AHEI dietary pattern. The purpose of this study was to examine the association between the intrapersonal factors of socio-demographics, depressive symptoms, perceptions of T2DM risk, benefits and barriers to healthy eating, and self-efficacy with AHEI diet quality in women within five years of a GDM pregnancy.

Theoretical Framework

There are multiple determinants that influence eating behavior and the quality of dietary patterns. The determinants can be categorized within contexts of intrapersonal, interpersonal, and environmental factors.[19] Although this study focused on the intrapersonal determinants, the investigators recognized the multiple contexts that influence dietary behavior and incorporated the ecological model of eating behavior by Story and colleagues[19] to frame the singular intrapersonal contextual focus. The variables examined in this study were specifically guided by the Health Belief Model to understand the intrapersonal factors of perceived threat of T2DM, benefits and barriers to healthy eating, and self-efficacy with AHEI diet quality (Figure 1).

Individual influences on healthy eating have been widely studied among many populations and multiple intrapersonal factors have been associated with diet quality. As depicted in Story et al.'s ecological framework of the multiple influences of eating behavior, the intrapersonal influences include cognitions, skills and behavior, lifestyle, biological, and demographics.[19] Socio-demographic factors influence diet quality, with most studies concluding that increased age, higher education, higher income, and non-minority race/ ethnicity are associated with higher diet quality.[20–22] Knowledge and self-efficacy are important predictors of diet quality with post-partum and in women with pGDM.[10,21,23] Depression has also been associated with lower diet quality,[24] with some recent studies suggesting that poor diet quality may predict depressive symptoms, especially in women of childbearing age.[25,26]

The investigators of this study hypothesized that women with pGDM who had higher perceptions of the threat of T2DM, along with greater perceived self-efficacy and benefits of healthy eating, and lower perceptions of healthy eating barriers would have higher AHEI diet quality, controlling for socio-demographics, dietary knowledge and depressive symptoms.

Methods

Study Design, Setting, and Participants

This was a cross-sectional, descriptive, quantitative study conducted from August 2011 through December 2012. Participants were recruited from the community and through women's health clinics of an academic health center, an inner-city public hospital, and a public health department. Eligible participants were women who were (a) within 5 years of a GDM pregnancy, (b) aged 18–45 years, (c) fluent in English or Spanish, (d) with no history of polycystic ovary syndrome and no development of T2DM, (e) not currently pregnant or breastfeeding, (f) not following a prescriptive or weight-loss diet, and (g) no more than moderate depressive symptoms (score of ≥ 20 on the Patient Health Questionnaire-9). The study protocol was approved by the university institutional review board and by the clinic sites where recruitment occurred.

Measurements

Participants completed the Block 110-item semi-quantitative food frequency questionnaire (FFQ) to assess usual dietary intake in the past year. The Block FFQ has been validated among other major FFQ's and has been found to be comparable.[27] Reliability and validity have been demonstrated in populations of women.[28] Nutrition Quest (Berkeley, CA) provided the FFQ analysis for specific daily nutrient intake and daily food servings and the investigators scored the dietary data into the AHEI. AHEI is scores range from 2.5–87.5, with greater concordance (better diet quality) reflected in higher scores. Eight of the nine AHEI components are scored from 0 (recommendations were not met) to 10 (recommendations were met fully), with intermediate intakes scored proportionately between 0 and 10. The final component of multivitamin use is scored dichotomously as 2.5 points for no use and 7.5 points for use.[14]

Demographics and basic, pertinent medical history were collected on a form designed for this study and included age, race/ethnicity, education, income, delivery date of most recent GDM pregnancy, and current medications.

