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ETHIOPIA NETWORK FOR HIV/AIDS TREATMENT, CARE, & SUPPORT

GESTATIONAL DIABETES: A RISK FACTOR FOR MATERNAL DEATH IN TIGRAY, ETHIOPIA



Photo by Genaye Eshetu

ABOUT ENHAT-CS

The Ethiopia Network for HIV/AIDS Treatment, Care, and Support (ENHAT-CS) program is a USAID initiative funded by PEPFAR and implemented by a Management Sciences for Health (MSH)-led consortium of national and international partners. The program works in the Amhara and Tigray regions and supports the Regional Health Bureaus, *woreda* (district) health offices, health centers, and communities to deliver quality, comprehensive HIV services that are integrated with and strengthen other services, including: maternal, newborn and child health; family planning; tuberculosis; sexually-transmitted diseases; malaria; neglected tropical diseases; nutrition; mental health; and laboratory services.

ENHAT-CS supports the Government of Ethiopia to scale-up the provision of comprehensive HIV services, including antiretroviral treatment, by training nurses and health officers at health centers to perform services previously provided only by physicians at hospitals. This practice of task shifting is endorsed by the World Health Organization and has been shown to be an effective way to address shortages of human resources without compromising the quality of care.¹ ENHAT-CS continued support to 152 health centers supported by its predecessor, the HIV Care and Support Program (HCSP), and expanded comprehensive HIV service delivery to an additional 124 health centers, for a total of 276 by 2014.

Introduction

In the developed world, pregnant women are routinely screened for gestational diabetes. As a result, in the United States, about nine percent of pregnant women are diagnosed with gestational diabetes, a condition that if left untreated can have devastating effects on both the mother and baby. In the United States, however, as in the rest of the developed world, the vast majority of these women work with their physician or midwife to manage their blood sugar and go on to safely deliver healthy babies.

But in Ethiopia, like most other developing countries, women are rarely screened for gestational diabetes mellitus (GDM). In the rare event that they are screened and diagnosed, they have few options for managing the disease. Diabetes services, if available, are based at urban hospitals, where less than 10 percent of pregnant women seek antenatal care. Providers at these facilities typically follow international guidelines, which require multiple blood tests per day and thus are of limited practical use in resource-poor environments.²

Estimated at 676 deaths per 100,000 live births,³ maternal mortality in Ethiopia is more than three times the worldwide average. The most common causes of maternal death in Ethiopia are hemorrhage, eclampsia, hypertension, and obstructed labor. Interventions to improve maternal health have rightfully focused on preventing and treating these specific complications.

Identifying women with GDM provides an opportunity not just to improve pregnancy outcomes, but for women to make changes in lifestyle to help prevent development of diabetes later in life.

GDM, however, though it is never listed as a cause of maternal death, significantly increases the risk for all four of these maternal killers and yet is rarely addressed in resource-constrained settings.

Diabetes is on the rise in Ethiopia, where it is estimated that 1.4 million people are living with the disease, twice the number of people living with HIV. Identifying women with GDM provides an opportunity not just to improve pregnancy outcomes, but for women to make changes in their lifestyle to help prevent development of diabetes later in life.

It was previously estimated that gestational diabetes occurs in four to nine percent of pregnant women in Ethiopia,⁴ but these data are scant and old. An estimated 80 percent of cases remain undiagnosed.⁵ Therefore, Management Sciences for Health (MSH) set out to assess the prevalence of gestational diabetes among women served at the public health centers in Tigray, Ethiopia and determine whether or not providers at these facilities could provide adequate care for diabetic pregnant women. MSH funded the study through its Innovation Challenge Fund and implemented it in collaboration with ENHAT-CS.

Methods

MSH collected data at three public health centers supported by ENHAT-CS in Tigray, two of which were in urban areas and one rural. The study included all pregnant women aged 16 years or older attending the clinics between January 15 and April 15, 2014.

After receiving a urine dip stick, random plasma glucose (RPG) test, and an HIV test during the initial visit, pregnant women were asked to return for a second blood draw early in the morning, either the next day or soon thereafter, following 8 to 14 hours of overnight fasting.

Health center providers diagnosed women with GDM at any time of pregnancy if their fasting plasma glucose (FPG) or RPG level was high and they exhibited classic signs of diabetes such as weight loss, excessive thirst, and excessive urination. International guidelines recommend performing an additional two-hour oral glucose tolerance. This study, however, excluded this criterion, as it is not feasible in low-resource settings.

