Review

Targeting sexual health services in primary care: A systematic review of the psychosocial correlates of adverse sexual health outcomes reported in probability surveys of women of reproductive age

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ARTICLE INFO

ABSTRACT

Background. Women using primary care vary in need for sexually transmitted infections (STIs) testing and contraception. Psychosocial correlates of these needs may be useful for targeting services. We undertook a systematic review to identify psychosocial correlates of STI acquisition, unplanned pregnancy (UP), abortion and risky sexual behaviours in general population samples of women of reproductive age.

Methods. We searched bibliographic databases for probability surveys of women aged 16–44 years in the European Union, USA, Canada, Australia, UK or New Zealand undertaken January 1994–January 2014.

Results. Eleven papers were included. Unplanned pregnancy was associated with smoking, depression, being single and sexual debut <16 years. Abortion was associated with lack of closeness to parents, leaving home at an early age, and relationship break-up. Multiple partnerships were associated with intensity of marijuana and alcohol use, and smoking. STI diagnosis was associated with relationship break-up and younger partners. Non-use of contraception was associated with smoking, obesity, relationship status, sedentary lifestyles, fatalistic pregnancy attitudes and lower alcohol use. Condom non-use was higher (at first sex) with partners 5 + years older and lower (at last sex) in less stable partnerships.

Conclusion. Psychosocial variables, particularly relationship status and smoking, may help identify women in primary care for STI testing and contraception advice and supply.

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Introduction

Widened availability of STI screening and Contraceptive Advice and Supply (CAS) in primary care settings (DH, 2001) means that individuals with varying levels of risk of poor sexual health outcomes can access these interventions. This creates a need to develop acceptable and efficient means of targeting. In specialist sexual health services recent sexual history is used to assess individual patient need. However, in non-specialised settings such as General Practice, this approach may be inefficient, and may also be unacceptable with some target groups (Define, 2008; Edelman et al., 2013). In addition, as CAS and STI testing are increasingly co-located in both specialist and generalist settings, a single means of targeting both interventions for women in particular would be beneficial.

A substantial evidence base exists for socio-demographic variation in unplanned pregnancy (UP), sexually transmitted infection (STI) acquisition, and sexual risk behaviours such as unprotected intercourse and multiple partners (Mercer et al., 2013). Younger age groups, certain ethnic minorities and people from lower socio-economic groups are known variously to experience disproportionate burden of STI diagnoses and of unplanned pregnancy (Mercer et al., 2013). England's National Chlamydia Screening Programme for young people (aged <25 years and sexually active) is an example of how interventions may be targeted to at-risk sub-populations which are defined on the basis of socio-demographic correlates (DH). Known socio-demographic variation in sexual risk and morbidity is part of a growing social epidemiological evidence base concerning the complex ways in which sexual behaviour, social determinants of health, sexual health outcomes and availability and uptake of interventions are inter-related (Johnson et al., 2006). For example, Wasserheit and Aral (1996) describe the transmission dynamics of infectious diseases and how all three determinants of the basic Reproductive Rate are themselves 'subject to influence by factors external to the system of STD dynamics, such as poverty, marginality, level of education and culture'.

In the broader context of sexual health research and management, identifying 'psychosocial' factors associated with sexual risk behaviours and morbidities–such as substance use, relationship qualities or mental health–maybe of value in identifying at-risk populations for targeted intervention. In addition, they have the potential to enrich our understanding of sexual morbidity and of variation in risk within high-risk populations which are defined socio-demographically or in relation to sexual behaviour (e.g. men who have sex with men). Finally, they may constitute 'wider determinants of sexual health', responses to which may prevent sexual morbidity—a point highlighted by England's Sexual Health Improvement Framework, 2013 (DH, 2013).

