

# Teenage pregnancy and social disadvantage: systematic review integrating controlled trials and qualitative studies

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## ABSTRACT

**Objectives** To determine the impact on teenage pregnancy of interventions that address the social disadvantage associated with early parenthood and to assess the appropriateness of such interventions for young people in the United Kingdom.

**Design** Systematic review, including a statistical meta-analysis of controlled trials on interventions for early parenthood and a thematic synthesis of qualitative studies that investigated the views on early parenthood of young people living in the UK.

**Data sources** 12 electronic bibliographic databases, five key journals, reference lists of relevant studies, study authors, and experts in the field.

**Review methods** Two independent reviewers assessed the methodological quality of studies and abstracted data.

**Results** Ten controlled trials and five qualitative studies were included. Controlled trials evaluated either early childhood interventions or youth development programmes. The overall pooled effect size showed that teenage pregnancy rates were 39% lower among individuals receiving an intervention than in those receiving standard practice or no intervention (relative risk 0.61; 95% confidence interval 0.48 to 0.77). Three main themes associated with early parenthood emerged from the qualitative studies: dislike of school; poor material circumstances and unhappy childhood; and low expectations for the future. Comparison of these factors related to teenage pregnancy with the content of the programmes used in the controlled trials indicated that both early childhood interventions and youth development programmes are appropriate strategies for reducing unintended teenage pregnancies. The programmes aim to promote engagement with school through learning support, ameliorate unhappy childhood through guidance and social support, and raise aspirations through career development and work experience. However, none of these approaches directly tackles all the societal, community, and family level factors that influence young people's routes to early parenthood.

**Conclusions** A small but reliable evidence base supports the effectiveness and appropriateness of early childhood interventions and youth development programmes for reducing unintended teenage pregnancy. Combining the

findings from both controlled trials and qualitative studies provides a strong evidence base for informing effective public policy.

## INTRODUCTION

Countries such as the United Kingdom and the United States have high teenage pregnancy rates relative to other countries.<sup>1-3</sup> Although teenage pregnancy can be a positive experience, particularly in the later teenage years,<sup>4,5</sup> it is associated with a wide range of subsequent adverse health and social outcomes.<sup>6,7</sup> These associations remain after adjusting for pre-existing social, economic, and health problems.<sup>8</sup> Despite the establishment of a national teenage pregnancy strategy in 1999,<sup>9</sup> teenage birth rates in the UK are the highest in western Europe<sup>10</sup> and conceptions among girls under 16 years of age in England and Wales have increased since 2006.<sup>11</sup>

Recent research evidence shows that traditional approaches to reducing teenage pregnancy rates—such as sex education and better sexual health services—are not effective on their own.<sup>12,13</sup> This evidence has generated increased interest in the effects of interventions that target the social disadvantage associated with early pregnancy and parenthood.<sup>14-19</sup> Social disadvantage refers to a range of social and economic difficulties an individual can face—such as unemployment, poverty, and discrimination—and is distributed unequally on the basis of sociodemographic characteristics such as ethnicity, socioeconomic position, educational level, and place of residence.<sup>20,21</sup>

The objectives of this study were to determine on the basis of evidence in qualitative and quantitative research the impact on teenage conceptions of interventions that address the social disadvantage associated with early parenthood and to assess the appropriateness of such interventions for young people in the UK.

## METHODS

We undertook a three part systematic review of the research evidence on social disadvantage and pregnancy in young people by using an innovative method we developed previously for integrating qualitative and quantitative research.<sup>22,23</sup> The first part of the review

focused on quantitative controlled trials and was designed to assess the impact on teenage conceptions of interventions that address the social determinants of teenage pregnancy. The second part focused on qualitative research and examined intervention need and appropriateness on the basis of the perspectives and experiences of young people. In the third part of the review, we integrated the two sets of findings to assess the extent to which existing evaluated interventions do in fact address the social disadvantage associated with early pregnancy and parenthood as determined by the needs and concerns of young people.

The inclusion of qualitative research in systematic reviews facilitates the incorporation of “real life” experiences into evidence based policy making.<sup>24</sup> An ability to unpack the worldview of participants at a particular time and location has been highlighted as a key strength of qualitative research.<sup>25,26</sup> Although we included trials conducted in any country, we drew only on qualitative studies conducted in the UK to help assess the applicability of interventions to reduce teenage pregnancy within this country in particular.

#### Search strategy

Our literature searches covered seven major databases and five specialist registers (table 1). Highly sensitive topic based search strategies were designed for each database. We did not use study type search filters and identified controlled trials and qualitative studies using the same strategy.

We included randomised and non-randomised controlled trials that evaluated interventions designed to target social disadvantage and that reported teenage conceptions or births as an outcome measure. The inclusion of trials was not restricted according to language, publication date, or country. We included any qualitative study published between 1994 and 2004 that focused on teenage pregnancy and social disadvantage among young people aged less than 20 years old living in the UK.

Relevant interventions were those that aimed to improve young people’s life opportunities and financial circumstances; for example, through educational or income support. Relevant interventions could be targeted at children, young people, or their families. Controlled trials of sex education or sexual health services and qualitative studies focusing solely on attitudes to and knowledge of sexual health or sex education were excluded.

