

Oral Contraception and Adolescent Women With Insulin-Dependent Diabetes Mellitus: Risks, Benefits, and Implications for Practice

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Healthcare providers who work with adolescents with diabetes are in an ideal position to provide education and support regarding contraceptive issues. Diabetes educators and other health professionals who counsel teens focus on other aspects of diabetes care and management but frequently do not address sexual issues or assess contraceptive practices. The purpose of this paper is to review oral contraceptive issues for teens with diabetes and to provide practice implications for health professionals who are in a favorable position to influence the quality of diabetes and general health care for these adolescents.

Teenage pregnancies in the United States are occurring at the rate of approximately 1 million per year, with 40% of those occurring before the age of 18 years.¹ Adolescent women with insulin-dependent diabetes mellitus (IDDM), a subset of this group, are equally at risk for pregnancy,¹ but at a significantly greater risk for congenital malformations in their offspring.² Markedly lower anomaly rates among women with intensively managed diabetes prior to conception have been shown.²⁻⁴

Fifty percent of all teens ages 15 to 19 years are sexually active.⁵ Because of the social, economic, and health risks of pregnancy, sexually transmitted diseases (STDs), and human immunodeficiency virus (HIV), contraceptive counseling for adolescents now is an integral part of adolescent health care. Contraceptive counseling for adolescents with diabetes carries additional considerations due to the potential complications of diabetes, the high risk of congenital malformations in young women with less-than-optimal glycemic control, and the contraceptive options available.

Women with diabetes have had limited options in terms of contraceptive choices. With the wide variety of oral contraceptives currently available there are more safe choices for women with diabetes. However, even these preparations have special considerations for use in women with diabetes. The risks and benefits should be carefully considered and incorporated into diabetes education and/or contraceptive counseling for teens with diabetes. As diabetes educators endeavor to apply a holistic approach to diabetes education and care, they are ideally positioned to provide young women with counseling and support for contraceptive decisions.

Background of the Problem

Adolescent Sexuality The adolescent population in the United States today is becoming increasingly sexually active at a younger age. The birth rates for adolescents less than 15 years is approximately 6.5 per 1000 women.⁶ In 1988 approximately 75% of urban women under the age of 19 years reported having had sexual intercourse. The fact that adolescents and young adults have become increasingly sexually active at an early age has been widely recognized. Some of

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the factors thought to place adolescents at high risk for early sexual activity are high-risk behaviors (smoking, alcohol and drug abuse), peer influence, deterioration of the family unit, multimedia exposure to sexually explicit material, and depression.⁵

Teens who are less sexually active are more likely to come from consistent environments with two-parent families, have high personal educational aspirations in families with well-educated older fathers, and/or have strong religious beliefs.⁶ Approximately 22% of sexually active adolescents ages 15 to 19 years use no contraceptive method.⁷ Factors that may be related to the lack of or ineffective use of contraception in general include denial of the risk of pregnancy, reluctance to acknowledge one's sexuality, misconceptions, lack of preparation, and lack of knowledge about contraception. For healthcare providers prevention of adolescent pregnancy is the ultimate goal because of the high rate of morbidity to young mothers, fathers, infants, and society associated with adolescent pregnancy.⁶

Sexuality Issues in Adolescents With Diabetes

Adolescents who have diabetes may be even more vulnerable than others due to the effects of living with a chronic illness that may predispose them to feelings of depression, hopelessness, low self-esteem, and greater risk-taking behaviors.⁸ Prior to the mid 1970s women with diabetes received poor, if any, contraceptive counseling. There was some controversy as to whether women with diabetes could even conceive,⁹ although it was well recognized that women with diabetes were at very high risk for complications of their diabetes, complications of pregnancy, and fetal morbidity and mortality.¹⁰ One article¹¹ from 1974 states, "In diabetic women the contraceptive method should either be sterilization, intrauterine device, or low-dose progestins, and only in a few cases conventional (therapy)."

By 1985 it was suggested that unreliable patients with diabetes and those who have unplanned pregnancies were particularly at risk for complications because they tended to seek prenatal care late in pregnancy. Others at risk for having a poor chance of delivering a live baby were those with long-standing diabetes with serious renal disease and ischemic heart disease. Those with retinopathy also were found to "have a high risk of deterioration . . ."

