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Pregnancy in adolescence

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Abstract

Over 14 million adolescents in the world annually give birth and nearly 800,000 adolescents in the United States become pregnant each year. This paper considers concepts of teen pregnancy including risks to the mother as well as offspring, the adolescent father, issues related to abortion, and concepts of prevention of unwanted pregnancy in youth. Adolescent pregnancy is a global phenomenon affecting all societies and cultures.

Keywords: Adolescence, female, pregnancy

Introduction

There are over 14 million adolescents in the world giving birth each year, including 5.7 million in Asia, 4.5 million in Sub-Saharan Africa, 2.1 million in the Middle East and North Africa and 1.3 million in the developed countries (1). In North America, 5% of females ages 15-19 give birth each year, in contrast to 2% in Europe, 4% in Asia, 8% in Latin America and 12% in Africa (2). Approximately 750,000 adolescent pregnancies occur annually in the United States (US) to those 15 to 19 years of age; of those pregnancies delivery of a live baby occurs in 51%, while 35% end in abortion (400,000) and 14% in a miscarriage (3). Approximately 82% of adolescent pregnancies are unintended. In 2008, there were 434,758 live births to adolescent females under age 20 out of a total birth number of 4,247,696 in the US (4).

Table 1 reviews teen birth rates (ages 15-19 years of age) in the US over the last part of the 20th century, indicating a drop in pregnancies since 1960, except for several years in the late 1980s and early 1990's (5). This reduction in adolescent pregnancies is noted in all teen age groups (less with those 10 to 14 years of age) and racial/ethnic groups (especially black teenagers); this drop is especially observed in the 15 to 17 year old teen (6). Considerable ethnic

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disparity, as reflected in Figures 1 and 2, are noted in adolescents in the US, with more pregnancies and births noted in Black and Hispanic youth than in Caucasian youth (3,7). Abortion rates among adolescents increased in the 1970s, stabilized in the 1980s, and has dropped since the late 1980's. This drop in adolescent pregnancies and abortions is due to increased availability of contraceptives as well as less youth becoming sexually active (8). However, over 40% of American teen females become pregnant at least once per year before they turn 20 and adolescent females account for 13% of all births in America and 26% of the abortions (2,9). Approximately 8% of 15-19 year old American female adolescents become pregnant each year. Most teenage pregnancies are to those 18 or 19 years of age, though there were over 12,000 pregnancies in those under age 15 in 1992 versus less than 7,000 in 1960. Teenage pregnancy under age 15 is relatively rare in the world with under 3% of women in developing countries give birth by age 15 years.

Table 1. American Adolescent Birth Rates*

1. Highest rates: 1950s-1960s
2. 1970: **66/1000 females 15-19 years age**
3. 1986: **50.2**
4. 1990: **60**
5. 1991: **62**
6. 1997: **53**
7. 1998: **51**
8. 1999: **49.6**
9. 2000: **48.5**
10. 2001: **45.9**
11. 2002: **43.0**
12. 2006: **40.0**
13. 2009: **39.1**

*From: Facts at a glance. Washington, DC: Child Trends, Inc. November, 2003; Moore KA, 2009; and Abma JC et al: Vital Health Stat 23(24): 3, 2004 (December).