Perceived threat of type 2 diabetes (T2DM) was assessed with a 23-item questionnaire incorporating three subscales (*Personal Control*, *Optimistic Bias*, *Knowledge*, and an additional seven items addressing risk perception and lifestyle behaviors) of the *Risk Perception Survey for Developing Diabetes* (*RPS-DD*), developed for the Diabetes Prevention Program trial[29] and adapted for women with pGDM.[30] For all subscales, higher scores are equivalent to higher levels of that component. Beliefs about the benefits of diet and exercise and individual risk perception with an additional seven items on the *RPS-DD* were assessed, replicating the assessment of risk perception in women with pGDM as conducted by Kim and colleagues.[30]

Perceived benefits of healthy eating was assessed with a 9-item, 5-point Likert instrument designed specifically for this study. At the time that this study was being designed, there were no published instruments that examined the concept of healthy eating benefits, especially in a population at risk for cardiometabolic diseases. Content validity of the scale was established with an expert review panel and then pilot-tested in a convenience sample (n = 91) of adults who had any cardiometabolic risk factor. Items address benefits such as healthy eating: "can help prevent diabetes," "can help control my weight," and "can help me feel better." Scores range from 9 – 45, with higher score indicating greater perceived benefits. Cronbach's alpha coefficient in the unpublished pilot study was acceptable at .88 and in this sample was .92.

Perceived barriers of healthy eating was assessed with the *Barriers to Healthy Eating Scale (BHES)*, a 16-item scale originally developed to assess healthy eating barriers in pregnant women.[31] It addresses areas related to unavailability of food, expense, inconvenience, preferences and inability to engage in healthy eating. Higher scores indicate greater perceived barriers to healthy eating. The 16-item *Cardiac Diet Self-Efficacy Scale* was used to measure self-efficacy related to healthy eating. It is a general nutrition self-efficacy scale addressing healthy dietary behavior.[32]

Knowledge and depressive symptoms are known to influence dietary quality, especially in women of child-bearing age.[21,26] Dietary knowledge was assessed with an 11-item questionnaire (10 knowledge questions and 1 Likert questions for perceived level of dietary knowledge) to assess awareness of the 2010 Dietary Guidelines for Americans. This instrument was adapted from a survey designed to test knowledge of the 2005 Dietary Guidelines for Americans from a study with community health advisors.[33] For this study, an adapted and updated version of the questionnaire to reflect the 2010 guidelines specifically for women aged 18–45 was used.[34] The knowledge questions are each 4-item multiple choice items, which test the participants' understanding of recommended daily calories, daily servings of grain, fruits and vegetables, dairy, protein, fiber, sodium, and amount and types of fat. Knowledge of diabetes risk factors was assessed with the knowledge subscale of the *RPS-DD*.

Depressive symptoms were assessed with the *Patient Health Questionnaire-9 (PHQ-9)*, a 9-item scale that was designed to be a brief assessment of depressive symptoms. It has been tested in multiple samples, including women of childbearing age[35] and deemed a reliable and valid measure of depression severity. Scores range from 0–27, with higher scores indicating greater depressive symptoms.

Procedures—Upon receiving a study letter of invitation or seeing/hearing an advertisement, interested women contacted the lead researcher or bilingual research assistant by email or telephone. The study was fully explained, initial verbal telephone consent completed, and eligibility criteria determined. English-speaking women who chose to enroll were mailed the questionnaire packet. Enrolled Spanish-speaking women completed questionnaires in an interview format with the bilingual research assistant. The research staff met participants in the setting chosen by the participant, usually the home or workplace. Questionnaire completion time ranged from 1 to 2 hours. Participants were compensated with a $25 gift card and presented with individualized cardiometabolic health and nutrition education materials for their participation in the study.

Data Analyses

Data were analyzed with IBM SPSS version 20.0.[36] Descriptive statistics were used to review sample characteristics and check underlying distribution assumptions. Race and ethnicity data were dichotomized into categories of non-Hispanic Caucasian women (n = 34) and Minority women (n = 41). The Minority group consisted of 24 African-American, 11 Hispanic, 2 Asian, and 4 multiracial/ethnic women. Bivariate correlation analyses were used to determine significant associations ($P \leq .05$) between the contributing and independent variables with diet quality. Mean differences in diet quality were examined with two sample t-tests by race, education status, and level of risk perception. Multiple linear regression modeling was used to examine the contribution of the independent and contributing variables to the variance in diet quality. The control variables of age, race, dietary knowledge, educational attainment, and depressive symptoms were held constant in the model testing, with each of the independent variables added to the model to be examined for contribution and significance in predicting diet quality. Each independent variable was individually tested in regression models regardless of bivariate analysis significance. Independent variables that did not remain significant ($P > .05$) were excluded from the final model.