There continues to be evidence suggesting that in adolescents with diabetes, when glycemic control is at its worst, pregnancy is more frequent than would be expected from the general population.^{1,11,12} Literature¹ as recent as 1989 suggests that recommendations regarding contraception in patients with diabetes are not appropriate for the adolescent population due to the "peculiar physiological and developmental characteristics of this population" and that "more medical research is necessary regarding various hormonal preparations available."¹³ Recent evidence¹⁴ also indicates that most women with diabetes did not plan their pregnancies despite knowing the increased risk of bearing a child with birth defects. Many women with diabetes who had generally good knowledge about contraception and the risks of unplanned pregnancy did not use birth control and questioned the advisability of using oral contraceptives. A number of these women also believed that they would have difficulty conceiving.¹⁵

Neonatal complications that may occur in pregnancies complicated by IDDM include macrosomia and hypoglycemia. Congenital malformations occur during the first 5 to 8 weeks of gestation and may affect the central nervous system, the heart and major vessels, the kidneys, and the skeleton.³ A relationship has been indicated between the incidence of birth defects and maternal glycemic control, although the teratogenic mechanism has not yet been identified. One study⁴ of women with diabetes showed malformations in the infants of 4.9% of women receiving early care versus 9.0% of women receiving late gestational care, compared to 2.1% in controls. At major centers, however, the perinatal mortality figures for offspring of women with IDDM who were under the care of those experienced in diabetes and pregnancy were reported to be 1.6% to 2% of the rate found in the general population.^{16,17}

Women with diabetes now are encouraged to tighten glycemic control prior to conception and to maintain near-normal glycemic control throughout pregnancy.¹⁴ Adolescent women who are particularly at risk for unplanned pregnancies and who have poorer glycemic control due to the impaired insulin sensitivity of adolescence should be a target for contraceptive counseling and use.

Oral Contraception Oral contraceptives (OC) are the most widely used contraceptive in the United States primarily due to their low failure rate. Currently OCs are available in monophasic, biphasic, and triphasic formulations, and today's agents have lower estrogen doses than earlier formulations. In general, the contraceptive effect from combined birth control pills is produced by inhibition of ovulation through interference with releasing factors at the hypothalamic-pituitary level. Thinning of the endometrium ensues, reducing the likelihood of implantation.

Standard combination pills contain an estrogen and a synthetic progesterone with usual doses of 20 to 50 mcg estrogen and .15 to 1.0 mg progestin. Triphasic preparations have a varied progestin dose based on normal physiologic cycling. The earlier preparations had higher doses of estrogen that were associated with severe adverse effects such as venous thrombosis. Side effects of pills containing high amounts of estrogen can be edema, dysmenorrhea, elevated blood pressure, fibrocystic disease, breast tenderness, headaches, and chloasma. Side effects from progesterone include depression, increased appetite, shortened menses, increased blood pressure, fatigue, acne, hirsutism, and alopecia. Both systolic and diastolic blood pressures have been found to be elevated in women using oral contraceptives.¹⁸

Research has focused on reducing the steroidal content of these agents to lower the incidence of side effects yet maintain a high degree of efficacy, cycle control, and regulated withdrawal bleeding. The additional advantages of oral contraception include decreased morbidity due to iron deficiency anemia, pelvic inflammatory disease, ectopic pregnancy, endometrial cancer, fibroadenomas and chronic cystic breast disease, ovarian neoplasms, and rheumatoid arthritis.¹⁹

For healthy adolescents the risk of developing life-threatening conditions from oral contraceptive use is minimal. The benefits far outweigh the risks of unwanted pregnancy in most cases. One consideration for managing adolescents on

oral contraceptives is choosing between a lower-dose pill to reduce side effects and a high-dose pill to maintain regular menses, which has implications concerning compliance with the regimen. Migraine headaches may worsen, and the risk of stroke is increased in females on oral contraception.¹⁸ Although thromboembolism and myocardial infarction have been reported as complications of oral contraceptive use, the risk to the adolescent age group is probably not significant.¹⁹

Oral Contraception and Diabetes The adverse effects of OCs in IDDM have not been well documented.²⁰ Due to concerns regarding complications of cardiovascular disease, including stroke, OCs have been prescribed very cautiously for women with diabetes.^{21,22} Concerns over worsening glycaemic control also have limited the use of OCs by women with diabetes,¹⁹ although studies have not shown any marked deterioration of diabetes control^{23,24} or increased risk of cardiovascular illness for those without renal failure or diabetes complications.²²

There has been concern that the adverse cardiovascular effects associated with standard combination pills might exacerbate complications of diabetes.²² High-dose OC formulations have a negative effect on glucose and lipid metabolism and carry an increased risk for cardiovascular complications.^{22,27} Until the recent release of lower-dose preparations, OCs were cautiously and sparingly used in women with diabetes.