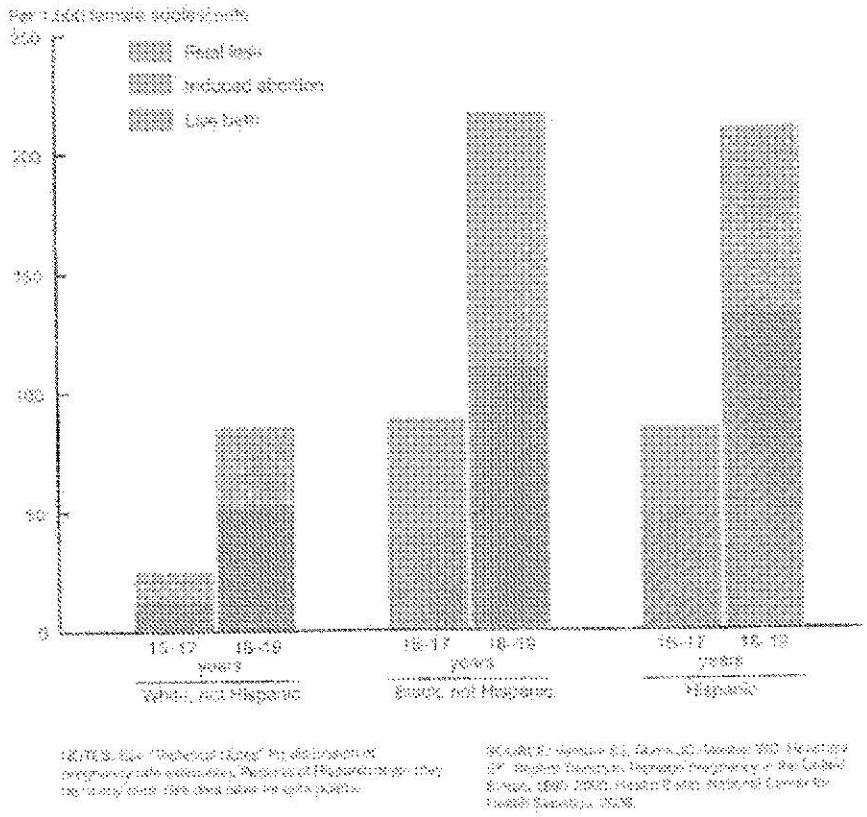

Figure 1. Pregnancy rates among adolescents 15-19 years of age, by age, race and Hispanic origin, and outcome of pregnancy: United States, 2002.

