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# Teenage Pregnancies: A Worldwide Social and Medical Problem

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Additional information is available at the end of the chapter

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## Abstract

Teenage pregnancies and teenage motherhood are a cause for concern worldwide. From a historical point of view, teenage pregnancies are nothing new. For much of human history, it was absolutely common that girls married during their late adolescence and experienced first birth during their second decade of life. This kind of reproductive behavior was socially desired and considered as normal. Nowadays, however, the prevention of teenage pregnancies and teenage motherhood is a priority for public health in nearly all developed and increasingly in developing countries. For a long time, teenage pregnancies were associated with severe medical problems; however, most of data supporting this viewpoint have been collected some decades ago and reflect mainly the situation of per se socially disadvantaged teenage mothers. According to more recent studies, teenage pregnancies are not per se risky ones. A clear risk group are extremely young teenage mothers (younger than 15 years) who are confronted with various medical risks, such as preeclampsia, preterm labor, and small for gestational age newborns but also marked social disadvantage, such as poverty, unemployment, low educational level, and single parenting. In the present study, the prevalence and outcome of teenage pregnancies in Austria are focused on.

**Keywords:** teenage pregnancies, adolescent mothers, social and medical problems, teenage pregnancy in Austria

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## 1. Introduction

Teenage pregnancies and teenage motherhood are a cause for concern worldwide. According to the World Health Organization (WHO), about 16 million girls aging between 15 and 19 years

and about one million girls younger than 15 years give birth every year [1]. Nowadays, the vast majority of teenage pregnancies occur in low- and middle-income countries characterized by poor health-care services; therefore, complications during pregnancy, birth, and postpartum phase (e.g., 42 days after birth) are the second cause of death among girls aging between 15 and 19 years worldwide. Additionally, it is estimated that some three million teenage girls undergo unsafe abortions, which may result in consecutive reproductive problems or even death [1]. Fifteen years ago, The United Nations International Children's Emergency Fund (UNICEF) reported that worldwide every fifth child is born by an adolescent mother and 80% of these so-called teenage pregnancies occur in third-world countries [2]. Although in traditional societies the majority of these pregnancies are socially desired, several studies have pointed out the enormous risks which are associated with teenage pregnancies [3, 4], such as anemia, preterm labor, urinary tract infections, preeclampsia, high rate of cesarean sections, preterm birth, and low birth weight infants and even maternal and newborn mortality. Teenage pregnancies, however, still also occur in high-income countries and despite much better medical care teenage pregnancies are also considered as risky and policy tries to avoid too early motherhood [1]. This is not only due to medical problems, but first of all the social consequences of teenage motherhood. Therefore, the analyses of causes and consequences of teenage pregnancies have been the topic of much research and debate [5–7]. The present paper focuses on the biological, medical, and social aspects of teenage pregnancies with special respect to the situation of Austria, a country with exceptionally high standards in medical and social care.

## 2. Biological basis of teenage pregnancy

A girl can conceive from sexual intercourse as early as she started to ovulate. Usually, the first ovulation takes place after the first menstrual bleeding, the menarche [8]. Girls experience menarche at very different ages and it is quite difficult to estimate the mean age at menarche worldwide, because significant differences between individual countries, but also between subpopulations within a country, are observable [9]. Commonly, the mean age at menarche is considered as 13 years, the median, however, as 14 years [9]. Consequently today menarche occurs mainly in the first half of the second decade of life. From the viewpoint of human life history theory, this stage of life is called adolescence: Adolescence starts with pubertal hormonal changes such as the activation of the hypothalamus-pituitary-gonad-axis and can be divided into early and late adolescence. Early adolescence is defined as an age of 15 years and below, late adolescence means an age of 16–19 years. From the viewpoint of evolutionary biology, adolescence seems to be a very recent phenomenon [10]. It is not found before *Homo sapiens* and may lead to a fitness advantage because it is a phase of socio-sexual maturation and of acquisition of social and economic skills which may increase reproductive success during later life. During early adolescence, successful reproduction was and is rare. The years following menarche are often characterized by anovulation and consequently the likelihood of successful conception is quite low [11]. Furthermore, a mean age of menarche of 13 years is a quite recent phenomenon. Although the reliability of data concerning age at menarche in historical times has to be questioned, it can be assumed that over the past 180 years the age of

menarche has fallen substantially across all developed countries [9]. In the 1840s, the average age at menarche was 16.5 years in Europe; today, menarcheal onset occurs at the age of 12.5 on the average in Europe [12]. This decline of menarcheal age is the consequence of the so-called secular acceleration trend, which was induced by improved living conditions, infection control, and an improvement of nutrition [13]. In the 1990s, the secular trend in menarcheal age had slowed down or ended in many European countries and the United States [14]. Better living conditions and sufficient food supply, however, resulted not only in earlier sexual maturation but also in an increase in the rate of ovulatory cycles soon after menarche. In other words, the risk of becoming pregnant shortly after menarche increased too. The secular trend, however, affected not only sexual maturation, on the other hand peak height velocity and the development of secondary sexual characteristics such as breast development take place much earlier and most adolescent girls often look like young ladies, long before they reach mental maturity [15, 16]. Consequently, these girls may feel that they are old enough to start with sexual activity. Although sexual freedom and activity patterns among adolescent girls differ markedly according to cultural and religious background, we have to be aware that today nearly half of the global population is less than 25 years old. Even the generation of adolescents, that is, individuals between 10 and 19 years [1], is the largest in our history. Worldwide, an increasing number of adolescents tend to develop increased interest in sexual activities and consequently we are faced with increasing rates of sexually transmitted diseases including human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) but also of unintended pregnancies and all associated social and medical risks of early childbearing among adolescent girls.

