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Miscellaneous

Factors associated with teenage pregnancy in the European Union countries: a systematic review

Mari Imamura¹, Janet Tucker¹, Phil Hannaford², Miguel Oliveira da Silva³, Margaret Astin⁴, Laura Wyness⁵, Kitty W. M. Bloemenkamp⁶, Albrecht Jahn⁷, Helle Karro⁸, Jørn Olsen⁹, Marleen Temmerman¹⁰, on behalf of the REPROSTAT 2 group

Background: As part of the REPROSTAT2 project, this systematic review aimed to identify factors associated with teenage pregnancy in 25 European Union countries. **Methods:** The search strategy included electronic bibliographic databases (1995 to May 2005), bibliographies of selected articles and requests to all country representatives of the research team for relevant reports and publications. Primary outcome measure was conception. Inclusion criteria were quantitative studies of individual-level factors associated with teenage (13–19 years) pregnancy in EU countries. **Results:** Of 4444 studies identified and screened, 20 met the inclusion criteria. Most of the included studies took place in UK and Nordic countries. The well-recognized factors of socioeconomic disadvantage, disrupted family structure and low educational level and aspiration appear consistently associated with teenage pregnancy. However, evidence that access to services in itself is a protective factor remains inconsistent. Although further associations with diverse risk-taking behaviours and lifestyle, sexual health knowledge, attitudes and behaviour are reported, the independent effects of these factors too remain unclear. **Conclusions:** Included studies varied widely in terms of methods and definitions used. This heterogeneity within the studies leaves two outstanding issues. First, we cannot synthesize or generalize key findings as to how all these factors interact with one another and which factors are the most significant. Second, it is not possible to examine potential variation between countries. Future research ensuring comparability and generalizability of results related to teenage sexual health outcomes will help gain insight into the international variation in observed pregnancy rates and better inform interventions.

Keywords: EU countries, factors, pregnancy, teenage, review

Introduction

This literature review was conducted for REPROSTAT2 (Reproductive Health Indicators in the European Union), one component of the Health Monitoring Program of the European Commission. The first phase of REPROSTAT

(2001–03) aimed to develop key indicators for monitoring and evaluation of reproductive health in the European Union.¹ This second phase, REPROSTAT2, aims to assess the usefulness of these indicators for the enlarged European Union, with particular emphasis on adolescents and young adults. Among its objectives is to develop and pilot a youth reproductive health survey. This systematic review aims to identify factors associated with teenage pregnancy for use in the future surveys.

EU public health policy on teenage sexual health aims to reduce the burden of sexually acquired infection and reduce unwanted teenage pregnancies that may limit education, employment and life-long career opportunity.^{2,3} Identification of factors associated with teenage pregnancy and collection of such information by international surveys, would provide important insights for individual member states.

Previous studies examining risk factors related to teenage pregnancy in Europe represent 'macro-level' reviews of social and population characteristics such as the overall wealth and income distribution of a country, the average years of education and strength of religion.^{4,5} Our review focuses on micro-level factors (characteristics of the individual as well as attributed small area characteristics of socioeconomic deprivation) associated with teenage pregnancy. Two key studies influenced the design of this review, namely a systematic review by the UK NHS (National Health Service) Centre for Reviews and Dissemination⁶ and the European Health Behaviour in School-aged Children (HBSC) study.⁷ The CRD review included US studies and identified

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factors associated with teenage pregnancy within six broad themes including individual, family, educational, community, socioeconomic and contraceptive factors.⁶ In the protocol of the HBSC survey, Currie *et al.*⁷ identified factors associated with inter-personal and sociocultural variables (such as self-esteem, risk behaviour and attitudes towards parents, teachers and schools).

The objective of this study was to review the micro-level studies from all contemporary European Union member states from the last 10 years to identify possible risk or protective factors of teenage pregnancy. The extensive US literature was excluded because social and cultural differences may limit the generalizability of American findings to European country settings and policy.

Methods

Electronic searches (1995 to May 2005) were undertaken using MEDLINE, EMBASE, Applied Social Sciences Index and Abstracts (ASSIA) and Social Science Citation Index (SSCI) to identify potentially relevant studies. Three search facets, 'adolescents', 'EU countries' and 'pregnancy', were used with an additional facet of 'factors' also applied to larger databases such as MEDLINE and EMBASE. Additional references were located through searching the bibliographies of selected articles and by requesting the EU country representatives of the REPROSTAT research team for relevant reports and publications. There were no language restrictions.