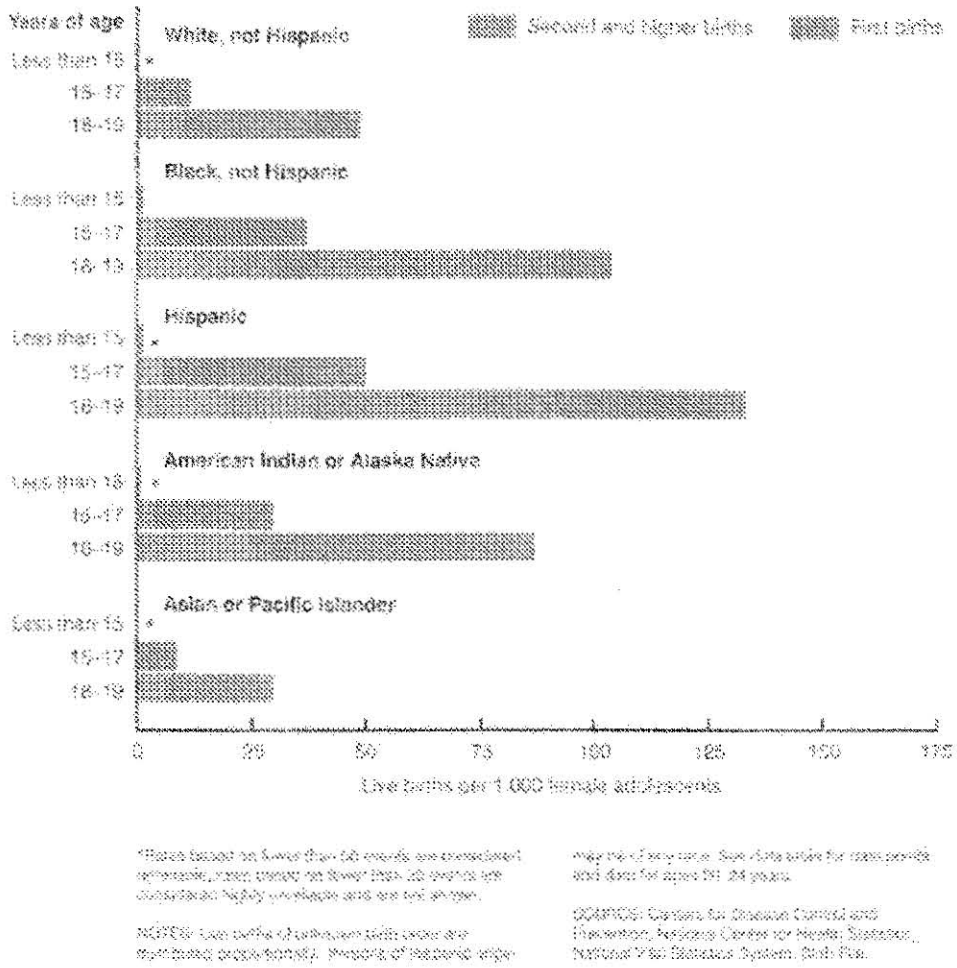

Figure 2. Birth rates among adolescents 10-19 uears of age, by birth order, age group and race and Hispanic origin: United States, 2004.

The 2002 birth rate of 40 per 1000 females aged 15 to 19 years (49.6 in 1999) in the U S is the highest among developed nations; the rate is 5 per 1000 in Japan, 6 per 1000 in the Netherlands, 20 per 1000 in Canada and 31 per 1000 in the United Kingdom (10,7). The abortion rate per 1000 females (15 to 19 years of age) is 36 in the U S and is higher than the pregnancy rate in many countries (such as the Netherlands, France, Sweden) (11). Sexual activity rates among adolescents are not higher in the United States versus Western Europe. However, access to comprehensive sexuality education and availability of contraceptives is higher in Europe. Approximately half of adolescent pregnancies occur within the first 6 months after beginning sexual intercourse and American adolescents typically wait one year or more after starting sexual intercourse before seeking advice about effective contraception.

Risks of adolescent pregnancy

In general, the obstetric risks for pregnant adolescents are similar to that of adults, if comprehensive prenatal care services are provided early and throughout the pregnancy (9,12).

Table 2 presents a comprehensive checklist for providers to follow when caring for pregnant adolescents throughout the nine months of pregnancy.

If prenatal care is not available at all, started late in the pregnancy or is not comprehensive, or the adolescent fails to seek out such care (out of shame, for example), her risks increase, leading to a two to four times increase in maternal mortality in youth versus adults.

Table 2. Checklist for Adolescent Pregnancy*

Determinations: Initial visit	
Complete blood count	
Complete urinalysis	
Blood type and group	
VDRL	
Culture for *Neisseria gonorrhoeae, Chlamydia trachomatis*	
Other Sexually Transmitted Infections (STI's) screens (e.g., HIV)	
Sickle cell test	
Nutritional status evaluation	
Rubella titer	
Discussion points with each visit: Suggested schedule	
Anatomy and physiology of pregnancy	1st visit
Assess safety in her home	1st visit
Sexual activity and STI's	2nd visit
Substance abuse-related problems	3rd visit
Nutrition	4th visit
Contraception	5th visit
Childbirth phenomena	6th visit
Infant care	7th visit
Contraception	8th visit
Repeat of appropriate issues	9th visit
Importance of follow-up care: patient and child	10th visit
Visitation	
Biweekly until 34 weeks	
Weekly until delivery	
Educational aspects: Progress report of teacher	
In school	
Homebound	
Other	
Social aspects: Progress report	
Parent-patient	
Patient-father of the child	
Post-delivery: progress report	
Psychological aspects	
Nutritional aspects: Progress report	
Nursing report	
Report of neonatologist or physician who will be present	
Additional problem areas: such as risk for HIV infection or group B streptococcus	

Abbreviations: VDRL = Venereal Disease Research Laboratory (test); STD = Sexually Transmitted Disease; HIV = Human Immunodeficiency Virus.

*Source: Reprinted, with permission: Greydanus DE, Shearin RB: Adolescent Sexuality and Gynecology. Philadelphia: Lea and Febiger, 1990, p 218.