We hand searched *American Journal of Public Health* (from January 1999 to January 2004), *Journal of Adolescent Health* (from January 1999 to February 2004), *Journal of Adolescence* (from February 1999 to April 2004), and *Perspectives on Sexual and Reproductive Health* (from issue 1, 1999, to issue 1, 2004). We also reviewed the reference lists of all studies that met our inclusion criteria and contacted experts in the field who suggested further studies to pursue.

#### Quality assessment

We assessed the extent to which controlled trials had minimised bias and error in their findings by using a set of criteria developed in previous health promotion reviews.<sup>27-29</sup> “Sound” trials were those that reported data on each outcome measure indicated in the study aims; used a control or comparison group equivalent to the intervention group on relevant sociodemographic measures (or, in cases with non-equivalent groups, adjusted for differences in the analysis); provided pre-intervention data for all individuals in each group; and provided post-intervention data for all individuals in each group.

The criteria we used to assess the methodological quality of the qualitative studies were built on those suggested in the literature on qualitative research.<sup>26,30-33</sup> Each study was assessed according to 12 criteria designed to aid judgment on the extent to which study findings were an accurate representation of young people’s perspectives and experiences (box). A final assessment sorted studies into one of three categories on the basis of quality: high quality (those meeting 10 or more criteria), medium quality (those meeting between seven and nine criteria), and low quality (those meeting fewer than seven criteria).

#### Data extraction

We used a standardised tool to extract from “sound” controlled trials information on the development and content of the intervention evaluated, the population involved, and the trial design and methods.<sup>34</sup> Data to calculate effect sizes for pregnancy and birth rates were identified from study reports and via contact with study authors if data were incomplete or not in an appropriate form.

Data on the development, design, methods, and the populations involved were extracted from the qualitative studies in a standardised way by using an established tool designed for a broad range of study types.<sup>35</sup> The findings of the qualitative studies were identified within the “findings” or “results” sections of study reports and exported verbatim into NVivo

**Table 1** Major databases and specialist registers searched

	Time period of search	Date searched
<b>Major commercial databases</b>		
PubMed (includes Medline and old Medline)	January 1950-June 2004	June 2004
Embase	January 1981-June 2004	June 2004
Cumulative Index to Nursing and Allied Health Literature (CINAHL)	January 1982-May 2004	May 2004
Education Resources Information Center (ERIC)	January 1985-April 2004	April 2004
Sociological Abstracts (SocAbs)	January 1981-May 2004	May 2004
Applied Social Sciences Index and Abstracts (ASSIA)	January 1987-May 2004	May 2004
PsycINFO	January 1988-May 2004	May 2004
<b>Specialist registers</b>		
Evidence for Policy and Practice Information Centre Register of Health Promotion and Public Health Research (BiblioMap)	All years available	April 2004
Cochrane Central Register of Controlled Trials (CENTRAL)	All years available	May 2004
National Research Register (NRR)	All years available	March 2004
Health Promotion Library for Scotland (HPLS)	All years available	March 2004
Health Development Agency Register (Health Promis)	All years available	April 2004
All sources searched were used to identify both quantitative and qualitative studies.		

### Criteria used to assess the quality of qualitative studies

#### Quality of reporting

- Were the aims and objectives clearly reported?
- Was there an adequate description of the context in which the research was carried out?
- Was there an adequate description of the sample and the methods by which the sample was identified and recruited?
- Was there an adequate description of the methods used to collect data?
- Was there an adequate description of the methods used to analyse data?

#### Use of strategies to increase reliability and validity

- Were there attempts to establish the reliability of the data collection tools (for example, by use of interview topic guides)?
- Were there attempts to establish the validity of the data collection tools (for example, with pilot interviews)?
- Were there attempts to establish the reliability of the data analysis methods (for example, by use of independent coders)?
- Were there attempts to establish the validity of data analysis methods (for example, by searching for negative cases)?

#### Extent to which study findings reflected young people's perspectives and experiences

- Did the study use appropriate data collection methods for helping young people to express their views?
- Did the study use appropriate methods for ensuring the data analysis was grounded in the views of young people?
- Did the study actively involve young people in its design and conduct?

(version 2; QSR, Victoria, Australia), a qualitative data analysis software package.

#### Data synthesis

The data synthesis was conducted in three stages according to the model described by Thomas and colleagues.<sup>22</sup> Firstly, we used statistical meta-analysis techniques to assess the effectiveness of the interventions in the controlled trials. Chi square statistical tests were used to test for heterogeneity (“Q statistic”) between controlled trials; when there was no significant heterogeneity, we combined effect sizes in a random effects statistical meta-analysis using Evidence for Policy and Practice Information Centre reviewer software.<sup>36</sup> Relative risk (RR) was used to calculate both individual study and combined effect sizes. Our procedures for meta-analysis followed standard practice in the field<sup>37-39</sup> and were similar to those used in previous reviews by the Evidence for Policy and Practice Information Centre.<sup>29,40</sup>

Secondly, we conducted a thematic synthesis of the findings from the qualitative studies,<sup>41,42</sup> following established principles developed for the analysis of qualitative data.<sup>25,43,44</sup> Study findings were coded line by line to characterise the content of each line or sentence (for example, “frustration with rules and regulations at school,” “expectations for the future”). Codes were compared and contrasted, refined, and grouped into higher order themes (for example, “dislike of school”). The review team then drew out the implications for appropriate interventions suggested by each theme.

Thirdly, we constructed a methodological and conceptual matrix to integrate the findings of the two syntheses. The potential implications of young people’s views for interventions to prevent teenage pregnancy were laid out alongside the content and findings of the soundly evaluated interventions.