Current Considerations of Oral Contraceptive Use in Adolescents with IDDM

When weighing the risks and benefits of using oral contraception in adolescents with diabetes, the low-dose preparations offer many advantages due to their markedly reduced mild and severe adverse effects. Certainly the most beneficial advantage is preventing pregnancy in young women at high risk for fetal morbidity and mortality. The low failure rate of oral contraceptives make them acceptable alternatives for young women in general and young women with IDDM in particular.

Research on standard-dose preparations has shown that oral contraceptives can increase the risk of various cardiovascular disorders. The risk appears to be concentrated in women over age 35 years who are heavy smokers.¹⁸ There is a relatively low risk of cardiovascular complications with use of low-dose OCs, although women who smoke, have hypertension, diabetes, a family history of cardiovascular illness, and take OCs are at higher risk than others who do not have these risk factors.²⁸ However, the use of anabolic steroids, which often are abused by athletes, also increases an adolescent's risk of developing adverse effects from OCs.²⁹

Low-dose combinations and triphasics do not seem to influence glucose tolerance in nondiabetic women²⁴ or in women with previous gestational diabetes.³⁰ Triphasic formulations do not increase the insulin response. Radberg²⁴ reported that low-dose preparations do not have a significant influence on diabetes control.²⁴ Patients who monitor blood glucose frequently could adjust insulin doses accordingly.

Standard- and low-dose OCs do not cause alterations in HDL cholesterol levels. Patients with IDDM are thought to be more sensitive to the influence of 19-norprogesterone than to alkylid estrogens with respect to lipid metabolism.¹⁸

Triphasic formulations may elevate plasma triglyceride concentrations.³¹ However, no association has been found between the use of contraceptive pills and glycosylated hemoglobin, hypertension, retinopathy, or nephropathy.³²⁻³⁴ Because some women may have both a reduced glucose tolerance and insulin sensitivity, it is prudent for them to be monitored closely for metabolic and cardiovascular changes.²⁴ Women should have a baseline lipid profile before starting oral contraceptives so that lipid alterations can be monitored.³⁵

Progesterone-only contraception is available as progestin-only pills (mini-pills, injections, and implants). These preparations work by inhibiting ovulation, thickening and decreasing the amount of cervical mucus, and causing premature luteolysis. The effect of these preparations on diabetes has not been well studied. These preparations can cause bleeding, weight gain, and may cause insulin resistance.²⁰

Careful monitoring of blood pressure changes should be observed in adolescent women on oral contraception. Mild hypertension has been observed in many, and significant hypertension has been reported in 5% of women on oral contraception.²⁸ The increase in blood pressure tends to be gradual and may be quite severe. However, blood pressure usually returns to pretreatment levels within several months following discontinuation of the OC.

The hypertensive effects of OCs probably result from the capacity of both estrogen and progestin to facilitate retention of Na⁺ and water, secondary to increases in plasma renin activity and subsequent formation of angiotensin.²⁸ Currently, early treatment of even subtle changes in blood pressure and aggressive treatment of very mild hypertension in adolescents with diabetes with angiotensin-converting enzyme (ACE) inhibitors has been shown to prevent or delay the progression of diabetic nephropathy. The presence of microalbuminuria can precede the onset of hypertensive changes. Findings suggest that angiotensin-converting enzyme inhibition postpones the development of clinically overt diabetic nephropathy in normotensive patients with IDDM and persistent microalbuminuria.³⁶ Therefore, health-care providers must carefully monitor blood pressure, weight gain, and any persistent microalbuminuria in young women, noting any progressive hypertensive changes. There is very little in the literature on the subject of adolescent contraception and diabetes, thus signaling the need for additional research in this area.

Implications for Practice

Healthcare providers of young women with diabetes may not be well informed regarding current contraceptive benefits, and women, particularly adolescents, may be misinformed. In one recent study³¹ 28% of women with diabetes were found to be using unsuitable methods of contraception, including high-dose OCs. Certainly abstinence is the most effective method of preventing pregnancy and STDs in young women. As healthcare providers, we should encourage abstinence as the preferred and only 100% effective method, but recognize that societal and biological pressures strongly encourage sexual experimentation and activity. It is critical that women and their sexual partners use a condom in addition to a low-dose OC to prevent STDs and AIDS.

There is a need for better information and guidance for women with diabetes concerning contraception^{31,37} as well as for their partners. To be truly effective, a counseling program must recognize that the adolescent population of women with diabetes has an unusually high frequency of pregnancy for unknown reasons.¹⁵ The adolescent period is generally recognized as a difficult period for those with diabetes with regard to their glycemic control, adjustment to the diabetes regimen, and ability to cope. These difficulties have a physiologic and developmental basis.