Table 3 reviews global maternal mortality statistics (1, 2, 10). Maternal pre-eclampsia may be more prevalent in births occurring from 15-19 years of age. Stillbirths, spontaneous abortions and premature labor are reported at increased rates because of limited access to comprehensive healthcare, low socioeconomic status, increased parity and low educational level (7). In contrast to non-primiparous females, primiparous teens and adults have increased risk for such problems as chronic hypertension, pre-

eclampsia and eclampsia. Pregnant adolescents are more likely to be anemic than adult pregnant women. Adolescents who are less than 15 years of age may not be fully developed and a small uterus may lead to obstetric risks. In addition, the ongoing growth of the young adolescents may interfere with nutritional needs to the fetus.

Table 3. Global maternal mortality (Alan Guttmacher, 1998; Greydanus, 2003; Abma, 2004)

Nearly 600,000 females die each year from pregnancy and childbirth; most of these deaths are in the developing world:

1. 227,000 maternal deaths in South Central Asia
2. 56,000 in South East Asia
3. 16,000 in West Asia
4. 24,000 in East Asia
5. 235,000 in Africa
6. 4,000 in the developed countries

Though nearly 40% of American youth live in low income families, 83% of adolescents who deliver and 61% of adolescents who have an abortion grow up in low income families. Youth who are substantially below the poverty line have a significantly increased risk for adolescent pregnancy (13). In the 1990's, it was estimated that $5 to $9 billion was spent annually through the Aid for Dependent Children (AFDC) program for households headed by females who become parents as teens (6). AFDC program costs have declined in direct proportion to the reduced teen pregnancy rate that has developed as the 21st century has begun. Youth who are adolescent parents have increased risks for obtaining a limited education and, therefore, not climbing out of poverty as either adolescents or adults, having limited employment as an adult, having increased rates of substance abuse and becoming involved in illegal activity leading to incarceration. If adequate contraception is not provided or accepted, adolescent teens have a greater risk for additional pregnancies prior to adulthood, leading to even greater psychosocial complications.

An adolescent mother usually does not marry because of her pregnancy and if she does, higher divorce rates (70%) are noted than in adults (50%). In 1960, 15% of US adolescent females who were pregnant were unmarried, in contrast to 80% in 1999. Pregnancy is not a major stimulus toward teen marriage in contemporary American society. In fact, the teen mother often has limited contact with and limited support from her baby's father.

Clinicians should understand that sexual abuse and teen pregnancy are linked behaviorally. Some adolescent pregnancies are the result of sexual abuse, and if the abuse does not result in pregnancy, sexually abused children and teens are at risk for early coital activity and pregnancy in the post-abuse adolescent years. As many as 66% of pregnant adolescents report histories of sexual abuse and pregnancies that may be a direct result of rape indicating that a past history of sexual abuse is a dominant warning sign of early pregnancy if not attended to by healthcare providers (14). Adolescents who have been sexually abused may have increased motivation to become pregnant, sometimes because of fertility concerns. Prostitution may become another sequel to early sexual abuse and early teen pregnancy. Depression, substance abuse, and multiple sexual partners are also linked to early adolescent pregnancy.

Risks for children of adolescents

Over 4 million newborn babies die each year globally, often because of limited prenatal services provided to the mother (1,15). The neonatal mortality rate in the United States has dropped over the past several decades and overall is now 6.9 per 1000 live births; this rate is nearly double for all adolescents under age 15 and for all African-American adolescents. Low birth weight (i.e., under 2,500 grams at birth) is a major determinant of increased infant mortality which is noted in 14% of first-born infants with mothers under the age of 14 years old, while less than 6% of first-born infants are under 2500 grams at birth if their mothers are 25 to 29 years of age. In short, infants of teen mothers are usually smaller at birth and have an increased death risk, in contrast to those of adult mothers. In addition, prematurity is reported in 14% of infants whose mothers are less than 15 years of age, in stark contrast to 6% whose mothers are 25 to 29 years of age.

Table 4 reviews factors associated with low birth rate, prematurity, and increased mortality rates in newborns and infants. Infants of mothers 17 years of age and less (independent of parity) and infants of multiparous mothers who are 18 to 19 years of age have increased risks for death and illness. Increased rates of violence, accidents and sudden infant death syndrome (SIDS) result in mortality rates that are nine times higher in infants with adolescent mothers versus adult mothers. Adolescent mother's infants, in contrast to infants of adult mothers, are hospitalized more often and have greater risks for poisonings, burns and other injuries.