Screening of full reports against inclusion criteria, quality assessment, data extraction, and data synthesis were all carried out by pairs of reviewers working independently at first and then together. Initial screening of titles and abstracts was done by single reviewers after a period of double screening to ensure consistency across reviewers.

## RESULTS

### Study characteristics and quality

Ten controlled trials<sup>w1-w10</sup> and five qualitative studies<sup>w11-w15</sup> met our inclusion criteria. Six controlled trials were judged to be of sufficient methodological quality to provide reliable evidence about the impact of interventions on teenage pregnancy rates.<sup>w1-w3 w6 w7 w9</sup> All these trials were conducted in the US and targeted disadvantaged groups of children and young people (tables 2 and 3).

Each of the methodologically sound controlled trials evaluated one of two intervention types: (a) an early childhood intervention, or (b) a youth development programme. Three studies evaluated early childhood interventions that aimed to promote cognitive and social development through preschool education, parent training, and social skills training.<sup>w2 w3 w7</sup> Two of these studies—the Perry Preschool Program<sup>w2</sup> and the Abecedarian Project<sup>w3</sup>—evaluated the long term effects of preschool education and parenting support interventions; the third—the Seattle Social Development Project—evaluated the long term effects of a school based social skills development intervention for children and their parents.<sup>w7</sup>

A further three studies evaluated youth development programmes that aimed to promote self esteem, positive aspirations, and a sense of purpose through vocational, educational, volunteering, and life skills work.<sup>w1 w6 w10</sup> Two of these studies—Teen Outreach<sup>w1</sup> and the Quantum Opportunities Program<sup>w6</sup>—evaluated after school programmes based on the principle of “serve and learn,” in which community service is combined with student learning and educational support; the third—the Children’s Aid Society Carrera-Model Program—evaluated a comprehensive academic and social development intervention delivered in youth centres, which included work experience, careers advice, academic support, sex education, arts workshops, sports, and other activities.<sup>w10</sup>

In each trial, the control group received no intervention or standard education. The four controlled trials that were deemed not to be of sufficient quality also evaluated youth development programmes in the US.<sup>w4 w5 w8 w9</sup> All five qualitative studies were judged to be of medium or high quality.<sup>w11-w15</sup> These studies included participants from a range of areas throughout the UK and used individual interviews, focus groups,

Table 2 | Characteristics of the six “sound” trials

Authors	Country	Study design	Sample size	Sample characteristics			
				Gender	Age range	Socioeconomic position	Ethnicity
Allen et al, 1997 <sup>w1</sup>	USA	Randomised, controlled trial	I=342; C=353	Male=15%; Female=85%	14-15 years	Authors describe sample as “high risk,” with 54% living in one parent households and 46% living in two parent households	Authors report “black”=67%; “white”=19%; “Hispanic”=11%; “other”=3%
Berrueta-Clement et al, 1984 <sup>w2</sup>	USA	Randomised, controlled trial	I=58; C=65	Male=60%; Female=40%	3-4 years	Authors describe sample as children from families of low socioeconomic status	Authors report sample to be 100% “black”
Campbell et al, 2002 <sup>w3</sup>	USA	Randomised, controlled trial	I=53; C=51	Male=49%; Female=51%	0-4 years	Authors state sample was “high risk” from “impoverished households”	Authors describe sample as all “African-American”
Hahn et al, 1994 <sup>w6</sup>	USA	Randomised, controlled trial	I=125; C=125	Male=47%; Female=53%	14-17 years	Authors describe sample as recruited from list of families receiving public assistance	Authors report “white”=15%; “black”=76%; “Hispanic”=7%; “Asian”=1%; “other”=2%
Hawkins et al, 1999 <sup>w7</sup>	USA	Controlled trial*	I (full)=156; I (late)=267; C=220	Male=50%; Female=50% (approx)	6-12 years	Authors note that more than 56% participated in National School Lunch/Breakfast program	Authors report “white”=44%; “African-American”=26%; “Asian-American”=24%; “native American”=5%; “other”=3%.
Philliber et al, 2001 <sup>w10</sup>	USA	Randomised, controlled trial	I=589; C=574	Male=45%; Female=55%	13-15 years	Authors report almost half of young people come from families with at least one unemployed adult	Authors report “African-American”=43%; “Caribbean-black”=3%; “Hispanic”=29%; “white”=5%; “Asian”=4%; “multiethnic”=14%; “other”=2%

\*This study began as a randomised, controlled trial: students within eight schools were randomised into intervention or control groups, and those in the intervention group received the programme for four years. At the end of four years, children in both the intervention and the control group received the programme for two years. Additional schools matched to the original eight schools were recruited into the study. Children in these schools formed a new control group.

and self completion questionnaires to collect data (table 4). Four studies focused on, or included, the views of young parents,<sup>w11 w12 w14 w15</sup> but only two of these studies included the views of young fathers as well as young mothers.<sup>w14 w15</sup>