All factors potentially associated with teenage (age 13–19) pregnancy at the level of the individual, such as socio-demographic, social, economic and psychological variables, were included. For the purpose of the review, the term 'factor' does not imply causality but only associations. Only studies with some form of statistical analysis using comparison between groups (e.g. cross-tabulations, regression) were included. The key outcome measure was pregnancy (conception); studies that only used intermediate or proxy outcome measures of pregnancy, such as childbearing (parenthood) or sexual behaviour, were excluded.

The methodological quality of included studies was assessed using a checklist, although studies were not rated or excluded on the basis of the overall quality rating. Study selection, quality assessment and data extraction were undertaken by one reviewer and checked by a second reviewer. The study design and other characteristics of included studies are summarized in table 1.

Results

Included studies

A total of 4444 abstracts were screened, 266 full-records were examined for relevance and 20 studies met the inclusion criteria. Of the studies included, 12 were conducted in the UK, 7 in the Nordic countries and one study in Hungary.

The methodological quality of the included studies varied considerably (table 2). Studies also varied in their settings: population characteristics and representativeness, target age groups, method of data collection and analysis (see table 1); and some factors were assessed in only one or two reports. Of note, definition of outcome variables also varied. Thus, it was not possible to examine potential variations across different EU countries or between teenage sub-groups.

Findings are presented by factors grouped into six broad headings: (i) sociodemographic, (ii) family structure and stability, (iii) educational, (iv) risky health behaviours, (v) sexual health knowledge, attitudes and behaviour and (vi) service accessibility and acceptability.

Factors associated with teenage pregnancy

Sociodemographic factors

The most consistent risk factor for early pregnancy was lower socioeconomic status. Of the five UK studies which investigated the link between pregnancy and area deprivation all found a strong association: the areas with higher levels of deprivation were found to have higher conception rates.^{8–12} Two further studies (using variously defined parental socioeconomic status derived from adolescents' self-report) supported the increased risk of early pregnancy associated with lower socioeconomic status,^{13,14} whereas one study found no such significant association.¹⁵

Few studies investigated the association between ethnicity and teenage pregnancy. One study found that individuals living in areas with more ethnic minorities had higher teenage pregnancy rates, although this association was no longer significant after adjusting for socioeconomic deprivation.⁸

Using mother tongue as a proxy for immigrant status, one descriptive study conducted in a Swedish city reported that male teenagers from bilingual families were more likely to have made their partners pregnant than those from monolingual families.¹⁶ In contrast, one Finnish study reported that Swedish-speaking teenage girls had a lower pregnancy risk than the Finnish-speaking counterparts.¹³ This was partly explained by the fact that Swedish speakers in Finland tend to come from higher socioeconomic groups.

Three studies assessed whether early physical development was associated with early pregnancy.^{15–17} Only one descriptive study found this to be a risk factor.¹⁶

Four studies reported higher teenage pregnancy rates in urban areas.^{9,11,13,18} However, in two of these studies, this association appeared to be confounded by other factors such as deprivation and family type.^{11,13} Vikat *et al.*¹³ found persistent regional variation in Finnish teenage pregnancy rates (1987–98) with higher rates in less developed northern and city settings that remained after allowing for socioeconomic status. It was argued that pregnancy rates in Finland were considerably lower than other European countries and this may explain the relatively small socioeconomic differentials observed compared with other UK studies (where pregnancy rates are more than three times higher).

Family structure and stability

Three studies examined whether family disruption influenced the likelihood of teenage pregnancy.^{13,15,16} Two reported that the likelihood of pregnancy was higher among teenagers who did not live with both parents.^{13,16} One reported no significant difference by family type after adjusting for further sociodemographic factors as well as early age (<16) at first intercourse, which was itself significantly associated with teenage pregnancy.¹⁵

Surprisingly, only one small descriptive study reported that the daughter (age 13–19) of a mother who had a teenage conception was more likely to become pregnant as a teenager herself.¹⁹

Educational factors

Wellings *et al.*¹⁵ found that among sexually active females, leaving school early (at the minimum school leaving age of 16) was independently associated with pregnancy (resulting in motherhood).

