

# Preconception Care and Women with or at Risk for Diabetes: Implications for Community Intervention

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## Introduction

Diabetes is a chronic and, often, disabling disease, which has reached epidemic proportions in America and worldwide. When a person has diabetes their body cannot produce or properly use insulin – a hormone needed to convert sugar, starches, and other foods into energy. This leads to high levels of sugar in the bloodstream, which can result in serious complications and premature death, if diabetes is not controlled. There are three main types of diabetes [1]. In type 1 diabetes, the body does not produce any insulin; daily injections of insulin are required for survival. Typically beginning in childhood or young adulthood, type 1 accounts for approximately 5–10% of all cases of diabetes. Autoimmune, genetic, and environmental factors influence type 1 diabetes risk [1].

In type 2 diabetes, which accounts for 90–95% of all diagnosed cases, the body's cells do not secrete or use insulin adequately. Risk factors for type 2 diabetes include obesity, physical inactivity, family history of diabetes, and history of gestational diabetes (GDM). GDM, defined as diabetes that develops or is first recognized during pregnancy, is the third type of diabetes. Risk factors for GDM include obesity,

pregnancy weight gain, age, and family history of diabetes [1–5].

In the weeks after pregnancy, 5–10% of women who had GDM are diagnosed with type 2 diabetes [1]. Subsequently, women with a history of GDM have a 20–50% chance of developing type 2 diabetes five to 10 years after the index pregnancy, with a lifetime risk near 80% [1, 4–7]. Both type 2 diabetes and GDM are diagnosed more frequently in African Americans, Hispanic/Latino Americans, and American Indians compared to non-Hispanic whites [1].

National Health and Nutrition Examination Survey III data for nonpregnant women aged 20–49 years indicate that during the period 1988–1994, 27.6% of Mexican American women and 22.4% of African American women of childbearing age had diabetes or impaired glucose tolerance, in comparison to 10.1% of non-Hispanic white women [8]. Approximately one third of women of childbearing age have undiagnosed diabetes [9]. Additionally, between 3 and 8% of pregnant women have gestational diabetes (GDM) [2, 3, 9, 10].

A study of women with pregestational diabetes (type 1 and type 2) found that 60% of the women had suboptimal glucose control before conception [11]. Women who had a poor outcome in a previous pregnancy were more likely to enter a subsequent pregnancy with poor glucose control than were women with good outcomes [11].

Diabetes during pregnancy is associated with increased risk for miscarriages, stillbirth, macrosomia and obstetric complications [12–16], intrauterine developmental and growth abnormalities, birth and neonatal complications, and later development of obesity and type 2 diabetes [3, 10–15, 17, 18]. Treatment to normalize maternal blood glucose prior to conception and throughout pregnancy is necessary to reduce the likelihood of maternal, obstetric, and infant

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complications [12–16]. While treatment and monitoring are common practice during prenatal care, many women and their families may not know about the importance or even the existence of preconception care interventions for women of childbearing age who have or are at risk for diabetes.

Greater awareness of the potential contribution of preconception care to diabetes prevention and control may help reduce the devastating impact of diabetes and its complications on the lives of women and their families. The objectives of this paper are to: 1) review barriers that can impede a woman's ability to receive preconception care, and 2) recommend novel interventions to reach reproductive-aged women with or at risk for diabetes.

Prevention trials have demonstrated that type 2 diabetes and its complications can be prevented or at least delayed through healthful dietary practices, regular moderate physical activity, weight loss, and medication use [19, 20]. The clinical practice guidelines of the American College of Obstetrics and Gynecologists [21] and the American Diabetes Association [15] suggest that preconception care is an ideal primary prevention opportunity during which modifiable risk factors can be identified and reduced.

Preconception care may be defined as a window of opportunity for comprehensive health care to: 1) identify conditions that may have detrimental effects on the mother or fetus, and 2) recommend necessary medical, behavioral, and educational interventions for increasing the likelihood of achieving optimal pregnancy outcomes. A major goal of preconception care for women with diabetes is to reduce the risk of diabetes-related complications by obtaining the lowest possible glycated hemoglobin (HbA<sub>1c</sub> [a measure of glucose control]) without significant episodes of hypoglycemia [15].