Quantitative studies of the effects of interventions on teenage pregnancy rates

Of the six controlled trials deemed to be of sufficient methodological quality, four measured pregnancy rates reported by young women,<sup>w1 w2 w7 w10</sup> three measured partner pregnancy rates reported by young men,<sup>w1 w7 w10</sup> and two measured birth rates reported by young men and young women separately<sup>w3</sup> or

together.<sup>w6</sup> The four controlled trials measuring pregnancy rates reported by young women or young men<sup>w1 w2 w7 w10</sup> were included in two random effects meta-analyses: one that assessed the effects of interventions on teenage pregnancies reported by young women and a second that measured the effects of interventions on teenage pregnancies reported by young men. The findings of the two controlled trials that measured birth rates<sup>w3 w6</sup> were not subject to meta-analysis, but their findings are summarised after each meta-analysis. Tests revealed no statistical heterogeneity between the studies, suggesting that it would be appropriate to pool the effect sizes. However, effect sizes for youth development interventions and early childhood

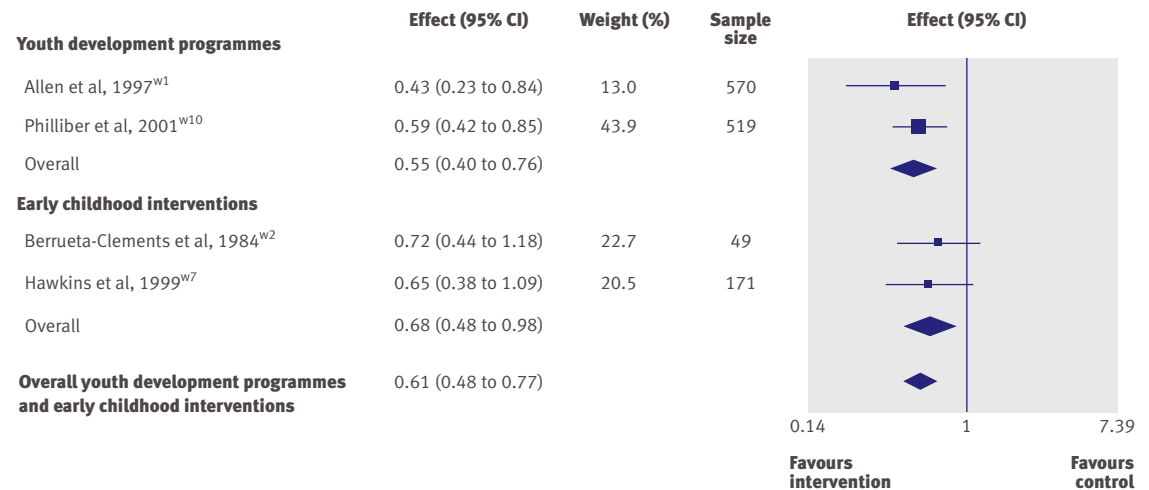


Fig 1 | Forest plot showing the effect of youth development programmes and early childhood interventions on pregnancy rates reported by young women

Table 3 | Characteristics of the interventions in the six “sound” trials

Authors	Intervention name	Intervention type	Intervention objectives	Setting	Provider	Length	Protocol	
							Intervention group	Control group
Allen et al, 1997 <sup>w1</sup>	Teen Outreach	Youth development programme	To prevent teenage pregnancy and promote academic achievement among “high risk” young people	School and community	Teachers and adult volunteers	One year	Young people undertook nearly 50 hours of voluntary service in their local communities, reflected on their experiences in discussion groups, and attended social development classes.	Young people in the control group received no intervention.
Berrueta-Clement et al, 1984 <sup>w2</sup>	The Perry Preschool Program	Early childhood intervention	To improve the intellectual and social development of children from socially disadvantaged families	School and home	Teachers	Two years	Children received two and a half hours of preschool education five days a week during term time. Teachers made home visits one afternoon per fortnight.	Children in the control group received no intervention.
Campbell et al, 2002 <sup>w3</sup>	The Abecedarian Project	Early childhood intervention	To enhance cognitive skills and “adaptive” behaviour in early childhood among children in “impoverished households”	School and home	Teachers	Eight years	Children aged 0 to 4 years received full time day care that aimed to develop cognitive and language skills and adaptive behaviour. On entering school, children were assigned a home school resource teacher for three years to encourage parental involvement in learning.	Children in the control group did not receive any educational intervention but they did receive nutritional supplements for the first 15 months of life.
Hahn et al, 1994 <sup>w6</sup>	The Quantum Opportunities Program	Youth development programme	To improve academic achievement and social skills among young people from families receiving public assistance	Community	Staff from local Opportunities Industrial Centres (OIC)	Four years	Young people took part in community improvement activities, educational activities (for example, tutoring), and developmental activities (for example, health education and career and college planning). Financial incentives were provided for participation.	Young people in the control group received no intervention.
Hawkins et al, 1999 <sup>w7</sup>	The Seattle Social Development Project	Early childhood intervention	To increase school bonding and academic success, reduce physically aggressive behaviour, improve family behaviour management practices, and reduce poor health and other outcomes among children in schools serving high crime areas	School	Teachers	Six years	Teachers were trained in classroom instruction and management and delivered a cognitive and social skills training curriculum. Parents were offered parent training classes to develop skills in child behaviour management, supporting their children to succeed at school, and reducing their children’s risks for using drugs.	Children in the control group received no intervention.
Philliber et al, 2001 <sup>w10</sup>	The Children’s Aid Society Carrera-Model Program	Youth development programme	To reduce pregnancies amongst socially disadvantaged teenagers	Community	Community workers	Two to three years	Young people were offered academic support; health, sport, and art workshops; and participation in a “job club,” which included work experience and careers advice.	Young people in the control group received no intervention.

education interventions were pooled separately in recognition of the differences between these two types of intervention.