Results

The sample included 75 women (45% Caucasian, 55% Minority - 32% African-American, 15% Hispanic), with a mean age of 35.5 years (SD = 5.5), who were 2.6 years (*SD* = 1.6) since their last GDM delivery, and a mean parity of 2.7 (SD = 2.1). Most were married (73%). More than half (58%) had a Bachelor's degree or higher and 52% were employed full-time. During their pregnancy, the majority of women (63%) were managed with lifestyle interventions while 24% were also treated with insulin (Table 1).

AHEI scores indicated an average level of diet quality (mean = 47.6, SD = 14.3), with a range of scores from 20.5 – 77.5. No participant fully met the AHEI recommendations. The dietary components with the poorest scores included alcohol consumption and red to white meat ratio, indicating that most women were consuming less than the suggested moderate alcohol intake per day of 0.5 – 1.5 servings per day and that red meat intake was higher than consumption of poultry and fish (Table 2).

Half of the participants (49%) believed that they had a moderate to high chance of developing diabetes in the next ten years, while the other half perceived their risk to be none or slight. There was no difference in diet quality between those with none/slight perception and those with moderate/high ($t = -0.23$, $P = .82$). Nearly everyone (97%) believed that regular exercise and diet may prevent T2DM development. While 83% believed that doing regular exercise and following a diet required a lot of effort, 81% also believed that the benefits outweighed the effort of doing it. Participants reported a high level of personal control for preventing diabetes (mean = 3.2, SD = 0.5), and a moderate amount of worry about future T2DM development (mean = 2.7, SD = 0.8). Participants, on average, did not feel that they were any more or less susceptible to the development T2DM or other serious disease compared to other women, with a mean Optimistic Bias score of 2.1 (SD = 0.7).

Barriers to healthy eating were low (mean = 27.3, SD = 6.5), with items related to distance greater than two miles for food and fresh fruits/vegetables as the more commonly reported barriers. Participants also reported a high level of perceived benefit to healthy eating (mean = 42.2, SD = 3.1), and had relatively high levels of dietary self-efficacy (mean = 21.9, SD = 12.7).

Despite a high level of education among participants, knowledge of dietary guidelines was rather poor, with an average test score of 42.2% (SD = 24.6). While 89% of the participants recognized that having had GDM increased risk for T2DM, overall risk knowledge was moderate with a mean test score of 60.7% (SD = 18.4). Most participants reported minimal depressive symptoms (68%), with scores ranging from 0 – 15 (mean = 4.1, SD = 4.1).

Bivariate associations were examined between diet quality, demographics, dietary knowledge, depressive symptoms, and perceived beliefs. Non-Hispanic Caucasian race, higher levels of education, and higher self-efficacy were all significantly associated with higher levels of diet quality (Table 4).

Non-Hispanic Caucasian women had higher AHEI scores compared to Minority women ($t = -2.4$, $P = .02$). The greatest mean difference in diet quality was between women with a Bachelor's degree or higher, compared to those who did not complete college ($t = -5.0$, $P = < .0001$), with a mean AHEI score difference of 14.5 points.

Each of the seven independent variables (*Personal Control, Worry, Optimistic Bias subscale scores, Diabetes Risk Knowledge* score, perceived benefit score, perceived barrier score and dietary self-efficacy score) were entered individually into a multiple regression model with all four control variables (race, education status, depressive symptoms and dietary knowledge). *Personal Control, Worry, Optimistic Bias, Diabetes Risk Knowledge,* perceived benefits and barriers did not contribute to variance in diet quality. Controlling for all other variables, only higher levels self-efficacy significantly predicted better AHEI diet concordance ($R^2 = .36$, $F(6, 66) = 6.19$, $P = <.0001$). The final model with education status and self-efficacy as significant predictors, explained 36% of the variance in diet quality. The parameter estimates of the predictors in the regression model further suggest that education status was the strongest predictor of AHEI diet quality (Table 5).