Table 4. Factors associated with increased newborn/infant mortality rates (Alan Guttmacher, 1998; Greydanus, 2003; Abma, 2004)

Adolescent age
Limited prenatal care
Poverty
Poor nutrition
Incomplete pubertal growth
Reduced family support
Limited education
Drug abuse (including alcohol and tobacco)
Sexually transmitted infections

Table 5. Potential problems that are increased in children of teen mothers (Alan Guttmacher, 1998; Greydanus, 2003; Abma, 2004)

Lower intelligence
Lower reading ability
Lower communication scores
Increased developmental delay
Increased hyperactivity and impulsiveness
Lower school performance
Increased teenage pregnancy
Increased sexually transmitted infections

Children of adolescent mothers, in contrast to children of mothers in their 20's or 30's, are more likely to have academic dysfunction, drop out of school, become unemployed as adults, become incarcerated, and become teen parents themselves. Children of teen mothers also tend to be more neglected than children of adult mothers, probably because the young mother is not aware of her children's needs. This neglect does not necessarily lead to increased rates of sexual abuse, but more likely, to a variety of problems in school and society (Table 5).

These young mothers usually have poor parenting skills and often provide improper discipline. Many of these negative psychosocial risks can often be avoided if clinicians and society cooperate to improve access to quality health care (for the mother and child) and encourage further adolescent education, counseling, and medical care. Higher school completion rates increase when youth grow up in a small family and have parents who are educated and employed — especially the mother (16).

Adolescent fathers

Approximately two-thirds of adolescent mothers have sexual partners who are older than 20 years of age, often 6 or more years older than themselves. This older partner may subject the younger female to sexual abuse and other forms of relationship violence. The adolescent male who is a father frequently has a history of a troubled childhood, limited financial resources, poor academic records, and elevated rates of school drop-out. (6). He often has limited education about methods of contraception and in accepted roles of fatherly caretaking. In addition, the adolescent father may receive a negative reception from the mother's family and often has limited access to comprehensive medical care for either himself or his new family. However, some fathers want closer ties with their children, if provided the opportunity, encouragement and education.

Abortion

The issue of abortion remains a polarizing concept in the US since the 1973 US Supreme Court decision allowing legal abortion (6). In addition to a variety of surgical techniques, so-called medical abortion is also available using a combination of mifepristone (RU 486; progesterone antagonist) and methotrexate (folic acid antagonist) (16, 6,9). Medical abortions can be legally accomplished up to 63 days (9 weeks) from the first day of the last menstrual period. Up to 97% of these female will abort within 2 weeks, and one in twenty will need a surgical procedure (dilation and

curettage) to complete the abortion. Potential adverse effects from the medications used for medical abortion include nausea, emesis, fever, chills, diarrhea, infection, heavy bleeding, and possible teratogenicity if delivery occurs. Potential adverse psychological effects from abortion in adolescent females remain a controversial topic with most research showing minimal outcomes in those prepared for and clearly choosing the abortion (9). Prevention of unwanted adolescent pregnancy and abortion should be a major public health priority of all clinicians and society.

Prevention of adolescent pregnancy and pregnancy complications

The prevention of pregnancy that is unwanted by the adolescent remains a complex challenge for contemporary American society (2,17,18). Reduction in unplanned adolescent pregnancies is a goal of the Centers for Disease Control Healthy Peoples 2020 Project (www.healthypeople.gov/; www.healthy teennetwork.org/). Current American adolescents receive limited comprehensive sexuality education and the effectiveness of abstinence-only education has not been established (6,17). Adolescents can be encouraged to avoid coital behavior and those who wish to be sexually active should be provided with effective contraception, including emergency contraception. If pregnancy occurs in an adolescent, legal options can be explored with her, including delivery and keeping the baby, delivery and adoption, and abortion. If the adolescent decides to deliver the baby, early and comprehensive health care is important for the pregnant adolescent to reduce her risks for negative outcomes.