The pooled effect size from the first meta-analysis showed that early childhood interventions and youth development programmes reduced teenage pregnancy rates among young women (RR 0.61, 95% CI 0.48 to 0.77; fig 1). The effect of an early childhood intervention on birth rates reported by young women was similar in the study by Campbell and colleagues<sup>w3</sup> (0.56, 0.42 to 0.75).

The effect of these interventions on pregnancies reported by young men is less clear (fig 2). The pooled effect size from the second meta-analysis showed that young men who had received an early childhood or youth development intervention reported fewer partner pregnancies than those who had not, but this result was not statistically significant (RR 0.59, 95% CI 0.34 to 1.02).

Hahn and colleagues<sup>w6</sup> evaluated a youth development programme and measured birth rates reported

by both young women and young men. The intervention reduced the birth rate by 36%, although this result was of borderline statistical significance (RR 0.64, 95% CI 0.40 to 1.03).

#### Qualitative studies of the views and experiences of young people

Three major themes relating to teenage pregnancy emerged from the findings of the five qualitative studies: dislike of school; poor material circumstances and unhappy childhood; and low expectations and aspirations for the future (fig 3).

Dislike of school was a key aspect of young parents’ accounts of their lives before becoming parents and of young people identified as “at risk” of becoming teenage parents (for example, “Still be at school? I’d rather have a baby than that. I just didn’t like school, it was hard, it was horrible”<sup>w14</sup>). The reasons young people gave for disliking school varied (fig 3). Some related to the subject matter taught in school, which was seen as boring or irrelevant, especially for young women

who had difficult or unhappy home lives and caring responsibilities (for example, “what on earth is this going to do for me?”<sup>w15</sup>). Other reasons related to insufficient or inappropriate support when falling behind with school work or experiencing bullying by teachers and peers (for example, “I got bullied so I just stopped going”<sup>w12</sup>). Some young people were frustrated with the inflexibility of “institutional life,” with all its rules and regulations (for example, “You can’t sit with your friends, which I found the best way of learning”<sup>w11</sup>).

Young parents reported unhappiness, rather than poverty in itself, as the most significant aspect of their childhood experiences that related to becoming a parent, although unhappiness went hand in hand with adversity and material disadvantage in their accounts. Common experiences included family conflict and breakdown, sometimes caused by violence, which could lead to living in care (fig 3). Young fathers

reported violent fathers and a lack of suitable role models. Young parents noted how they had to “grow up faster” in order to survive, and also reported a lack of confidence, low self esteem, and high anxiety levels.<sup>w11</sup> Some young women saw having a baby at an early age as a way to change their circumstances and ameliorate the effects of adversity. It is important to note, however, that not all the teenage mothers who participated in these studies had grown up unhappy or experienced personal adversity. Regardless of circumstances, some women had wanted to have a baby when they were young and looked forward to still being young when their children were older.

There were differences in the expectations and aspirations of young people who had, or wanted to have, a baby early in life and young people who had or wanted to have a baby later in life. For example, mothers who had children when they were teenagers

**Table 4** | Characteristics of the four high and medium quality qualitative studies

Study	Aims	Methods	Study location	Sample size	Sample characteristics			
					Gender	Age range	Socioeconomic status	Ethnicity
Arai, 2004 <sup>w11</sup>	To explore the factors present at neighbourhood, family, peer group, and individual levels that influence teenage reproductive behaviour	Cross sectional study using semi-structured interviews with teenage mothers	England (inner London, Greater Manchester, and Northumberland)	15	All female	Not stated	Author presents detail on family background (7 women from two parent families, 5 from one parent families, 3 from the “looked after children” system); marital status (1 married, 14 not married); and housing status (2 women living hostels)	Authors report “white”=13; “black mixed”=1; “Asian”=1
Burnett, 2003 <sup>w12</sup>	To examine young women’s experiences of pregnancy and parenthood, and subsequent experiences of professionals and agencies in Suffolk	Cross sectional study using semi-structured interviews and focus groups to collect data	Suffolk, England	17	All female	15-27 years	Not stated	Not stated
Hooke et al, 2000 <sup>w13</sup>	To explore gender differences in Scottish teenagers’ views about sexual relationships and consequences of teenage pregnancy	Cross sectional study using a self completion questionnaire with ten open ended questions	Ayrshire, Scotland	126	Mixed (50% male, 50% female)	14-15 years	Not stated	Not stated
Hughes et al, 1999 <sup>w14</sup>	To explore the factors that influence young people’s sexual behaviour and their attitudes towards pregnancy and parenthood	Cross sectional survey using discussion groups and semi-structured interviews to collect data	England (London, Birmingham and north-east England)	Not clearly stated (approx. 60)	Mixed (six of the nine discussion groups were female only and three were male only. Six women were interviewed and four men)	15-25 years	Authors describe sample as including teenage mothers and fathers, looked-after young people, the homeless, those excluded from school and young offenders	Not stated
Wiggins et al, 2005 <sup>w15</sup>	To explore the link between teenage parenthood and social exclusion	Part 1 was a prospective study comparing teenage and non-teenage mothers. Part 2 was a cross sectional study using semi-structured interviews with women who were pregnant while teenagers, teenage fathers, and the children of teenage mothers	England, (Derby, Reading, Tunbridge Wells, Stoke, Reading, and inner London)	1262	Mixed (13 teenage fathers interviewed)	16-50 years	Of the teenage mothers, 2/3 lived in social housing, 1/4 were a single parents, 1/4 were in paid employment, and 1/3 had no educational qualification; 12 of the 13 teenage fathers were “working class”; 17 of the 19 children of teenage parents were “working class”	“White British”=approx 70%; eight other ethnic groups recorded