Implications

Diet quality in this sample of women with pGDM was moderate, with a substantial opportunity to improve intake to be consistent with protective diets such as the AHEI. Inadequate diet quality in the pGDM population has been reported previously,[9,10] with one other study examining AHEI dietary concordance in pGDM women.[12] The increasingly beneficial T2DM risk reduction demonstrated along the continuum of AHEI scores by Tobias and colleagues (2012) suggests the significant need to improve diet quality in women with pGDM. Identifying the important factors that predict diet quality is an important next step in designing diet improvement interventions. The findings of this study highlight the importance of educational attainment and dietary self-efficacy in promoting better diet quality, supporting components of the study hypotheses. However, neither the perceptions of T2DM threat, nor the perceptions of healthy eating benefits and barriers contributed to the variance in diet quality in this sample. The finding that risk perception is not a significant predictor of diet quality supports previous findings in women with pGDM.[30]

Higher levels of education were demonstrated in this study to be predictive of higher diet quality, which likely contributes to overall better dietary and disease risk/health promotion knowledge.[37] In a recent study specifically examining women with pGDM, higher levels of education were associated with better adherence to dietary recommendations.[38] In this sample, education levels were highly correlated with T2DM risk knowledge (Spearman's *rho* = .42, *p* = <.0001) and dietary knowledge (Spearman's *rho* = .52, *p* = <.0001). Although education level may not be a modifiable factor easily addressed in adult populations, diabetes risk knowledge and dietary knowledge can certainly be improved through education interventions. Improving health knowledge and health literacy at levels appropriate for individual educational attainment has been demonstrated to improve health behavior.[39] Enhancing diabetes and diet specific knowledge and health literacy may be an important component in designing multi-strategy dietary interventions for pGDM women.[40,41]

Discussion

This study's finding regarding the influence of dietary self-efficacy with diet quality supports previous findings in the pGDM population[10] and in general adult populations.[42] These findings are promising for designing nutritional interventions, since self-efficacy can be modified to improve diet quality.[43] Intervention studies that have specifically developed dietary self-efficacy through education, problem-solving, role-playing, and planning have demonstrated improvements in diet quality.[44–46]

The demographic factors of age and ethnicity had no associations with diet quality in this sample and race did not remain a significant predictor of diet quality in the regression modeling. These findings are in contrast with multiple studies that have demonstrated the significant influence of age, race, and ethnicity with diet quality.[37,47,48] This study sample ranged in age from 18 – 48 years, with the largest subset (50%) of the participants between 32 and 37 years. This limited age variance may explain the lack of association with diet quality. Similarly, Hispanic women comprised 15% of the sample, which may not have represented a sufficient sub-sample size to observe any variance in diet quality by ethnicity. Non-Hispanic Caucasian women had higher diet quality than the minority participants however, non-minority race was also significantly associated with higher levels of education. This relationship may explain the bivariate association between race and diet quality, but when entered into a regression model, educational attainment became the stronger demographic predictor of diet quality in this sample.

This study did not find any association between depressive symptoms and diet quality. Variance in depressive symptoms was limited (*PHQ-9* scores ranged from 0 – 15), with 88% reporting minimal or mild symptoms. The association between depressive symptoms and diet quality is well-established, with studies demonstrating both that poor diet quality predicts depression[49] and that higher levels of depressive symptoms contribute to poor diet.[50] The lack of association in this study's findings is likely due to the low variance and minimal depressive symptoms reported by the participants.

Risk perception or threat of T2DM did not have an influence in predicting variance in diet quality. In general, participants had realistic risk perceptions with half believing that they had none/slight chance of T2DM within ten years. A higher percentage of women in this study sample believed their risk to be moderate/high than in a previous study with pGDM women.[30] The higher perception of risk in this sample may be due to selection bias– those with higher risk perceptions may be more likely to enroll in a study about diet quality and cardiometabolic risk. However, those that believed they had a moderate/high risk did not have any difference in diet quality as compared to those with lower perceived risk. Furthermore, neither perceptions about personal control, worry, nor optimistic bias contributed to variance in AHEI diet scores. These findings are similar to those reported in other studies in which risk perception did not influence health behavior in women with pGDM.[51]

Perceptions about barriers or benefits to healthy eating also were not associated with diet quality. Participants reported high levels of perceived benefits and low levels of barriers to healthy eating, but similar to another study,[52] these factors did not contribute to variance in diet quality. Investigators from another study about healthy eating benefits and barriers found that these perceptions were related to levels of education.[53] An association between lower perceived barriers and higher levels of education ($r = -.26$, $P = .03$) was found in this study sample, but there was no association with perceived benefits.