### **3. Teenage motherhood from a historical viewpoint**

From a historical point of view, teenage pregnancies are nothing new. Teenage pregnancies and teenage motherhood were considered as normal and often socially accepted in previous centuries and even during the twentieth century in Europe. It was absolutely common that first births took place during adolescence for much of human evolution and history. Girls married during adolescence and gave birth during their second decade of life. This kind of reproductive behavior was socially desired and considered as normal [17]. It is documented that Hildegard of Vinzgouw, the second wife of Charlemagne, was about 14 years old when she delivered her first son in 772 AD. Another prominent example is Margaret Beauford, who was only 13 years old when she gave birth to Henry VII of England in 1457. Margaret Beauford's granddaughter Margaret Tudor gave birth to her first three children before her 19th birthday. These are only few historical examples; childbirth during the second decade of life is quite common even today. In 2008, there was much debate concerning the teenage motherhood of Bristol Palin, the daughter of Sarah Palin, the Governor of Alaska and vice presidential candidate of the United States.

Pregnancies during early adolescence (girls under the age of 15), however, have always been rare. This was mainly due to the biological fact that menarche and reproductive maturity were experienced much later in historical times than today. Furthermore, sexual activity of girls and

young women was mainly related to marriage until the second half of the twentieth century [9]. Today, the first sexual activity is initiated at a much younger age, and the use rate of contraception among this age group, however, is rather low [18, 19]. Therefore, the probability of pregnancies during teenage age increased worldwide during the second half of the twentieth century.

#### 4. Teenage pregnancies as a worldwide phenomenon

Today, teenage pregnancies are a worldwide phenomenon. About 11% of all births worldwide are still girls aged 15–19 years old. According to the World Health Statistics 2014, the average global birth rate among 15–19 year olds is 49 per 1000 girls, whereas country rates range from 1 to 299 births per 1000 girls. Rates were highest in Sub-Saharan Africa [20]. The 10 highest-risk countries for teenage motherhood are still Niger, Liberia, Mali, Chad, Afghanistan, Uganda, Malawi, Guinea, Mozambique, and the Central African Republic. In these countries, teenage birth rate (births per 1000 women aged 15–19) ranges from 233 in Niger to 132 in the Central African Republic. In Niger, more than 50% of teenage girls (15–19 years) are married. Approximately 25% of teenage girls gave birth between 15 and 19 years [21]. This is mainly due to the fact that childbearing among teenagers is socially desired in some traditional societies and in developing countries [22]. Therefore, a substantial proportion of teenage pregnancies and births are therefore intended in developing countries.

In developed countries, by contrast, teenage birth rates are quite low and teenage motherhood is discouraged, debated as a public health problem and considered as a societal challenge. Nevertheless, there are considerable differences in teenage pregnancy rates between the different developed nations. The majority of teenage mothers (60%) are accounted for by the United States [20]. The teenage birth rate of the United States is about four times that of the European Union (EU) average [23]. Within the European Union, the highest teenage birth rates are found for UK with 27% and the new European Union members Bulgaria (33%), Romania (34%), and the Baltic States (21–23%) [20]. Extraordinary high levels are also reported for Ukraine (38%), Macedonia (34%), Russia (31%), and Belarus (27%). By contrast, extremely low rates of teenage births are reported for Japan and Korea (less than 5%), for Switzerland (4%), Netherlands (5%), and Sweden (6%). Less than 15% were reported for Italy, Spain, Denmark, Finland, France, Luxembourg, Belgium, Greece, Norway, Germany, and Austria [23].

However, we have to be aware that contained in all of these data sources the teenage birth rate focused on girls aged between 15 and 19 only. The extremely vulnerable group of teenage mothers younger than 15 years is not accounted for in the majority of statistics quoted. Singh [24] reported that 8–15% of girls in Cameroon, Liberia, Malawi, Niger, and Nigeria and 11% of the girls in Bangladesh had given birth before their 15th birthday. Pregnancy and birth among girls younger than 15 years are extremely risky; nevertheless, in some societies it is still common that girls marry in their teens and reproduce as early as possible mainly because

early reproduction may enhance the girls' low status in their new family [25]. This social pressure to reproduce as early as possible increases the mortality rate among early adolescent girls such as in Bangladesh where the risk of maternal mortality may increase fivefold among mothers aging between 10 and 14 years in comparison to adult women [21].