**Table 5** | Comparison of themes arising from studies of young people's views with interventions assessed in "sound" trials

Themes and potential measures to address them	Coverage in "sound" trials
<b>Dislike of school</b>	
Involve young people in decision making about the curriculum; rules and regulations; and design and layout of the school, and other aspects of school culture	None identified
Support young people starting at new schools	None identified
Equip young people with the skills to form positive relationships with other young people	Allen et al, 1997 <sup>w1</sup> ; Hawkins et al, 1999 <sup>w7</sup>
Equip young people with the skills to resolve conflicts	Hawkins et al, 1999 <sup>w7</sup>
Introduce anti-bullying strategies	None identified
Introduce training for secondary school teachers to provide emotional support for young people	None identified
Introduce learning support interventions	Hahn et al, 1994 <sup>w6</sup> ; Philliber et al, 2001 <sup>w10</sup>
Increase parental involvement during secondary school	Hawkins et al, 1999 <sup>w7</sup>
<b>Low expectations for the future</b>	
Improve work experience opportunities	Allen et al, 1997 <sup>w1</sup> ; Hahn et al, 1994 <sup>w6</sup> ; Philliber et al, 2001 <sup>w10</sup>
Protect young people against bad experiences of work (for example, by introducing minimum wage, better regulation, and legislation)	None identified
Actively involve young people in careers development	Allen et al, 1997 <sup>w1</sup> ; Hahn et al, 1994 <sup>w6</sup> ; Philliber et al, 2001 <sup>w10</sup>
Provide activities out of school to improve self esteem and positive outlook	Hahn et al, 1994 <sup>w6</sup> ; Philliber et al, 2001 <sup>w10</sup>
Create more employment opportunities in disadvantaged communities	None identified
Raise awareness of training, employment, and careers opportunities	Allen et al, 1997 <sup>w1</sup> ; Hahn et al, 1994 <sup>w6</sup> ; Philliber et al, 2001 <sup>w10</sup>
<b>Unhappy childhood and poor material circumstances</b>	
Introduce interventions to prevent domestic violence	None identified
Support children and young people experiencing family breakdown and conflict (for example, with counselling services)	Allen et al, 1997 <sup>w1</sup> ; Hahn et al, 1994 <sup>w6</sup> ; Philliber et al, 2001 <sup>w10</sup>
Train parents in conflict resolution	Hawkins et al, 1999 <sup>w7</sup>
Improve the continuity and quality of care for children and young people in the care of the social services	None identified
Introduce housing interventions (for example, by investing in new housing and housing repairs)	None identified

wanted to leave school as soon as possible and get a job. In contrast, those who became pregnant later in life expected to go to university and travel. Both young mothers and young fathers believed that few opportunities were open to them apart from poorly paid,

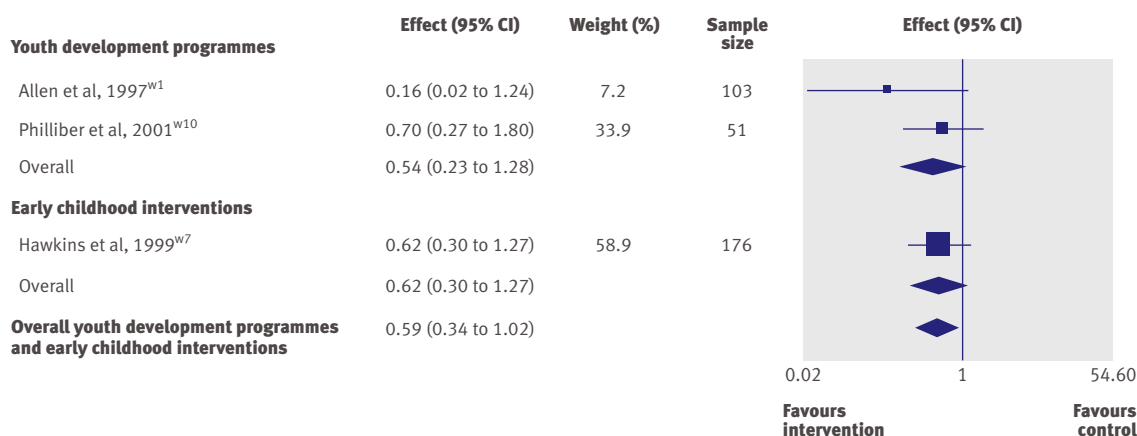
temporary work in jobs that they disliked (for example, "There are so many jobs out there that I didn't even know existed . . . I probably could have done something but I just didn't even think of these high paid jobs I could have done"<sup>w14</sup>). Young mothers described how having a baby was a more attractive option than entering the workforce, further education, or training. Young men's lack of ambition was compounded by the low expectations their parents and peers held for them. Young people who wanted children later in life had long term plans and a more positive outlook for the future, and they described how participating in out of school activities such as sports, music, and arts improved their self esteem and motivation.