Results

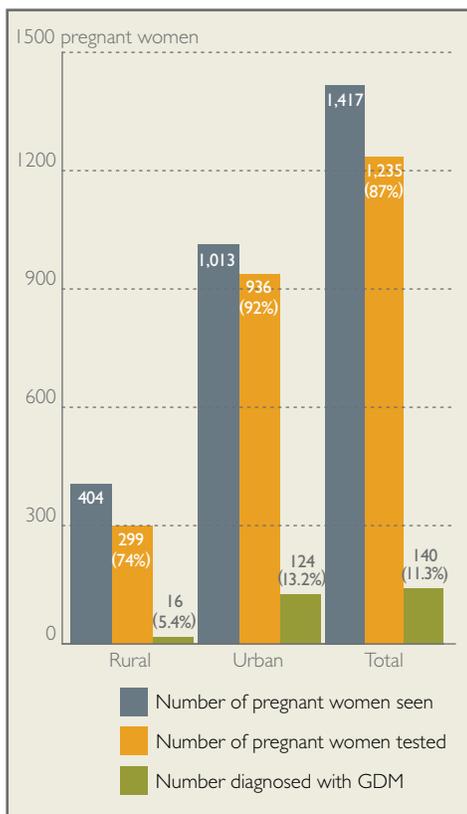
Prevalence of GDM and associated factors

The three health centers served 1,417 pregnant women during the study period. Among them, 88 percent received a FPG test (Figure 1).

The study found no significant difference between women with GDM and women without GDM in age, occupation, education, or marital status. However, the prevalence of GDM (13 percent) among urban women was two and a half times higher than that of women in rural areas (5 percent).

Interestingly, the study also found that the prevalence of gestational diabetes among HIV-infected women was 22 percent compared to 11 percent among women not infected with the virus. Also, though 81 percent of HIV-uninfected women with GDM responded well to behavioral interventions, only 43 percent of HIV-infected women were able to control their GDM with diet and exercise. The difference was not statistically significant, probably because of the relatively small number of HIV-infected women in the study, but it warrants further investigation.

Figure 1. GDM testing and prevalence among pregnant women at the three health centers, Tigray, January–April 2014



As has been found in other studies, high body mass and a family history of diabetes were both associated with greater likelihood of developing gestational diabetes. Twenty-one percent of women with a body mass index (BMI) greater than 25 were diagnosed with gestational diabetes, while just five percent of women with a BMI lower than 18.5 had the disease. GDM prevalence among those who reported having a first degree family member with diabetes was almost three times greater than those who did not report such a history. This is a significant finding given that an estimated 1.4 million Ethiopians are living with diabetes and the number continues to grow.

Management of Pregnant Women with GDM

Health center staff trained by MSH advised all of the women diagnosed with GDM on management of the condition with diet and exercise, using educational materials from the Ethiopian Diabetes Association. Among the women diagnosed with GDM and actively followed, 79 percent responded to behavioral changes in diet and exercise. Women who did not respond were referred to the diabetes center at Ayder Referral Hospital for further evaluation and management by obstetricians.

The prevalence of GDM in our study population was higher than that cited by earlier studies in Ethiopia and higher than the US Centers for Disease Control estimate of nine percent in the US.

Discussion and Conclusion

This pilot intervention showed that:

- 1. Gestational diabetes is a larger problem in northern Ethiopia than previously thought.** The prevalence of GDM in our study population was higher than that cited by earlier studies in Ethiopia and higher than the US Centers for Disease Control estimate of nine percent in the US.⁶ Considering that the classic risk factors for diabetes, obesity and lack of exercise, are much less common in Ethiopia than in the US, this level of GDM in Ethiopia is of grave concern.
- 2. The majority of clients diagnosed with GDM responded well to simple behavioral interventions.** Eighty-one percent of HIV-negative women with GDM responded well to changes in diet and exercise, however, only 43 percent of HIV-infected



Photo by Genaye Eshetu

Integrating behavioral counseling on nutrition and exercise into ANC services is a low-cost intervention that can reduce women's risk of developing the most common causes of maternal mortality.

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women were able to control their GDM with these measures, suggesting already-compromised health due to HIV. Further studies are needed to examine if HIV-positive pregnant women have higher levels of GDM and how well they respond to low-cost interventions.

- 3. Health center-level service providers can acquire the skills to effectively screen for, diagnose, and manage GDM.** Simple, low-cost training of health providers in primary health care settings, as well as a nearby referral hospital for more complicated management, was feasible and effective.
- 4. International protocols and guidelines that were adapted to the Ethiopian context worked well in detecting and managing GDM.** Broad participation of Ethiopian endocrinologists, obstetricians, counsellors, and others ensured appropriate adaptation of international guidelines and protocols to the realities of the Ethiopian health care system.

In conclusion, the findings and success of this study underscore the importance and urgency of scaling-up GDM screening and management throughout Ethiopia. Integrating behavioral counseling on nutrition and exercise into ANC services is a low-cost intervention that can reduce women's risk of developing the most common causes of maternal mortality.

Ethiopia is a vast and diverse country. The findings of this study may or may not apply to other parts and populations of Ethiopia. However, this low-cost study is well worth replicating, and at larger scale, to other parts of the country and in other resource-constrained environments. Further, our pilot successfully developed and introduced Ethiopia-specific GDM service guidelines that can be adapted for wider use.

We recommend replicating and expanding this experience to follow the mothers with GDM after they give birth and assess outcomes among them and their babies compared to mother-baby pairs without GDM. Further studies will be needed to examine if HIV-infected pregnant women are more likely to develop GDM and if they also have higher rates of type 2 diabetes; if so, it will be necessary to tailor interventions to their unique needs. ■

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