## 5. Adverse effects of teenage pregnancies

Female reproduction has always been risky and doubtless pregnancies and births are, independent of maternal age, critical phases in the life of mother and fetus. Teenage pregnancies were seen as a special problem because adverse health consequences of teenage pregnancies were solely attributed to the young maternal age for a long time. The REPRO-STAT project of the European Union declared teenage pregnancy rates as one of 18 core indicators for monitoring and describing reproductive health in the European Union [26, 27]. Teenage pregnancy is labeled alongside obesity, diabetes, cardiovascular disease, and cancer rates as a major public health problem [5, 7, 28]; the classification of teenage pregnancies as a high-risk category and a major public health concern, however, is debated controversial today. Adverse medical effects of teenage pregnancies have been reported mainly in quite old studies dated back to the 1950s. At this time, teenage pregnancies were seen as obstetric problems per se, which are associated with an increased risk of anemia, preterm labor, urinary tract infections, hypertension, preeclampsia, a high rate of cesarean sections but also preterm birth, low birth weight, and intrauterine growth restriction [5, 15, 29–35]. These observations, however, are based on studies among social-deprived subpopulations and from third-world countries with very poor medical conditions [30, 36–38]. During the 1970s, this viewpoint of teenage pregnancies changed markedly. Studies from more economically advantaged clinics in developed countries yielded no increased obstetrical problems among teenage mothers compared with older mothers [32, 33, 39–42]. A recent study from Austria showed clearly that the obstetric outcome of adolescent pregnancies has remained favorable over the last 18 years. Cesarean section rate remained the same in the adolescents during the last 18 years, and the incidence of abnormally adherent or incomplete placentas decreased. The authors concluded that teenage motherhood is a social problem and not an obstetrical or a clinical one [43, 44]. Adverse health consequences and poor pregnancy outcome among teenage mothers seem not to be associated with low gynecological or chronological age of the mothers but with adverse life circumstances [4, 45] because the highest proportions of teenage pregnancies occur in most socioeconomically disadvantaged subpopulations or in developing countries. Therefore, in developed countries teenage pregnancies and teenage motherhood were no longer seen as medical risk but as a social problem because teenage motherhood has numerous deleterious social consequences for mother and child. Teenage motherhood is significantly associated with dropping out of school, low educational level, low income, poverty and single parenting, and/or belonging to ethnic minority groups [6, 34, 46]. What remains unknown is the extent to which these poor outcomes result from teenage pregnancies or from per se social disadvantages which affect the teenage mother already before pregnancy.



It is really a chicken-egg debate because it remains unclear if social disadvantage is the reason or the result of teenage motherhood [47].

## **6. Strategies to decrease teenage pregnancy rates and improve teenage pregnancy outcome**

Some recent studies have demonstrated that a well-acting social welfare system including appropriate psychosocial support and prenatal care improves the obstetric outcome in teenage mothers significantly [48–51]. In this case, teenage pregnancy outcome may be comparable with, or even better than, that in older mothers [4, 52]. The second goal is the efficient reduction of teenage pregnancies per se. The World Health Organization published guidelines in 2011 to prevent early pregnancies and reduce poor reproductive outcomes [1]. The six main objectives were defined as follows:

1. reducing marriage before the age of 18;
2. creating understanding and support to reduce pregnancy before the age of 20;
3. increasing the use of contraception by adolescents at the risk of unintended pregnancy;
4. reducing coerced sex among adolescents;
5. reducing unsafe abortion among adolescents.

The main purpose of this program is to avoid getting pregnant. Unfortunately, sex education is lacking in many countries and consequently young girls are not aware about physiological basis of reproduction and contraceptives. Furthermore, many girls may feel too inhibited or ashamed to seek contraception services. On the other hand, contraceptives are sometimes too expensive or not widely or legally available. Consequently, the most important strategies to avoid teenage pregnancies are improved education of girls, the introduction or improvement of sexual education, and the availability of cheap and easy to use contraceptives [1, 53].

A cornerstone in reducing adolescent sexual-risk behaviors and promoting reproductive health is sex education programs. School-based programs have the potential to reach the majority of adolescents in developed countries and large number of adolescents in countries where school enrollment rates are high [54, 55]. European countries prefer school-based sex education because schools in industrialized countries are the only institution in these societies regularly attended by nearly 95% of all youth aged between 6 and 16 years [53]. It is well documented that sex education programs may increase knowledge of human reproduction and methods of contraception [56]. Developed countries with the lowest rates of teenage motherhood are characterized by advanced school-based sex education but also broad availability of contraceptives including postcoital emergency contraception, and a liberal abortion law [57–59]. Since not all adolescents are in school especially in developing countries, sex education programs have also to be implemented in clinics, community organizations, and youth-oriented community agencies.