The importance of self- efficacy in health promoting behavior has been demonstrated both in this population and in other populations. The association of self-efficacy with diet quality supports part of this study’s hypotheses and one component of the Health Belief Model. However, the lack of association between T2DM risk perception, barriers, and benefits of healthy eating with diet quality refutes the other hypotheses and does not support these constructs of the Health Belief Model. Perceptions or beliefs seem to have less influence on dietary outcomes than self-efficacy and knowledge.[42] Although this study was largely guided by the Health Belief Model and focused on examining individual influences and perceptions, it was embedded within an ecological model with recognition that achieving optimal dietary quality is complex and multifactorial.

In addition to the potential social and environmental influences that were beyond the investigative scope of this study, there may be other important individual influences that impact diet quality in women with pGDM. Time constraints, fatigue, work obstacles, and childcare duties have been identified as major barriers to diet and exercise activities in a qualitative investigation with women with pGDM.[54] These identified barriers require further study to test their contribution to diet outcomes. Additionally, dietary restraint,[55] perceived stress[56] and sleep quality[57] have been associated with diet quality in other populations of women, but have not been investigated in women with pGDM.

Limitations

There are a few limitations of this study which are worth noting. First, as a cross-sectional study, only associations could be identified between the variables, but no causality could be determined. Longitudinal studies in women with pGDM are needed to identify and understand the directionality of potential influences of diet quality. Second, while this sample size was adequate to determine the effect size of individual perceptions on diet quality, it was too small to detect differences by specific socio-demographic characteristics. The convenience sampling approach should be considered when generalizing the study findings to other studies in women with pGDM.

Strengths

This study has several strengths as well. It is one of few studies that have examined overall diet quality in pGDM women in addition to investigating associated socio-demographic and intrapersonal beliefs. Inadequate diet quality in pGDM women has been established in previous studies, but little was known about what might influence dietary adherence in this population. This study suggests that self-efficacy and education in particular may be important predictors of diet quality in pGDM women. Although a convenience sample, the study participants were recruited from multiple community and health care settings, which resulted in a socio-demographically diverse group of women. This diversity enhances the generalizability of these findings to pGDM women of multiple races, Hispanic ethnicity, and a wide range of education and income levels.

Conclusion

Level of education and dietary self-efficacy are important predictors of AHEI diet quality in women with pGDM. Interventions aimed at improving diet quality in these high-risk women should address strategies to increase dietary self-efficacy and address dietary knowledge and T2DM risk knowledge appropriate to individual health literacy and education levels. There is a considerable need to improve diet quality in pGDM women as this study supports previous work confirming that these at-risk women are not adhering fully to protective diets to prevent T2DM development. In addition to physical activity, a healthful diet is a critical component in preventing the progression to T2DM in at-risk populations. Future studies of diet quality among pGDM women should investigate intrapersonal influences of diet quality with a longitudinal design and expand the scope of influence beyond the individual to potential family/social and environmental factors.