Bonell *et al.*¹⁴ found that females who disliked school were significantly more likely to report pregnancy (by age 16) compared with those who liked school. This association remained largely unaffected by adjusting for other factors, including expectations (of parenting and education at age 20), confidence (in rejecting unwanted sex and communicating

Table 1 Studies of teenage pregnancy

Author and country	Key factor(s) investigated	Number of subjects	Design	Population source; pregnancy definition	Data source	Analysis
Bradshaw <i>et al.</i> ⁸ UK	(A) Deprivation	N/A	Population data analysis	Conception rates (15–17 years) in England	Routinely collected ONS (Office for National Statistics) data, 1994–96, 1997–99	Multivariate
Clements <i>et al.</i> ⁹ UK	(A) Deprivation, (F) Service accessibility	N/A	Population data analysis	Pregnancy rates (13–19 years) in the Wessex region, England	NHS (National Health Service) database and British Pregnancy Advisory Services (BPAS); 1991–94	Multivariate
Diamond <i>et al.</i> ¹⁰ UK	(A) Deprivation, (F) Service accessibility	N/A	Population data analysis	Pregnancy rates (13–19 years) in the Wessex Region, England	NHS (National Health Service) database and British Pregnancy Advisory Service (BPAS), 1991–94	Multivariate
McLeod ¹¹ UK	(A) Deprivation	N/A	Population data analysis	Pregnancy rates (13–19 years) in Scotland	Routinely collected ISD (Information and Statistics Division) data, 1981–85 and 1991–91	Multivariate
Paton ¹² UK	(A) Deprivation, (F) Service accessibility	N/A	Population data analysis	Pregnancy rates (13–19 years) in Scotland, England and Wales	Routinely collected data (ONS, ISD, NHS, etc), 1984–97	Multivariate
Vikat <i>et al.</i> ¹³ FI	(B) Family structure	28914 F	Survey follow-up using registers	Female respondents (12, 14, 16 and 18 years) in the AHLS samples representative for Finland; Pregnancy occurring to 14–19 years	Adolescent Health and Lifestyle Survey (AHLS), 1987–98, and registers on pregnancies (abortions, births, miscarriages)	Multivariate
Seamark, Gray ^{19,22} UK	(B) Mother's pregnancy history, (D) Smoking	76 F	Case-control, retrospective	Females (13–19 years) registered with a group general practice in east Devon, England; Pregnancy 13–19 years	General practice records, 1994–95	Univariate
Bonell <i>et al.</i> ¹⁴ UK	(C) Attitude to school	4248 F at baseline	Longitudinal (2 years)	Female participants (13/14 years at baseline) in a sex education trial in central and southern England; Pregnancy by 15/16 years	Self-completed questionnaire based on trial (RIPPLE), 1997–99	Multivariate
Holmberg, Berg-Kelly ¹⁶ SW	(D) Health and risky behaviour	1175 M	Cross-sectional	Male students (18 years) from one community in a medium sized city; Pregnant female partner (age not reported)	'Q90' survey in 1994 and 1998	Univariate
Berg-Kelly ²⁰ SW	(D) Health and risky behaviour	4516 M/F	Cross-sectional	Students (grades 7, 9 and 11, age 13–18 years) from 7 (not randomly) selected areas across Sweden; Pregnancy <13–18 years	'Q90' survey, 1990–91	Univariate
Easton <i>et al.</i> ²¹ HU	(D) Health and risky behaviour	2615 M/F	Cross-sectional	Representative sample of students (15–18 years) in Budapest; Pregnancy <15–18 years, or pregnant female partner (age not reported)	Budapest Student Health Behaviour Survey (BSHBS), 1999	Univariate

(continued)

Table 1 Continued

Author and country	Key factor(s) investigated	Number of subjects	Design	Population source; pregnancy definition	Data source	Analysis
Wellings <i>et al.</i> ¹⁵ UK	(E) Early sexual initiation	11161 M/F	Cross-sectional	National probability sample of men and women aged 16–44 years in Britain (analysis restricted to females aged 18–24 years who had first intercourse before 18 years); Pregnancy resulting in motherhood or abortion before 18 years	National Survey of Sexual Attitudes and Lifestyles (Natsal 2000), 1999–2001	Multivariate
Edgardh ^{17,23} SW	(E) Early sexual initiation	1943 M/F (students) and 210 M/F (school dropouts)	Cross-sectional	National sample of teens (17 years) (statistical analysis restricted to the student sample, i.e. results for school dropouts not extracted); Pregnancy <17 years, or pregnant female partner (age not reported)	'SAM 73-90' survey, 1990	Univariate
Andersson-Ellström <i>et al.</i> ²⁴ SW	(E) Early sexual initiation	88 F	Cross-sectional	Female students (15–17 years) in the health care programme course in the city of Karlstad, Sweden; Pregnancy <15–17 years	Questionnaire and interview at a clinic, 1989–90	Univariate
Woodward ²⁵ UK	(E) Sexual behaviour	61 F	Cross-sectional	Pregnant teens (≤19 years) from an antenatal clinic and 'never-pregnant' teens from a family planning clinic, England	Self-completed questionnaire, 1992	Univariate
Wielandt <i>et al.</i> ²⁶ DK	(E) Contraceptive use/failure	359 F	Cross-sectional	National random sample of adolescents (16–20 years); Pregnancy <20 years	Structured interview at home, 1989	Multivariate
Churchill <i>et al.</i> ²⁷ UK	(F) Service access (GP consultation)	959 F	Case-control, retrospective	Females (<20 years) registered with 14 general practices in Trent region, England; Pregnancy occurring to 13–19 years	General practice records (case notes), 1995–97	Multivariate
Hippisley-Cox <i>et al.</i> ¹⁸ UK	(F) Service acceptability (characteristics of general practice)	N/A	Cross-sectional	Pregnancy rates for teens (≤19 years) registered with all 826 general practices in Trent region, England; Pregnancy occurring to 13–19 years	Hospital admission records, 1994–97	Multivariate