## 7. Teenage motherhood in Austria

According to the Forbes list 2012, Austria is the 12th richest country in the world and according to the gross domestic product (GDP) per capita the third richest country in the European Union. The standard of living is exceptionally high in Austria; this is especially true of the social welfare system which includes public health service for all inhabitants on nearly equal conditions and universal health insurance coverage. Furthermore, 9 years of education are mandatory in Austria. After compulsory basic school for 4 years, pupils have the option to visit higher-learning institutions that prepare one for university for 8 or 9 years, or to go on to vocational-preparatory schools for 5 years. Since 1971, sex education is mandatory in all schools and is provided at the age of 10, 14, and 16 years. Beside school-based sex education programs, special outpatient departments for adolescents such as the so-called first love outpatient department in Vienna were implemented. Adolescents have access to these institutions free of charge. They get sex education there but also access to contraceptives. Contraceptives and even emergency contraceptives are available. In 1974, the so-called mother-child passport was introduced. The mother-child passport is a highly sophisticated system of care, which includes seven checkups during pregnancy starting at the eighth week of gestation and eight postnatal checkups of the child between birth and the fourth year of life [60]. All checkups are free of charge and are performed in the gynecologist's or pediatrician's consulting rooms. Abortion has been fully legalized in 1974. Abortions can be performed on demand in hospitals, outpatient departments, and private practice for women whose pregnancies have not exceeded 12 weeks; however, abortions are not paid for by the government health system.

As pointed out above during the early 1970s marked changes in public advances to improve reproductive health took place. The mother-child passport was introduced, abortion became legal, and sex educations in public schools became obligatory. At the same time, teenage motherhood started to decrease markedly. Unfortunately, only births and not pregnancies are recorded in Austria [61]. Therefore, we have no information how many adolescent girls became pregnant because no official abortion statistics exist in Austria. Nevertheless as to be seen in **Figure 1** from 1974 to 2015 the number of girls aging between 15 and 19 years, that is, older adolescents, who gave birth dropped down from 14,387 to 1698 [61]. A marked decrease of motherhood was also observable for girls younger than 15 years (**Figure 2**). Among this early adolescent group, teenage motherhood dropped down from 66 births in 1974 to 15 births in 2015. During the same period, the mean age at first birth increased in Austria from 23.8 years in 1984 to 29.1 years in 2015 [61] (see **Figure 3**). This reduction started with 1974 when abortions became fully legal. In order to prevent teenage pregnancies, several governmental and nongovernmental programs were developed. In a first step, special help desks for young girls were introduced. Young girls can contact gynecologists in special consulting hours at private practices and hospitals free of charge to get information regarding contraception, abortion but also medical care during pregnancy. One example is the "Young Mom" outpatient department of the Hospital "Göttlicher Heiland." This hospital supports young girls during pregnancy and birth and provides advice after birth too. In general, Austrian girls older than 14 years have access to hormonal contraceptives without parental approval. In case of pregnancy girls older than 14, they may decide for abortion without approval by their parents. These private



and governmental activities helped to reduce teenage motherhood markedly. Although teenage motherhood in Austria is not among the lowest in developed countries, the positive effects of mandatory sex education and legal abortions on teenage motherhood rates can be seen. On the other hand, social programs for young mothers were introduced. Teenage mother receives medical care during pregnancy, birth, and after birth free of charge. Additionally, social and financial support improved the situation for teenage mothers markedly. In detail, young mothers are supported to finish school and professional training. Consequently, teenage motherhood is not strongly associated with poverty in Austria. Medical and social care during pregnancy improved pregnancy outcome markedly. These positive effects could be shown in the Viennese teenage pregnancy project.

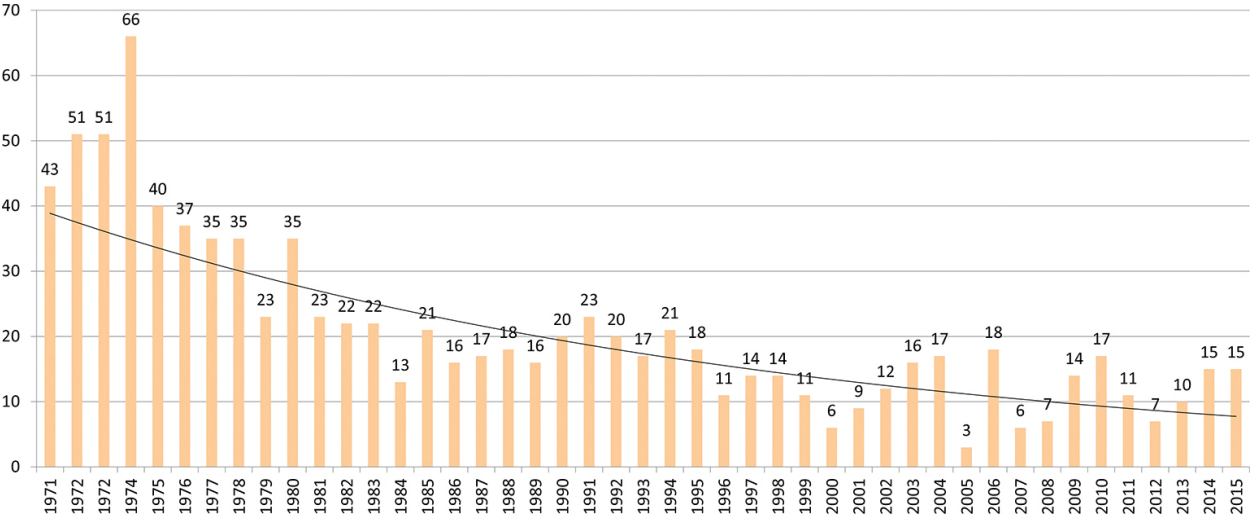


Figure 1. Absolute number of life birth among girls aging below 15 years in Austria between 1971 and 2015.