Here we present a systematic review, the purpose of which was to underpin the development of a clinical questionnaire tool for sexual risk assessment among women in primary care settings who are of reproductive age (16–44 years). A systematic review of relevant large probability surveys has the potential to uncover psychosocial factors associated with these outcomes in general populations of women, and so may be useful in identifying and meeting sexual health service need.
 Our research questions were:

1. In probability surveys of women aged 16–44 years which psychosocial variables are associated with: unplanned pregnancy, induced abortion, STI acquisition and/or sexual risk behaviour?

2. How do types and strengths of associations with these psychosocial variables differ across STI acquisition; sexual risk behaviours; and unplanned pregnancy and abortion?

3. What models and explanations are presented regarding the relationship between social, psychological and psychosocial variables and sexual health risk behaviours and/or adverse sexual health outcomes?

Methods

Definitions and concepts used in searching and selecting the literature

Sexual health outcomes

For the purposes of this review 'sexual risk behaviour' was treated as an outcome, as STI testing and CAS should be offered to those experiencing sexual risk behaviour. We searched for the key concept of 'sexual risk behaviour' using terms for multiple partnerships and/or unprotected intercourse; the latter comprising non-use and/or inconsistent use of condoms and/or of other contraception among those expressing pregnancy ambivalence or not wanting to become pregnant.

STI acquisition and unplanned pregnancy were also investigated as outcomes in this review. STIs were searched using umbrella terms such as 'sexually transmitted infection' and also by searching for the following specific infections: syphilis, gonorrhoea, Chlamydia, genital warts, genital herpes, trichomoniasis and HIV. Bacterial vaginosis, Hepatitis B and C were excluded as they are also frequently contracted by non-sexual contact. Unplanned pregnancy was searched alongside related terms such as 'unintended' and 'unwanted' and using the proxy of abortion/termination of pregnancy.

Psychosocial factors

The term 'psychosocial' is used with various meanings in social epidemiology, social psychology and related disciplines (Cassel, 1976; Martikainen et al., 2002; Wilkinson, 2006). Within social epidemiology, the term 'psychosocial' has been defined functionally—mapping out possible mechanistic pathways by which our environment impacts on our body through psychology, stress and behaviour. This definition of psychosocial is then fluid and widely encompassing of our experiences as humans and how they impact on health states. Investigation of such factors may shed light on the variation in risk seen with socio-demographically defined 'high-risk' populations for sexual health.

However, preliminary searching revealed that the term 'psychosocial' was rarely used in relevant sexual health studies. Therefore to ensure a comprehensive search of relevant literature we designed a strategy in consultation with an expert librarian, which focused on retrieving records for the outcomes described above, in the population of interest. Records were then reviewed using a working definition of 'psychosocial' as all factors which are not predominantly biological, attitudinal, sexual behavioural or socio-demographic. This definition is broadly congruent with social epidemiological definition of 'psychosocial' (Martikainen et al., 2002).

Eligibility criteria

Our epidemiological approach focused on psychosocial variables as 'exposures' and STIs, UP and sexual risk behaviours as 'outcomes'. Therefore studies which investigated psychosocial variables as consequences of those outcomes were excluded. E.g. experience of social support *following* STI diagnosis.

Inclusion and exclusion criteria were also chosen to reflect an intentional focus on findings which could be generalised to primary care populations of women on psychosocial factors which it would be acceptable to ask such populations about. Hence sexual and abuse factors are only presented which concern age at first intercourse and lifetime experience of partner violence. Data and publication were restricted to the 20 years preceding data searching, to provide a comprehensive overview of relevant data which coincides with a return to greater sexual risk-taking that followed the years immediately following the emergence of HIV (Johnson et al., 2001). A more detailed discussion of these exclusions is presented in the web appendix.