Women with diabetes who receive preconception care obtain intensive treatment to assist them with developing diabetes self-management skills, and obtaining nutritional, physical activity, and medical support needed to promote optimal glucose control and health status before becoming pregnant. During interconception periods, diabetes education, postpartum glucose testing, and ongoing support to reduce postpartum weight retention and maintain a healthy weight and glucose control may also help reduce risk factors for subsequent morbidity [3, 19, 24].

Previous studies have found that women with diabetes who received preconception care demonstrated improved glucose control during pregnancy, their offspring had fewer congenital anomalies, and the women's hospital stays were shorter in comparison with women who did not receive preconception care [25–27]. Although these findings are very positive and they support the importance of preconception care for women with diabetes, other studies have indicated that many women who could benefit from preconception care are not receiving this intervention [25, 28].

## Barriers to receiving preconception care

At every health care encounter, a woman of childbearing age should be informed about the importance of preconception care and, if she has diabetes, the steps required to maintain appropriate blood glucose control [15, 28, 29]. Unfortunately, however, reaching women who may be in need of preconception care has proven to be difficult, with only a quarter to a third of women with diagnosed diabetes receiving this care [25, 28].

There are many barriers to providing and/or receiving preconception care. Among them are: 1) Many women with diabetes do not know that they have the illness and, thus, they are undiagnosed [1], 2) Approximately 50% of all pregnancies are unintended [28, 30, 31], 3) Even among women planning to become pregnant, lack of health insurance or a regular care primary care or obstetric provider reduces contact with the health care system [32–34], 4) Many primary care practices do not have or use established guidelines for providing preconception care, or identifying women with risk factors [32, 34], 5) Some women and health care providers may not know about the existence or the importance of preconception care or do not see it as a high priority [15, 32, 34, 35], and 6) Women with incomplete health care coverage, lack of child care or transportation, geographic isolation, distrust of health care providers or other social and economic challenges have additional barriers to receiving preconception care [15, 32, 34–36].

Women are more likely to receive preconception care if they are married or in a stable relationship, are comparatively older, are nonsmokers, are non-Hispanic whites, are more educated, have annual incomes above \$20,000, have private medical insurance, and have a positive bond with their prepregnancy care provider [25, 26, 28, 33, 35]. Younger women with diabetes and those who are single, have low income, or are less educated may be particularly vulnerable to unplanned pregnancies, which greatly reduces the chances that they will receive any form of diabetes-related preconception counseling [16, 32, 36].

## Interventions to reach women of childbearing age with diabetes

Since the establishment of preconception care programs, health care centers have employed numerous marketing approaches geared toward physicians, and for patients in need of preconception care intervention. Janz et al. [28] identified marketing approaches which were employed in five Michigan medical centers to encourage the use of preconception care programs in treating high-risk women. These included journal advertisements, newsletters, brochures, flyers, posters, and patient education programs. However, the

results of these outreach efforts were “generally disappointing [28].”

In a Maine study, a diabetes registry was developed to promote the availability of preconception care programs [27]. In addition, health care providers formed a network to enhance the care of pregnant women using locally developed patient care guidelines. From 1987–1990, there were a total of 185 pregnancies in women with diagnosed diabetes. Of the total pregnancies, only 34% of these women received preconception care. These findings support those of Janz et al. [28], which demonstrate that very few women with diabetes are receiving preconception care. Additional innovative strategies are needed to increase awareness of the availability of preconception care.

Novel interventions to reach reproductive-aged women with or at risk of diabetes

The National Public Health Initiative on Diabetes and Women’s Health (cosponsored by the American Diabetes Association, the American Public Health Association, the Association of State and Territorial Health Officials, and the Centers for Disease Control and Prevention) is a partnership devoted to increasing public and provider awareness of the importance of interventions such as preconception care in the prevention and management of diabetes for women [37, 38]. Using a life stage approach, the Initiative’s cosponsors and partners developed and disseminated a national action plan, *The National Agenda for Public Health Action* [39], to identify 10 priority action steps to improve the lives of women with or at risk of diabetes, from adolescence to the older years (see Table 1). The *National Agenda* serves as a blueprint to guide the nation in implementing strategies related to diabetes and women’s health. Given the devastating effects that diabetes can have on women’s health, the *National Agenda* recognizes and identifies the need for effective interventions, such as quality health care and programs, public health research and surveillance, and specific policies to address the burden of this chronic illness on the lives of women and their families [37, 38].