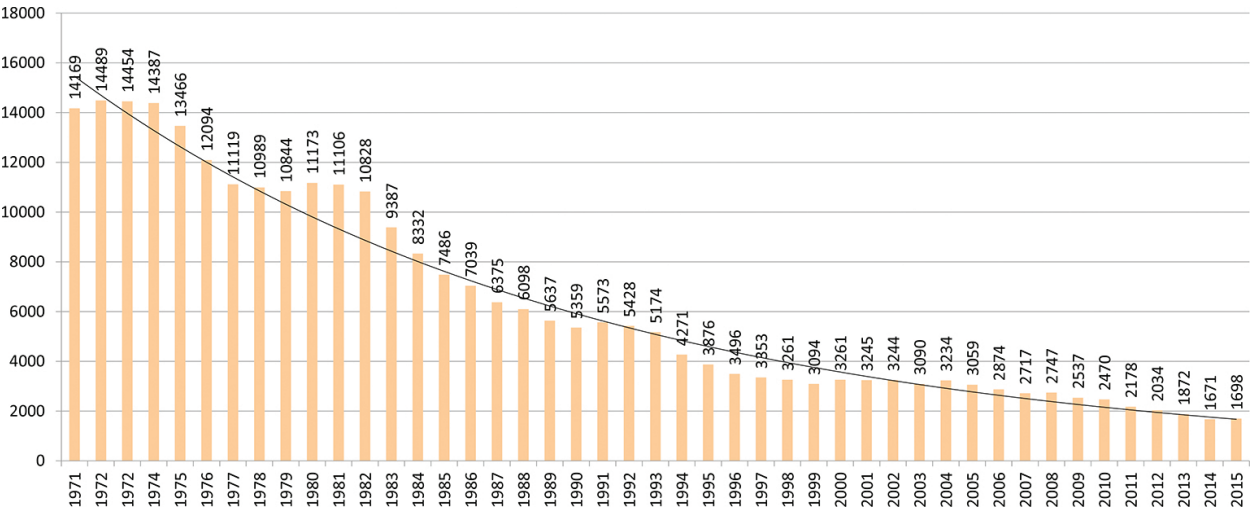
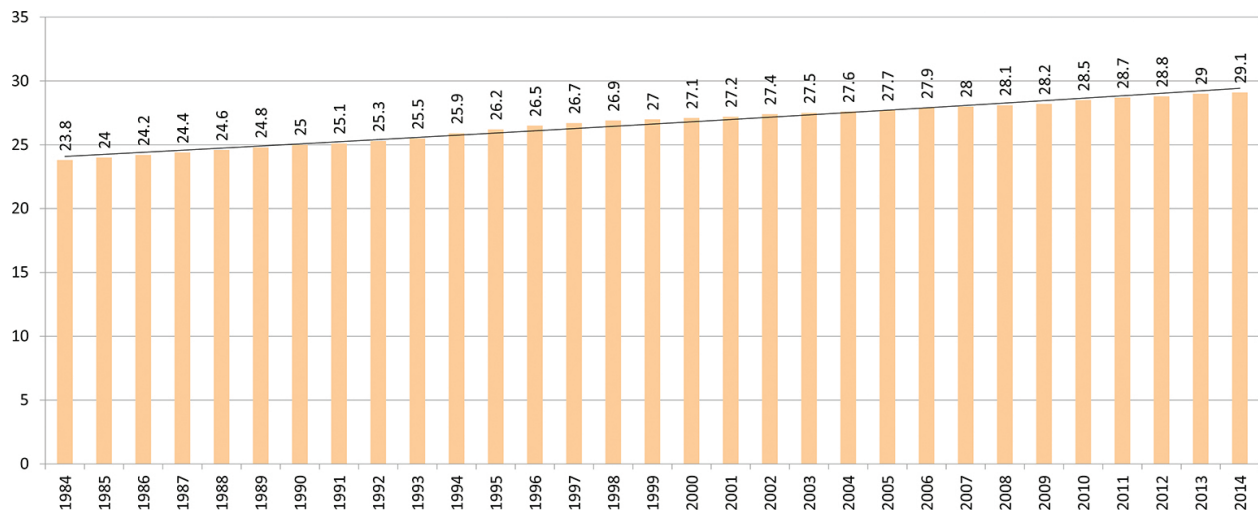


Figure 2. Absolute number of life birth among girls aging 15–19 years in Austria between 1971 and 2015.



**Figure 3.** The mean age at first birth between 1984 and 2015.

## 7.1. The Viennese teenage pregnancy project

The Viennese teenage pregnancy project focused on the impact of maternal age on birth outcome among Viennese primiparae women between 1985 and 1995. Furthermore, the effects of social support on the outcome of a small sample of teenage pregnancies were tested. The results of this project have already been published [62–65].