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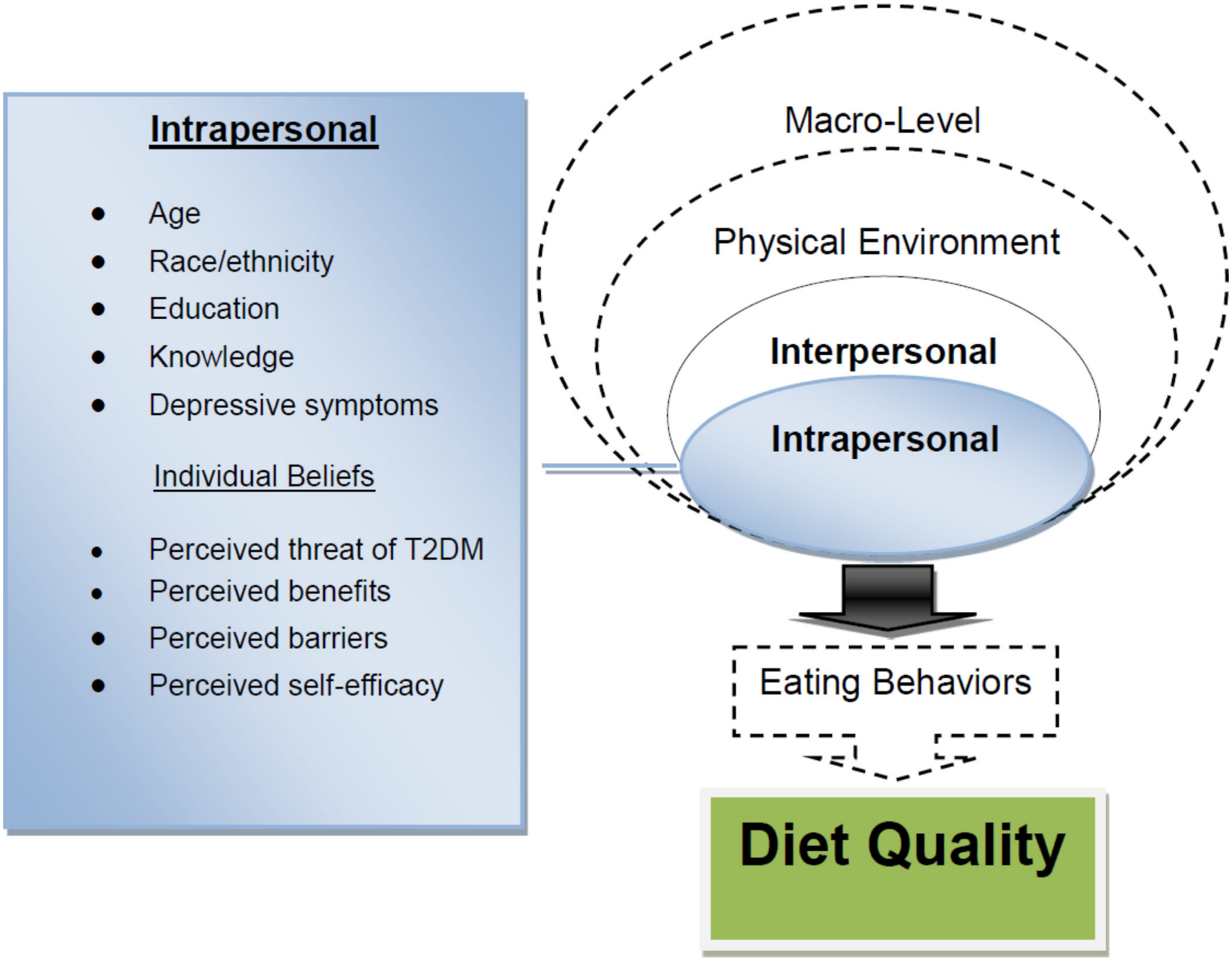

Figure 1. Intrapersonal Influences of Diet Quality in Women with pGDM

Note. The Ecological Framework for Eating Influences was adapted from Story et al. (2008) and combined with the Health Belief Model. This study is limited in focus to assessing specific intrapersonal factors as depicted in the colored boxes in this figure. Individual beliefs reflect the perceptions as defined by the Health Belief Model for eating behavior in relation to T2DM development. Adapted and republished with permission, from the *Annual Review of Public Health*, Volume 29 © 2008 by Annual Reviews www.annualreviews.org.

Table 1

Characteristics of the Sample (N = 75)

Characteristic	Study Sample
Age, mean years (SD)	35.5 (5.5)
Race/Ethnicity, %	
Non-Hispanic Caucasian	45.0
Minority	55.0
African-American	32.0
Hispanic	15.0
Asian	3.0
Multiracial	5.0
Education, %	
< 4 years college	41.3
≥ Bachelor's degree	58.7
Marital status, %	
Married	73.3
Employment Status, %	
Unemployed	33.0
Part-time employed	16.0
Full-time employed	51.0
Family History of T2DM, %	35.0
Family History of CVD, %	64.0
Current Smoker, %	12.0
Time since last GDM pregnancy, mean years (SD)	2.6 (1.6)
Parity, mean (SD)	2.7 (2.1)
GDM Pregnancy Treatment, %	
Lifestyle	63.0
Oral Medication	13.0
Insulin	24.0