Note: UK: United Kingdom; FI: Finland; SW: Sweden; HU: Hungary; DK: Denmark; M: Male; F: Female; N/A: not applicable; (A): Sociodemographic factor; (B): Family structure and stability; (C): Educational factor; (D): Risky health behaviours; (E): Sexual health knowledge, attitude and behaviour; (F): Service accessibility and acceptability.

Table 2 Selected characteristics of included studies (*n* = 20)

Methodological quality criteria	Number of studies
Assessment of outcome (pregnancy)	
Self-report	9/20 (45%)
Medical records or databases	11/20 (55%)
Assessment of factor	
Self-report	10/20 (50%)
Medical records or databases	9/20 (45%)
Self-report and medical records or databases	1/20 (5%)
Representative of the target population (national or regional)	
Likely	12/20 (60%)
Unlikely	8/20 (40%)
Type of analysis	
Multivariate analysis	11/20 (55%)
Univariate analysis	9/20 (45%)

about sex) or knowledge (about emergency contraception timing and contraception services). Notably, though, the association between dislike of school and pregnancy became statistically insignificant only after adjusting for parental employment status, which was itself significantly associated with pregnancy.

In the same study lack of expectation of being in higher education at age 20 was also significantly associated with early pregnancy.

Risky health behaviours

Five studies using univariate analysis investigated the relationship between risk-taking behaviour, lifestyles and teenage pregnancy.^{16,17,20–22} One small study found smoking to be associated with pregnancy amongst female teenagers.²² Two descriptive surveys in Sweden reported that, among sexually active males, those reporting binge drinking, smoking, violence (fighting) or anabolic steroid use were more likely to have made their partners pregnant.^{16,17} Two further descriptive studies found that sexual and risky behaviour tended co-occur with less healthy lifestyle (e.g. drinking, smoking or skipping breakfast), although the studies found no significant association between risk-taking behaviour or lifestyles and an outcome of teenage pregnancy.^{20,21}

Care needs to be taken in interpreting these findings, since none of these studies considered possible confounding from other sociodemographic characteristics.

Sexual health knowledge, attitude and behaviour

Bonell *et al.*¹⁴ found that expectations of parenting by age 20 were significantly associated with the likelihood of teenage pregnancy, although there was no significant relationship between pregnancy and knowledge of timing of emergency contraception and knowledge of access to contraception and sexual health services.

Four studies examined the association between early sexual activity and teenage pregnancy.^{15,17,23–25} Two studies found this to be a risk factor. A large UK study demonstrated early age (<16 years) at sexual initiation independently associated with early pregnancy.¹⁵ In the same study, 'sexual competence' at first sex (a composite measure including variables on regret, willingness, autonomy and use of contraceptives), and reporting parents as the main source of information about sex, were not associated with lower early pregnancy rates. One other descriptive study similarly found higher pregnancy rates among females who began

having intercourse early (age <15 years).²³ No such relationship was found among sexually active males. Nevertheless, two further descriptive studies reported that, among males, having first date intercourse more than twice, having more than two sexual partners, having had an STI, been a victim of a sexual offence, or non-use of contraceptives, were related to having made their partners pregnant.^{16,17}

One study suggested a possible effect of contraceptive failure on teenage pregnancy in Denmark.²⁶ The study estimated that from 25 to 50% of conceptions occurred despite reported use of contraceptives.

Service accessibility and acceptability

Five studies examined the relationship between service accessibility and teenage pregnancy.^{10–12,18,27} These studies mainly suggest that improved access alone may not reduce teenage pregnancy. For example, one study reported that increased distance to youth family planning clinic may be associated with higher conception rates.¹⁰ However, the association was only significant in urban areas up to 10 km away from their nearest clinic. The authors noted that specialized clinics are more likely to be located in cities and town centres, while suburbs (further away from cities) may represent a more affluent area with low pregnancy rates, although the results remained after controlling for deprivation.