### 7.1.1. Study: maternal age and birth outcome

The first study was based on a data set of 10,240 singleton term births (39–41st gestational weeks) which took place at the largest birth clinic in Austria, the University Clinic for Gynecology and Obstetrics in Vienna between 1985 and 1995. In this study, the data of 10,231 women aging between 12 and 49 years ( $x = 25.7$ ; standard deviation (SD) = 5.8) at the time of giving first birth and their newborns were analyzed. Exclusively healthy women originating from Austria or Central Europe with no registered maternal diseases before and during pregnancy who gave birth to a single infant were enrolled in the study. The following maternal characteristics were documented: Chronological age, age at menarche, gynecological age (years between menarche and conception), stature, prepregnancy weight, prepregnancy body mass index (BMI) ( $\text{kg}/\text{m}^2$ ), weight at the end of pregnancy, gestational weight gain, and the pelvic dimensions distantia spinarum (DSP) and distantia cristarum (DCR). Immediately after birth, newborn weight, newborn length, head circumference, diameter fronto-occipitalis, and acromial circumference were taken directly from the newborn. A low birth weight was defined as  $<2500$  g, a high birth weight (macrosomia) as  $>4000$  g according to the recommendations of the WHO [66]. In addition to anthropometric features, the 1- and the 5-min APGAR scores [67] for the evaluation of the newborn were determined. As obstetric characteristics, the mode of delivery, spontaneous versus cesarean section, and the intrauterine position of the infant at the time of delivery (head presentation, breech presentation, and transverse presentation) were

documented. A more detailed description of data collection and statistical analyses has been published previously [62–64].

The data set of 10,240 single births was divided according to maternal age at the time of giving birth into five subgroups: Groups 1 and 2 corresponded to the definitions of teenage pregnancies. In detail, group 1 comprised 19 extremely young mothers aging between 12 and 14 years at the time of giving first birth, while group 2 comprised 1532 mothers aging between 15 and 19 years at the time of giving first birth. The majority of these teenage mothers gave birth at the ages of 18 and 19 years (see **Figure 4**). Group 3 contained 6460 mothers aged between 20 and 29 years, group 4 comprised 2090 women aging between 30 and 39 years, and group 5 comprised 130 women aging 40 years and above. Consequently, the percentage of teenage mothers was 15.2% of the whole sample; only 0.2% of the mothers were less than 15 years when giving birth. The main focus of this study laid on the 19 extremely young mothers aging between 12 and 14 years. As demonstrated in **Table 1**, youngest mothers (<15 years) exhibited the significantly lowest menarcheal age, the lowest gynecological age. Furthermore, these early adolescent girls were significantly shorter and lighter than all older age groups, even late adolescent mothers. Even the pelvic dimensions *distancia spinarum* and *distancia christarum* of early adolescent mothers were significantly smaller than those of older mothers. Furthermore, the youngest age group experienced the lowest gestational weight gain.

Maternal age group	<15 years	15–19 years	20–29 years	30–39 years	>40 years	Significance
Variable	<i>x</i> (SD)	<i>x</i> (SD)	<i>x</i> (SD)	<i>x</i> (SD)	<i>x</i> (SD)	<i>p</i> -value
Age at menarche	11.5 (0.8) <sup>b-e</sup>	12.9 (1.4) <sup>a,d,e</sup>	13.3 (1.5) <sup>a,d,e</sup>	13.5 (1.5) <sup>a,b</sup>	13.7 (1.7) <sup>a,b</sup>	<0.001
Gynecological age	2.3 (0.9) <sup>b-e</sup>	5.1 (1.6) <sup>a,c,d,e</sup>	10.8 (3.1) <sup>a,b,d,e</sup>	19.8 (3.1) <sup>a-c,e</sup>	27.8 (1.9) <sup>a-d</sup>	<0.001
Stature height (cm)	159.1 (5.2) <sup>b-e</sup>	162.6 (6.0) <sup>a</sup>	163.4 (6.5) <sup>a</sup>	162.8 (6.9) <sup>a</sup>	163.5 (6.7) <sup>a</sup>	<0.001
Distancia spinarum (cm)	24.7 (2.5) <sup>d,e</sup>	24.5 (1.9) <sup>d,e</sup>	24.9 (2.0) <sup>b,e</sup>	25.4 (1.9) <sup>b,e</sup>	25.8 (1.9) <sup>a-c</sup>	<0.001
Distancia christarum (cm)	26.8 (1.7) <sup>b,c,d,e</sup>	27.6 (2.1) <sup>a,d,e</sup>	28.1 (2.0) <sup>a,e</sup>	28.4 (1.9) <sup>a,b,e</sup>	29.5 (5.8) <sup>a-d</sup>	<0.001
Prepregnancy weight (kg)	52.2 (7.1) <sup>b-e</sup>	57.1 (8.6) <sup>a,d,e</sup>	59.2 (9.9) <sup>a,e</sup>	61.9 (11.5) <sup>a,b,e</sup>	66.4 (12.3) <sup>a-d</sup>	<0.001
End of pregnancy weight (kg)	67.2 (9.5) <sup>c-e</sup>	70.0 (10.7)	73.1 (12.1) <sup>a</sup>	74.9 (13.4) <sup>a</sup>	75.9 (13.1) <sup>a</sup>	<0.001
Pregnancy weight gain(kg)	12.8 (7.5)	13.1 (5.5)	13.1 (5.4)	12.3 (5.6)	10.8 (5.6)	n.s.
BMI (kg/m <sup>2</sup> )	20.47 (2.12) <sup>c-e</sup>	21.59 (2.99) <sup>d,e</sup>	22.10 (3.44) <sup>a,e</sup>	23.28 (4.04) <sup>a,b,e</sup>	24.74 (4.56) <sup>a-d</sup>	<0.001

<sup>a</sup> Significantly different from maternal age group <15 years.