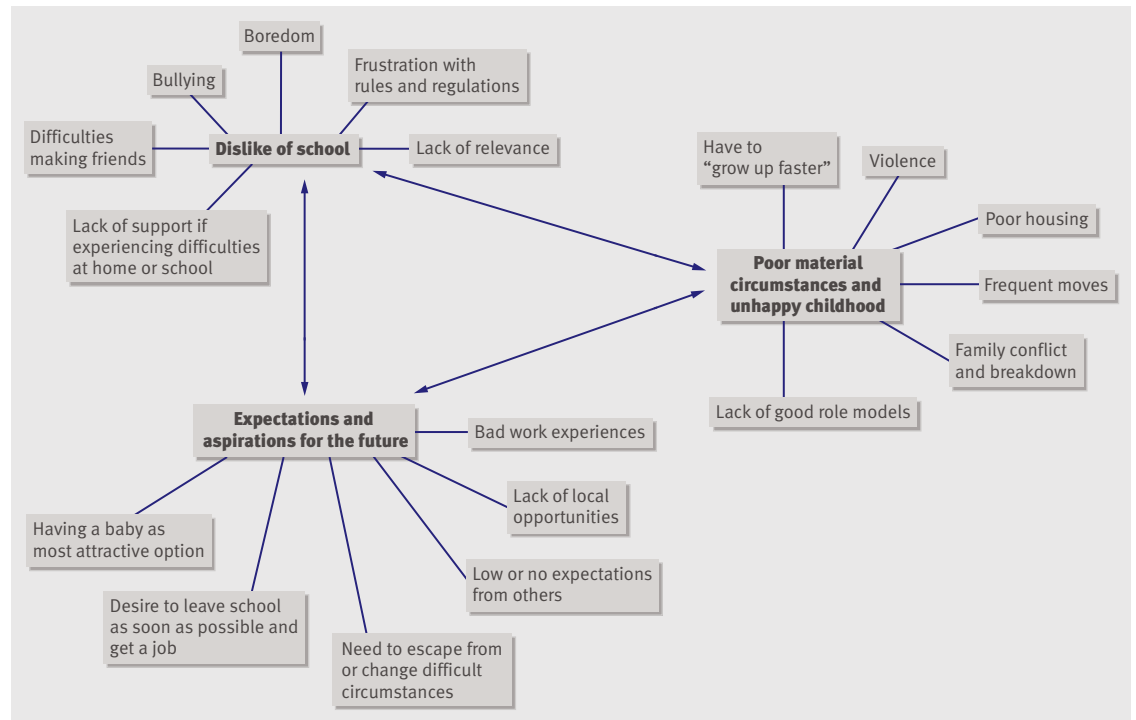
#### Do current interventions address the needs and concerns reported by young people?

The themes in our synthesis of qualitative studies suggest areas that should be addressed in preventive interventions, but measures to target these areas have not all been soundly evaluated for their effect on teenage pregnancy rates (table 5).

Youth development programmes and early childhood interventions both go some way to addressing young people's dislike of school. Two of the three youth development programmes in the controlled trials we reviewed included components designed to promote young people's academic achievement, such as tutoring and homework assistance,<sup>w6 w10</sup> whereas the third aimed to improve young people's interpersonal skills so they could develop good relationships with their peers and others.<sup>w1</sup> One early childhood intervention both taught children conflict resolution skills and trained parents to create a home environment supportive of learning.<sup>w7</sup> We did not find any research that had tested the impact on teenage pregnancy rates of interventions designed to change the school culture and environment, such as antibullying strategies, teacher training, or involving young people in making decisions about what happens in the school.

All the youth development programmes aimed to prevent teenage pregnancy by broadening young

**Fig 2** | Forest plot showing the effect of youth development programmes and early childhood interventions on pregnancy rates reported by young men



**Fig 3 |** Thematic analysis of young people's views on the role of education; training; employment and careers; and financial circumstances in teenage pregnancy

people's expectations and aspirations for the future. These programmes offered young people work experience in their local communities, careers advice, group work to stimulate active reflection, and discussion of future careers and employment opportunities. Two of the three soundly evaluated youth development programmes also provided out of school sports or arts activities.<sup>w6 w10</sup>

## DISCUSSION

### Summary of principal findings

This review sought to improve our understanding of the link between social disadvantage and teenage pregnancy by integrating evidence from qualitative studies and quantitative trials.

The evidence from the six controlled trials we looked at showed that early childhood interventions and youth development programmes can significantly lower teenage pregnancy rates. Both types of intervention target the social determinants of early parenthood but are very different in content and timing. Preschool education and support appear to exert a long term positive influence on the risk of teenage pregnancy, as well as on other outcomes associated with social and economic disadvantage such as unemployment and criminal behaviour.<sup>45</sup> Programmes of social support, educational support, and skills training delivered to young people have a much more immediate impact.

Our review of five qualitative studies of young people in the UK indicated that happiness, enjoying school, and positive expectations for the future can all help to delay early parenthood. Young people who

have grown up unhappy, in poor material circumstances, do not enjoy school, and are despondent about their future may be more likely to take risks when having sex or to choose to have a baby.

The findings of our review are especially important in the light of evidence that sex education and sexual health services are not on their own effective strategies for encouraging teenagers to defer parenthood<sup>12</sup>; they need to be complemented by early childhood and youth development interventions that tackle social disadvantage.<sup>13 18 46</sup> Early childhood interventions and youth development programmes provide enhanced educational and social support in the early years of life and engage young people in developing career aspirations, respectively, thus addressing some of the key themes identified within our qualitative synthesis. However, important gaps exist in the evidence on how effectively current interventions address these themes (table 5). Structural and systemic issues such as housing, employment opportunities, community networks, bullying, and domestic violence were all important issues in young people's accounts, but these factors have yet to be addressed in appropriate interventions and evaluated as wider determinants of teenage pregnancy.