McLeod showed in a Scottish study that, while some of the local variation in teenage pregnancy rates may reflect differential access to family planning services, socioeconomic deprivation remains a more important determinant.¹¹

Paton constructed models based first on the 1984 Gillick ruling, which would have denied access to family planning clinics for teenagers under 16 years in England (until it was overturned in 1985), and based secondly on observed attendance by under 16 years at family planning clinics.¹² No evidence was found that greater access to services reduced regional teenage (<16 years) pregnancy rates, whereas socioeconomic variables such as the proportion of children in care, unemployment rates and lower participation rates in post-compulsory education were significantly associated with teenage pregnancy.

A retrospective study in England found that, compared with non-pregnant teenagers, those who became pregnant were more likely to have consulted their general practice about contraception in the year before conception.²⁷ A related study also found that lower pregnancy rates were recorded in practices with a female or younger family doctor.¹⁸

Summary and conclusions

Socioeconomic disadvantage, disrupted family structure and limited education appear to be most consistently related to teenage pregnancy. Many health-compromising lifestyle factors (e.g. risky sexual behaviours, alcohol, drug or tobacco use) were also shown to have some association with teenage pregnancy. They also tended to co-occur; thus the independent effects of these factors remain unclear. Studies reported higher teenage pregnancy in relation to a range of self-reports of sexual behaviour, including early sexual initiation, increasing number of partners and non-use of contraceptives and one report demonstrated earlier age at sexual initiation independently related to teenage pregnancy (at age <18 years).¹⁵ The associations between sexual health knowledge, attitudes and accessibility of services, and lower teenage pregnancy rates are complex with greater uncertainty about strength of any associations. Improving services

and access may not reduce teenage pregnancy by themselves. In all the relationships, it is unclear how the various factors interact with one another, and the descriptive nature of studies included does not allow us to infer causality.

The factors associated with teenage pregnancy identified here are rather similar to those found in previous reports and reviews.^{28,29} Furthermore, when we considered a further 20 studies for factors associated with early childbearing (a sub-set of teenage pregnancy that excludes abortion), the factors identified remained largely consistent with those for teenage pregnancy.³⁰ This is not surprising for socioeconomic disadvantage, since at least in the UK context, teenage conception rates are higher but abortion rates are lower in more deprived areas,³¹ and thus, any socioeconomic association is likely to be stronger for early childbearing.

A number of methodological issues need to be considered when interpreting these findings. First, the review is limited by the amount and the quality of published literature on factors associated with the sexual health outcome of teenage pregnancy studied in the EU countries over the last decade. For example, we found few studies that focus on religious influences and ethnic origins. The issue of whether pregnancy was intended or unintended could not be explored fully, although one report demonstrated that those who become pregnant in their teens do express positive attitudes towards early parenting.¹⁴

Second, most of the studies in this review took place in a small number of EU countries (mainly UK and Nordic countries), possibly reducing the generalizability of the findings to other EU countries. The large proportion of studies from a few countries may be due to biases in the electronic databases used, including language or publication bias. Another reason for the relatively large number of UK studies may be that teenage pregnancy is perceived to be more problematic in the UK than the rest of Europe.

Third, many of the studies were of poor quality and also vary widely in terms of design, content and size. This heterogeneity within the studies made it difficult to interpret and summarize key findings, and to explore variation between countries or between age sub-groups. Since few studies examined factors in both males and females, exploration of potential gender differences in factors associated with early pregnancy was also not possible.

Future research with standardized measures and methodologies, especially in new EU member states, will help gain insight into observed international variations in pregnancy rates, and better inform interventions. Furthermore, since many of the risk factors are part of cultural and socioeconomic conditions, they are probably also time dependent and should therefore be updated at regular intervals.

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Conflicts of interest: None declared.

Key points

- Previous reviews of factors related to teenage pregnancy in Europe have focused on 'macro-level' factors between countries such as overall wealth and income, average years of education and strength of religion.
- This is a systematic review of individual-level factors associated with teenage (13–19 years) pregnancy in contemporary EU countries.
- The findings demonstrate most consistently the association between socioeconomic inequalities and teenage pregnancy.
- Further evidence about the protective effect of improved service access, or the independent effect of individual behaviour and life-style factors, remain uncertain.
- Many of the studies were of poor quality and varied widely in methods used. Further research ensuring comparability and generalizability of results is needed.

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