Note. T2DM = type 2 diabetes mellitus; CVD = cardiovascular disease; GDM = gestational diabetes mellitus

Table 2

Alternate Healthy Eating Index (AHEI) scoring method and total scores

Component	Criteria for Minimum Score[a]	Criteria for Maximum Score[a]	Participant AHEI scores, mean points (SD)
Vegetables (servings/day)	0	5	5.41 (2.84)
Fruit (servings/day)	0	4	4.96 (2.38)
Nuts and soy protein (servings/day)	0	1	6.00 (4.93)
Ratio of white to red meat	0	4	2.44 (2.57)
Cereal fiber (grams/day)	0	15	8.08 (2.74)
trans Fat (% of energy)	≥4	≤0.5	7.49 (1.19)
Polyunsaturated to Saturated Fat ratio	≤0.1	≥1.0	7.29 (1.83)
Duration of multivitamin use[b]	<5 years	≥5 years	3.77 (2.19)
Alcohol (servings/day)	0 or >2.5	0.5 – 1.5	2.13 (3.95)
Total Score	2.5	87.5	47.58 (14.25)

Note.

[a]Intermediate intakes were scored proportionately between 0 and 10.

[b]Minimum score is 2.5 and maximum score is 7.5.

Table 3

Participant Scores on Intrapersonal Measures

Instrument	Study Sample
10 year Risk Perception	
Almost no/Slight chance, %	50.7
Moderate/High chance, %	49.3
Personal Control (*RPS-DD*), mean (SD)	3.15 (0.5)
Worry (*RPS-DD*), mean (SD)	2.73 (0.75)
Optimistic Bias (*RPS-DD*), mean (SD)	2.10 (0.65)
Barriers to Healthy Eating, mean (SD)	27.29 (6.52)
Benefits to Healthy Eating, mean (SD)	42.23 (3.07)
Dietary Self Efficacy, mean (SD)	51.89 (12.72)
Knowledge	
Diabetes Risk, mean (SD)	60.96 (18.43)
Dietary Guidelines, mean (SD)	42.23 (24.64)
Depressive Symptoms (*PHQ-9*), mean (SD)	4.08 (4.06)
Minimal, %	68.0
Mild, %	20.0
Moderate, %	10.7
Moderately Severe, %	1.3

Note. RPS-DD = Risk Perception Survey for Developing Diabetes; PHQ-9 = Patient Health Questionnaire.

Table 4

Summary of Bivariate Associations with AHEI Diet Quality

Variable	Correlation Association	Two-sample T-test
Age	.18	
Minority versus Non-Hispanic Caucasian		−2.41*
Education (<Bachelor’s degree versus ≥ Bachelors)		−5.00**
Depressive Symptoms (PHQ-9)	−.10	
Dietary Knowledge	.21	
Threat of T2DM		
Personal Control	.17	
Worry	.00	
Optimistic Bias	.16	
Risk Knowledge	.22	
10-year Risk (No/slight chance versus Moderate/High chance)		−.23
Perceived dietary benefits	.20	
Perceived dietary barriers	−.18	
Dietary Self-Efficacy	.33**	

Note.

* $P < .05$;

** $P < .001$.

PHQ-9 = Patient Health Questionnaire; T2DM = type 2 diabetes.

Table 5

Multiple Linear Regression Analysis Summary for Intrapersonal Variables and AHEI Diet Quality

Variable	*B*	*SE B*	β	*t*	*P*
Age	−0.23	0.28	−.09	−0.82	.41
Non-Hispanic Caucasian Race	3.93	3.31	.14	1.19	.24
Education Status	3.51	0.89	.08	3.18	<.001
Depressive Symptoms	0.28	0.36	.51	0.76	.45
Dietary Knowledge	−0.08	0.07	−.13	−1.05	.30
Dietary Self Efficacy	0.37	0.12	.33	3.18	002

Note. R^2 = .36, F (6, 66) = 6.19, P = <.0001