Prevention of additional unwanted pregnancies while she is an adolescent is also important; 35% of adolescents with a pregnancy have a repeat pregnancy in two years, while 20% have a second delivery (2,15). The adolescent is more likely to repeat her pregnancy early after her first pregnancy if she lives with her male partner (married or not), does not attend school within a half-year after delivery, and/or if her mother is the main caretaker of the baby (19). Comprehensive care is also critical for the children of the adolescent mother to reduce their risks for adverse psychosocial complications (see Table 5). The medical and psychosocial needs of the teenage father should also be addressed.

As noted, there is no current evidence that abstinence-only programs are effective in reducing adolescent pregnancies, and the decrease in adolescent pregnancies over the past decades is attributed to the combination of fewer teens interacting sexually and more effective use of contraception by those adolescents who are sexually active (6,8). Though society wishes to reduce adolescent pregnancy further, it is an accepted phenomenon in many adolescent cultures (15). Since we know that the higher the socioeconomic status of adolescents, the more likely they are to delay initiation of coitus and to use effective contraception, raising the educational levels of adolescents globally has contributed to a reduction in adolescent pregnancy in the world by decreasing the number of adolescents living in poverty.

Mental health

Sexual activity without use of birth control is associated with higher rates of depression/stress among adolescent females (20). This is consistent with findings from the National Longitudinal Survey of Youth which indicated that for adolescent girls having intercourse at an early age, not using birth control, and having a child was linked to depression (21). In depressed adolescent females engaging in sexual intercourse, low levels of emotional well-being is associated with a prior history of sexual abuse, substance abuse, and parents that may have experienced mental health issues leading to a lack of attention and nurturance toward the adolescent females (22,23).

Poverty is correlated significantly with pregnancy in the US. Although 38% of adolescents live in poor or low-income families, as much as 83% of adolescents giving birth and 61% of those choosing abortions live in poor or low-income families (23,24). Impoverished families are often fraught with overt family conflict, low levels of child-parent nurturing and cold, unsupportive and often neglectful familial relationships. Families with these characteristics leave their children vulnerable to a wide array of mental

health disorders, such as depression, and significant psychosocial stressors including adolescent pregnancy (25).

Poverty, sexual and physical abuse, and poor mental health are intricately related to adolescent pregnancy and child-bearing. The medical and mental health needs of these young families are complex and challenging for the pediatric provider. Foci of clinical treatment include: 1) continued emphasis on the adolescent development of the pregnant teen; 2) access to appropriate, integrated mental health care throughout and beyond the pregnancy; 3) use knowledge of adolescent development to maximize the resilience of youth and the hope of beginning motherhood to compensate for the adolescent's lack of experience or social emotional maturity.

Conclusion

The number of pregnancies among adolescents has dropped over the past few years. A false sense of security that adolescent pregnancy is no longer a global social and medical problem, however, will only hinder the continued, necessary interventions that are paramount to continuing the decrease in pregnancies, infant mortality, poverty, education, and generational patterns of early pregnancy that are, in some countries, culturally bound.

Understanding the etiology and prevalence associated with adolescent pregnancy is only part of the solution. Healthcare providers must continue to expand their efforts at beginning comprehensive and constant prenatal care early in the pregnancy. Easy access to healthcare, well-informed and well-trained providers, as well as community and family support for pregnant adolescents are integral to eradicating the associated health issues of adolescent pregnancy.

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References

[1] Alan Guttmacher Institute. Into a new world: Young women's sexual and reproductive lives. New York: Alan Guttmacher Institute, 1998:1-56.

[2] Greydanus DE, Patel DR, Greydanus EK. Adolescent health. In: Wallace HM, Green G, Jaros KJ, eds. Health and welfare for families in the 21st century, 2nd ed. Sudbury, MA: Jones Bartlett, 2003:289-314.

[3] MacKay AP. Adolescent health in the United States, 2007. Washington, DC: DHHS 2008-1034, 2007:1-141.

[4] Martin JA, Hamilton BE, Sutton PD, Ventura SJ. Births: Final data for 2008. Natl Vital Stat Rep 2010;59(1).