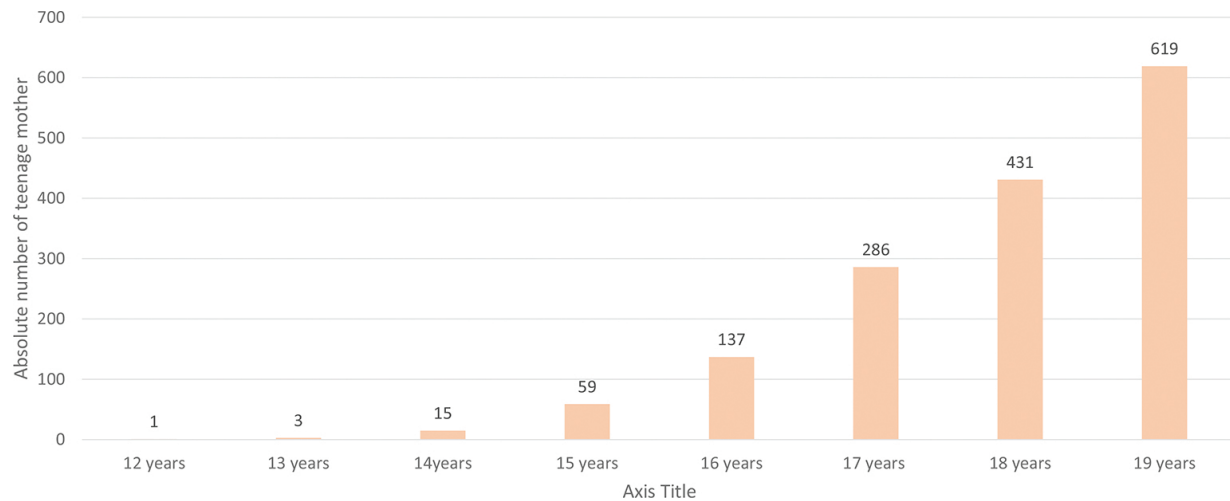
<sup>b</sup> Significantly different from maternal age group 15–19 years.

<sup>c</sup> Significantly different from maternal age group 20–29 years.

<sup>d</sup> Significantly different from maternal age group 30–39 years.

<sup>e</sup> Significantly different from maternal age group >40 years.

**Table 1.** Maternal reproductive and somatic characteristics according to maternal age group (Duncan analyses).



**Figure 4.** Absolute number of teenage mothers according to age (Kirchengast and Hartmann).

Maternal age group	<15 years	15–19 years	20–29 years	30–39 years	>40yrs	Significance
Variable	<i>x</i> (SD)	<i>x</i> (SD)	<i>x</i> (SD)	<i>x</i> (SD)	<i>x</i> (SD)	<i>p</i> -value
Birth weight (g)	2959.4 (362.4) <sup>b-e</sup>	3293.9 (402.8) <sup>a</sup>	3368.9 (425.3) <sup>a</sup>	3395.7 (462.6) <sup>a</sup>	3435.8 (406.1) <sup>a</sup>	<0.001
Birth length (cm)	48.5 (1.7) <sup>b-e</sup>	49.6 (1.9) <sup>a</sup>	49.9 (1.9) <sup>a</sup>	49.9 (2.1) <sup>a</sup>	50.2 (1.5) <sup>a</sup>	<0.001
HC (cm)	33.3 (1.1) <sup>b-e</sup>	34.1 (1.4) <sup>a</sup>	34.4 (1.4) <sup>a</sup>	34.5 (1.4) <sup>a</sup>	34.6 (1.5) <sup>a</sup>	<0.001
AC (cm)	35.8 (2.2) <sup>c-e</sup>	36.5 (2.2) <sup>d,e</sup>	36.8 (2.3) <sup>a</sup>	37.1 (2.5) <sup>a,b</sup>	37.4 (2.1) <sup>a,b</sup>	<0.001
DFO (cm)	11.0 (0.6)	11.2 (0.8)	11.3 (1.3)	11.3 (0.8)	11.2 (0.8)	n.s.
APGAR 1	8.3 (1.5)	8.6 (1.3)	8.6 (1.3)	8.6 (1.3)	8.5 (1.4)	n.s.
APGAR 5	9.7 (0.7)	9.7 (0.8)	9.8 (0.7)	9.8 (0.7)	9.8 (0.6)	n.s.

HC, head circumference; AC, acromial circumference; DFO, diameter fronto-occipital.

<sup>a</sup> Significantly different from maternal age group <15 years.

<sup>b</sup> Significantly different from maternal age group 15–19 years.