### Comparison with other studies

Our review adds to a growing body of research identifying factors that may explain the association between social disadvantage and teenage pregnancy. Dislike of school, an unhappy childhood, and a lack of opportunities for jobs and education have all emerged as explanatory factors in large scale national and international



**WHAT IS ALREADY KNOWN ON THIS TOPIC**

Evidence suggests that sex education and better sexual health services do not reduce teenage pregnancy rates

A number of controlled trials have tested the effects of interventions that target the social disadvantage associated with early pregnancy and parenthood, and a number of qualitative studies have considered young people's views of the factors associated with teenage pregnancy

No systematic review has brought these quantitative trials and qualitative studies together to determine intervention effectiveness and appropriateness

**WHAT THIS STUDY ADDS**

Early childhood interventions and youth development programmes that combine individual level and structural level measures to tackle social disadvantage can lower teenage pregnancy rates

Such interventions are likely to be appropriate for children and young people in the UK because they improve enjoyment of school, raise expectations and ambitions for the future, and ameliorate the effect of an unhappy childhood in poor material circumstances

A policy move to invest in interventions that target social disadvantage should complement rather than replace high quality sex education and contraceptive services

epidemiological analyses.<sup>39 17 18 47-49</sup> Dislike of school appears to have an independent effect on the risk of teenage pregnancy.<sup>49</sup> Our analysis of qualitative research provides additional insight into how factors that increase the risk of teenage pregnancy may operate. For example, a dislike of school was frequently the result of bullying, frustration with rules and regulations, lack of curriculum relevance, boredom, and inadequate support.

As well as developing and testing interventions to modify these antecedents, future research on teenage pregnancy and social disadvantage needs to consider strategies that counter the stigmatisation and discrimination faced by young parents. Some of the social exclusion experienced by young parents is the result of negative societal reaction. However, there is evidence to suggest that teenage parenting can under certain circumstances be a route to social inclusion rather than exclusion.<sup>50</sup>

Like many other systematic reviews in health promotion and public health, we found few trials conducted in the UK.<sup>27 29 40</sup> This raises questions about the generalisability of the trial evidence. Our inclusion of qualitative evidence permitted us to examine the appropriateness of interventions evaluated in US trials from the perspective of young people in the UK. The appropriateness of interventions is an important aspect of generalisability to consider.<sup>51</sup> Our inclusion of qualitative evidence does not, however, replace the need for further trials in the UK and elsewhere to address the impact of interventions designed to ameliorate the wider determinants of teenage pregnancy.

A recent study carried out in England evaluated the effects of the Young People's Development Programme—an intensive, multicomponent youth development intervention based on the Children's Aid Society Carrera Model Program.<sup>w1052</sup> In contrast to the findings of this review, the quasi-experimental study found that young women in the intervention group were more

likely to report pregnancy than those in the comparison group. This finding may be the result of the potentially stigmatising effect of targeting and labelling young people as “high risk” or of introducing participants to other “high risk” young people in alternative educational settings. In comparison with the Young People's Development Programme, the youth development programmes evaluated by the controlled trials in our review used after school programmes or interventions delivered in community settings rather than the approach of keeping young people out of mainstream schools and working with them in alternative educational settings. This difference in approach may explain the difference in the findings of the two studies and highlights the need to evaluate a revised youth development programme in the UK.

**Strengths and limitations of the study**

The strengths of our review include the comprehensiveness of our searches, the exclusion of methodologically weak studies, the rigorous synthesis methods used, and the inclusion of qualitative research alongside controlled trials to establish not only “what works” but also appropriate and promising intervention strategies on the basis of young people's views on the factors associated with teenage pregnancy. Including only studies that evaluated interventions relative to control conditions over the same period of time avoids missing temporal differences between groups. Such changes include the relaxing of abortion laws and the increasing acceptability of abortion over time, which may affect self reported pregnancy rates.

The small numbers of studies we found are a limitation of the available body of research, as is the dominance of controlled trials conducted in the US (although this is a common feature of many health promotion and public health reviews). Our search strategies would have under-represented non-English language studies. As with any systematic review, we cannot be certain that we identified all relevant studies; in particular we may not have identified all unpublished studies, which are more likely to report negative findings than are published studies. We are only aware of one relevant study published since the searches for this review were carried out: the evaluation of the Young People's Development Programme.<sup>52</sup> Whether this study would meet the quality criteria for our review is unclear, but it should be considered in any update.

**Conclusion and policy implications**

This review provides a small but reliable evidence base that early childhood interventions and youth development programmes are effective and appropriate strategies for reducing unintended teenage pregnancy rates. Our findings on the effects of early childhood interventions highlight the importance of investing in early care and support in order to reduce the socioeconomic disadvantage associated with teenage pregnancy later in life.<sup>53</sup> Both the early childhood interventions and the youth development programmes combined structural

level and individual levels components, which is in line with many current recommendations in health promotion and public health.<sup>54,55</sup> A policy move to invest in youth programmes should complement rather than replace high quality sex education and contraceptive services, and should aim to improve enjoyment of school, raise expectations and ambitions for the future, and provide young people with relevant social support and skills.

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