[5] Ventura SJ, Mathews TJ, Hamilton BE, Sutton PD, Abma JC. Adolescent pregnancy and childbirth. United States 1991-2008. MMWR 2011;60(Suppl):105-8.

[6] Elfenbein DS, Felice ME. Adolescent pregnancy. Pediatr Clin North Am 2003;50(4):781-800.

[7] Jenkins RR, Raine TR. Adolescent pregnancy and abortion. In: Greydanus DE, Patel DR, Pratt HD. Essential adolescent medicine. New York: McGraw Hill, 2006:559-68.

[8] Sonenstein FL. What teenagers are doing right: changes in sexual behavior over the past decade. J Adolesc Health 2004;35:77-8.

[9] Smith AJ, Deokar Am, Omar H. Pregnancy and abortion In: Omar HA, Greydanus DE, Tsitsika AK, Patel DR, Merrick J, eds. Pediatric adolescent sexuality and gynecology: Principles for the primary Care clinician. New York: Nova Science, 2010:471-501.

[10] Abma J, Martinez GM, Mosher WD, Dawson BS. Teenagers in the

[11] United States: Sexual activity, contraceptive use, and childbearing, 2002. National Center for Health Statistics. Vital Health Stat 2004;(24):3.

[12] Pazol K, Zane S, Parker WY, Hall LR, Gamble SB, Hamdan S, et al. Abortion surveillance. United States 2007 MMWR Surveill Summ 2011;60(1):1-42.

[13] Hofmann AD, Greydanus DE. Adolescent medicine, 3rd ed. Stamford, CT: Appleton Lange, 1997.

[14] Darroch JE, Frost JJ, Singh S. Teenage sexual and reproductive behavior in developed countries. Can more progress be made? Occasional Report No. 3. New York: Alan Guttmacher Institute, 2001:40.

[15] Stevens-Simon C, Reichert S Sexual abuse, adolescent pregnancy, and child abuse. Arch Pediatr Adolesc Med 1994;148:23-7.

[16] Greydanus DE. Teen pregnancy and contraception. In: Greydanus DE, Patel DR, Bhave S, Pratt HD. Course manual for adolescent health. New Delhi: Cambridge Press, 2002:299-308.

[17] Greydanus DE. Adolescent pregnancy and abortion. In: Hofmann AD, Greydanus DE. Adolescent medicine, 3rd ed. Stamford, CT: Appleton Lange, 1997:589-604.

[18] Greydanus DE, Pratt HD, Danielson P. Sexuality education programs for youth: Current state of affairs and strategies for the future. J Sex Educ Ther 1995;21:238-54.

[19] Sipsma HL, Ickovics JR, Lewis JR et al. Adolescent pregnancy desire and pregnancy incidence. Womens Health Issues 2011;21(2): 110-6.

[20] American Academy of Pediatrics. Committee on Adolescence and Committee on Early Childhood Adoption and Dependent Care. Pediatrics 2002;107: 429-34.

[21] Brooks TL, Harris SK, Thrall, JS, Woods ER. Association of adolescent risk behaviors with mental health symptoms in high school students. J Adolesc Health 2002;31(3): 240-6.

[22] Kowaleski-Jones L, Mott FL. Sex, contraception and childbearing among high-risk youth: Do different factors influence males and females? Fam Plan Perspect 1998;30:163-9.

[23] Kirby D. Emerging answers: Research findings on programs to reduce teen pregnancy (Summary). Washington, DC: National Campaign to Prevent Teen Pregnancy, 2001.

[24] Dailard C. Recent findings from the "Add Health" survey: Teens and sexual activity. Gutimacher Rep Public Policy 2001;4:13.

[25] Hoff T, Greene L, Davis J. National survey of adolescents and young adults: Sexual health knowledge, attitudes, and experiences. Menlo Park, CA: Henry J Kaiser Family Foundation, 2003:14.

[26] Repetti RL, Taylor SE, Seeman TE. Risky families: Family social environments and the mental and physical health of offspring. Psychol Bull 2002;128(2):330-66.

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