<sup>c</sup> Significantly different from maternal age group 20–29 years.

<sup>d</sup> Significantly different from maternal age group 30–39 years.

<sup>e</sup> Significantly different from maternal age group >40 years.

**Table 2.** Newborn characteristics according to maternal age group (Duncan analyses).

Concerning newborn characteristics, it could be shown that mothers younger than 15 years gave birth to the significantly lightest and shortest newborns (see **Table 2**). Furthermore, these newborns exhibited the smallest head and shoulder dimensions. Concerning the Apgar scores 1 and 5 min after birth, no significant differences between the maternal age groups could be proved. Furthermore, early adolescent mothers showed the significantly highest incidence of low weight newborns (<2500 g). None of these extremely young mothers gave birth to a macrosome (>4000 g) newborn (see **Table 3**). Concerning child presentation and delivery mode, it turned out that extremely young mothers showed the significantly highest

rate of breech presentation (10.5%) but the significantly lowest rate of cesarean sections (16.7%) (see **Table 3**). In this study, it could be shown that very young mothers (<15a) were quite immature, they were significantly shorter and lighter than older mothers, even older adolescent mothers. Furthermore, they gave birth to significantly smaller and lighter newborns. On the other hand—although breech presentation was quite high—the cesarean section rate—indicating birth complications—was significantly lower than among older mothers, even lower than among late adolescent mothers. Considering in contrast to the incidence of obstetrical risks such as cesarean section or adverse child presentation, such problems are low in comparison to older gravida. Therefore, we can conclude that teenage pregnancies—even among early adolescent mothers aging below 15 years—are not associated with increased obstetrical risks.

Maternal age group		<15 years	15–19 years	20–29 years	30–39 years	>40 years	Significance
Variable							
Pregnancy weight gain	<10 kg	33.3%	24.0%	23.5%	29.3%	40.4%	$p = 0.003$
	10–15 kg	44.4%	43.8%	46.0%	45.0%	40.4%	
	>15 kg	22.2%	32.2%	30.5%	25.7%	19.2%	
Newborn weight status	Low weight <2500 g	10.5%	2.0%	1.6%	2.4%	0.8%	$p = 0.001$
	Normal weight 2500–4000 g	89.5%	93.1%	90.4%	87.8%	91.5%	
	Macrosomia >4000 g	0.0%	4.8%	8.0%	9.8%	7.7%	
Delivery mode	Spontaneous vaginal delivery	83.3%	82.9%	79.7%	72.3%	68.7%	$p = 0.001$
	Cesarean section	16.7%	17.1%	20.3%	27.7%	31.3%	
Child presentation	Breech presentation	10.5%	2.5%	3.6%	4.4%	4.6%	$p = 0.023$
	Transverse presentation	0.0%	0.3%	0.2%	0.3%	0.0%	

**Table 3.** Birth outcome according to maternal age group (Chi-squared).

7.1.2. Study: social support and pregnancy outcome among teenage mothers

In this study, the impact of social support on the course of pregnancy and pregnancy outcome among 51 pregnant Austrian girls aging between 13 and 18 years ( $\bar{x} = 16.3$  years;  $\pm 1.3$ ) who decided to give birth was tested [65]. All girls were interviewed based on a structured questionnaire; furthermore, data from the mother-child passport were included in the analysis.



Complications during pregnancy and birth were seldom and no adverse birth outcome was observed. The majority of participants received optimal medical treatment and sufficient social support mainly from the parents, grandparents, and to a less degree by school. Institutional support was available for the vast majority of girls. The majority of girls got information and help from the gynecologist, health centers for teenagers, such as first love outpatient department, public social institutions, private social institutions, Internet services, and public information center. More than 90% of the girls reported that they had no problems to get sufficient information and institutional support. The majority of girls was satisfied with the social support and information provided by governmental and private institutions. These results support the idea that teenage pregnancies are mainly a social and not a medical problem, because adequate social support helps to reduce medical complications

## 8. Conclusion

In developed countries, most teenage pregnancies, especially those during early adolescence (<15 years), are unplanned and unintended. For a long time, teenage pregnancies were interpreted as major medical problems and obstetrical risk factors. More recently, however, obstetrical risks of teenage pregnancies are predominantly interpreted as results of adverse social and economic factors rather than chronological age. This, however, is no reason to deny that teenage pregnancies are currently still an important public health problem all over the world. There is no doubt that obstetrical problems can be managed by modern medicine and so the risk of teenage pregnancies can be diminished. In Austria, an improved sexual education and the legalization of abortions since the early 1970s reduced teenage motherhood dramatically. On the other hand, special support programs—including medical care, financial, and social support—for pregnant teenage girls and teenage mothers were introduced. First of all, special consulting hours for young girls free of charge at hospitals and private practices of gynecologists improved the access to contraceptives and advanced sexual education. Governmental financial support for young mothers reduced poverty among teenage mothers dramatically. Despite these improvements of the situation of teenage mothers in Austria, we should not forget that the development of strategies to reduce teenage pregnancy rate and teenage motherhood, especially among young adolescents, effectively should be a goal of public health worldwide.

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