Several of the *National Agenda’s* recommendations support the need for preconception care and follow-up care for women with or at risk for diabetes through community intervention efforts and policy development. These recommendations identify the need to: 1) expand our outreach to communities where women live, learn, work, and play by offering health promotion, education, activities and other incentives; 2) provide sufficient funding, tools, training, and materials to fortify community programs that focus on women’s health needs; 3) educate community members and leaders about diabetes prevention and control and the roles that they can play in promoting healthy environments; 4) encourage healthcare providers to promote risk assessment and quality care for

**Table 1** The National Agenda’s 10 priority recommendations for action

1. Encourage and support diabetes prevention and control programs in state health departments to develop prevention programs for all women and establish efficient links for women at risk for type 2 diabetes
2. Expand community-based health promotion, education, activities, and incentives for all ages in a wide variety of settings—schools, workplaces, senior centers, churches, and other locations where women live, learn, work, and play
3. Strengthen advocacy on behalf of women with or at risk for diabetes
4. Fortify community programs for women with sufficient training, tools, and materials
5. Expand population-based surveillance to monitor and understand:
  - a. Variations in the distribution of diagnosed and undiagnosed diabetes
  - b. The factors—cultural, racial, ethnic, geographic, demographic, socioeconomic, and genetic factors—that influence the risk for diabetes and complications among women at all life stages
6. Educate community leaders about diabetes and its management and about the value of healthy environments
7. Encourage healthcare providers to promote risk assessment, quality care, and self-management for diabetes and its complications in their practice settings
8. Ensure access to trained healthcare providers who offer quality services consistent with established healthcare guidelines
9. Encourage healthcare coverage and incentives for recommended diabetes prevention management practices by:
  - a. Promoting partnerships between insurers and workplaces or labor communities and encouraging employers and employees to discuss needed diabetes benefits in offered health care packages
  - b. Working with health insurers and policymakers to expand coverage and reimbursement policies to include prevention services for women throughout their lives
10. Conduct public health research to further our knowledge about the epidemiological, socioenvironmental, behavioral, translational, and biomedical factors that influence diabetes and women’s health

women, including preconception care; and 5) conduct public health research to better understand multiple factors that influence diabetes and women’s health.

Community intervention and the involvement of community health workers

One of the community-focused strategies from the *National Agenda*, is the need to “identify and develop links with community agencies that interface with women at greatest risk for diabetes, including organizations in the non-health related sectors [39].” Given that preconception care programs have had difficulty reaching high-risk women, nontraditional approaches to outreach and preconception care should be explored [32, 36].

Community health organizations and community health workers (CHWs) appreciate and understand the social,

political, environmental, and cultural factors that affect individuals within their own neighborhoods and have the potential to influence the consumers' relationship with the health care system [33]. They serve as "bridges"—connecting community members who have traditionally lacked access to the appropriate services needed [40, 41]. The Institute of Medicine (IOM) recommends supporting the use of CHWs. The IOM identifies CHWs as an integral component of the health care system that help to address racial and ethnic disparities in access to care [41, 42].

Many community-based projects funded by the Centers for Disease Control and Prevention have included CHWs in community-based programs aimed at health intervention for people with diabetes [43]. Programs employing CHWs have reported that they improve access and health outcomes for persons with chronic diseases, including diabetes, particularly in minority and underserved populations [44–48]. Although, no empirical studies have been published that assess the effectiveness or impact of CHWs in providing preconception care services for women with diabetes, CHWs have also played an important role in maternal and child health care. Thus, studying the methods for, and outcomes of an expanded role for CHWs with preconception outreach and education for women with, or at risk for diabetes, is recommended.

Community health workers could play a vital role in linking women to preconception care services in the following manner: 1) increasing women's awareness about the importance of preconception care programs, 2) providing culturally and linguistically appropriate diabetes-related health information and education, 3) reminding women about scheduled health provider visits, 4) providing a communication bridge linking women and providers in terms of patients' needs and providers' recommendations.

The prevalence of diabetes among women of childbearing age is rising, particularly in communities with ethnic minorities and low resources [4, 8]. There is a strong relationship between these conditions and adverse maternal, child and subsequent adult health outcomes. Assessing the processes and effects of preconception care interventions implemented by providers and CHWs, especially in those communities with varied ethnic and socioeconomic backgrounds, is a critical first step toward identifying and promoting effective preconception care [18, 49–55].

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