Issues about future pregnancies may seem secondary to concerns about the teen's own health and future. A fear of future complications may outweigh concerns about future children. Many wonder if they will live long enough to raise a child. The adaptive process of dealing with one's own mortality may interfere with the ability to consider the needs of future children and may be a contributing factor regarding birth control practices.¹⁵ Adolescents frequently have poor impulse control, and many adolescents with diabetes who feel bleak about their future anyway may have a live-for-today attitude that interferes with effectively using contraceptive planning and improving glycemic control. On the other hand, women who are able to maintain optimal metabolic control regarding their diabetes also may do well with other health-related issues, such as the use of birth control.

Women with diabetes must be educated to understand the importance of planning their pregnancies and meticulously following their contraceptive regimen. Sex education should begin early so parents can first become comfortable with issues of sexuality. Providers need to recognize that many women, especially adolescents, may have misconceptions about fertility and contraception. Rubin³⁸ suggests that healthcare providers ask about attitudes toward birth control that could discourage contraception as well as attitudes of significant others.³⁸ Adolescents who may never have discussed any sexuality related issues before may feel uncomfortable initiating discussion with a provider. Three major reasons why healthcare providers fail to take adequate sex histories are embarrassment, a belief that a sex history is not relevant to the patient's chief complaint, and the fact that they are not adequately trained.³⁹ Healthcare providers can and should deal directly with young women with diabetes about the issue of birth control and the positive effects of planning for their own health as they incorporate diabetes care and education into every other facet of life. The following contraceptive guidelines for diabetes educators and other healthcare providers who work with adolescent women with diabetes may be helpful.

Educational Issues

1. Comfort discussing sexual issues comes with practice and a sense of control over the subject matter. This comfort is communicated to the patient.
2. Begin sex education early in the preteen ages (eg, 11 years) so that it becomes a routine part of assessment and education.
3. Use unbiased, gender-neutral language. Terms such as *sexual partner* are more appropriate than boyfriend. Assess sexual orientation, practice, frequency, and use and consistency of contraceptive practices.

4. Encourage abstinence as the only 100% effective contraceptive method for preventing pregnancy, STDs, and AIDS.
5. When possible, include the female's partner as part of contraceptive education. Low-dose contraceptives should be used in conjunction with a condom at all times to prevent pregnancy, STDs, and AIDS.
6. Specifically ask the date of last intercourse. Does the woman (or couple) want to have a baby? What does pregnancy mean for the woman from a cultural perspective?
7. Ask questions about health beliefs regarding diabetes and pregnancy. For example, does the adolescent believe she can become pregnant? What is her understanding about how diabetes affects the health of her baby?

Clinical Issues

1. Has there been a history of steroid use or abuse or cardiovascular illness?
2. Is blood pressure and lipid profile within normal limits?
3. Is there persistent microalbuminuria?
4. Have subtle changes in blood pressure, excessive weight gain, or microalbuminuria occurred while using oral contraception?
5. Does the woman know how to adjust insulin to cover any glycemic alterations that may occur?

Summary

Low-dose oral contraception currently is a viable option for young women with diabetes who are sexually active. A low-dose formulation containing 35 mcg estrogen and the lowest dose/potency of progestin generally is recommended. Because oral contraception is the most effective, reversible method for preventing unwanted pregnancy, low-dose combinations and low-dose progesterone should be considered in young women who have diabetes without vascular complications.

Many healthcare providers continue to be reluctant to advise women with diabetes to use oral contraception due to the adverse cardiovascular complications that were commonly recognized in the standard-dose preparations of the past. However, with low-dose preparations the risks due to poor glycemic control or cardiovascular problems appear to be minimal. The advantages in terms of preventing pregnancy, avoiding iron deficiency anemia, dysmenorrhea, and certain types of cancers outweigh the disadvantages. However, careful monitoring of adverse effects is critically important, particularly very subtle changes in blood pressure, weight, lipid profile, and microalbuminuria.

Counseling and education regarding sexual activity and contraceptive practices are an important, necessary, and too often neglected part of the diabetes care and education of young women. Adolescent women who are particularly at risk for poorly controlled diabetes frequently also are at the same risk for pregnancy and the accompanying fetal morbidity and mortality. Sexuality and sexual issues should be incorporated into routine diabetes education for adolescents. Healthcare providers should become comfortable discussing sexual issues with teens as part of a holistic approach to diabetes care.

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