Papers were included if they met all of the following criteria:

1. Study conducted in UK, European Union, USA, Canada, Australia or New Zealand
2. Date of publication January 1994–January 2014
3. Data collection 1994 onwards
4. Papers which either exclusively reported on females or which provided sex-stratified analysis of a mixed-sex sample
5. Report of data on women aged within the age range 16–44 years
6. Report of multiple partnerships, unprotected sexual intercourse, unplanned/ unwanted/unintended pregnancy, induced abortion or STI acquisition.
7. Report of factors which fit the working definition of 'psychosocial' as described in the previous section
8. Cross-sectional surveys and/or baseline data from longitudinal observational studies of representative population samples

The following exclusions were applied:

1. Papers which present systematic or literature review only
2. Papers which report on convenience samples, or known high risk populations
3. Papers reporting on:
   - Randomised controlled trials or other intervention studies such as non-randomised trials
   - Case–control, case study, or longitudinal observational follow-up studies
   - Studies concerning new medical diagnostic techniques for STIs and pregnancy
   - Studies examining consequences, impact or sequelae of unplanned pregnancy or STI acquisition

Record retrieval

The following electronic bibliographic databases were searched: Cochrane; Medline; CINAHL (Ebsco host); PsycInfo (Ebsco host); Web of Science; Embase and ASSIA. As an example, the ASSIA search strategy is provided in full within the Web Appendix. Citations were also searched from all included papers and from four review papers identified using the primary search strategy.

Databases were searched using the key concepts 'sexual risk behaviour', 'sexual health outcomes', and 'gender'. In addition 'association' was searched as a key concept in record titles to focus retrieval on studies presenting factors associated with sexual risk behaviour or sexual health outcomes. For each concept a list of key terms were used to search for database-specific controlled language and for free-text searching. Identified records were then retained based on the presence of psychosocial variables defined as described above. This approach was designed to identify relevant literature which was not indexed as 'psychosocial'.

Records were exported from each database into a single reference manager file where duplicates across database searches were removed.

Study selection

Inclusion and exclusion criteria were applied at three stages in the systematic review process. First, paper titles were screened for eligibility. Then abstracts of remaining titles were screened, before screening of full-text for remaining records. To minimise the chances of relevant papers being excluded by title, records were screened by abstract where one of the following conditions were met:

1. The title referred to the outcomes of interest but did not specify the nature of factors investigated for their association with these outcomes
2. The title indicated report on health, behaviour or risk-taking which might be sexually related and which was investigated in relation to psychosocial factors where the author was aware of evidence for association with UP or STI acquisition—e.g. substance misuse, formative experiences, relationship quality, and mental health problems.

One paper was excluded after the corresponding author was contacted and confirmed that data were not collected within the study inclusion period.

Data collection and assessment of quality for full text papers

Data for all included papers was extracted into an Excel database which was also used to record quality assessment. An independent reviewer checked 10% of all title and abstract exclusions, inclusion and exclusion decisions for all full text papers, and all data extraction for included papers.

Quality was assessed in relation to: item validity; bias; clarity; the degree to which conclusions were substantiated by findings; generalisability of findings; report on stated research objectives in analysis and discussion; nature of statistical analyses and the quality of their report. In particular, papers were excluded where no significance testing of associations was reported. However, in recognition that p values will vary according to the sample size and statistical approach, associations were reported regardless of the accompanying p values; while a p value of 0.05 was taken to indicate that an association was statistically significant, in line with convention. This reflects the pragmatic purpose of the review in identifying psychosocial factors that warrant further investigation in later psychosocial tool development work.

Results

Overview of papers

The results of the screening process are given in Fig. 1. From an initial $n = 5427$ records, a total of eleven papers were included in the review. These comprised $n = 10$ cross-sectional survey papers and $n = 1$ longitudinal baseline study papers, conducted in Britain, France, the USA and Australia and spanning 1995–2012.

Among the 11 included papers one addressed lifetime partner numbers (Cavazos-Rehg et al., 2011), three addressed abortion (Taft and Watson, 2007; Coleman et al., 2009; Moreau et al., 2011), one addressed unplanned pregnancy (Wellings et al., 2013), two addressed STI diagnosis (Kraut-Becher and Aral, 2006; Moreau et al., 2011) and five addressed unprotected sexual intercourse. Among these latter five Mercer et al. (2009) investigated use of condoms at first sex with last partner, and Xaverius et al. (2009) and Kramer et al. (2007) investigated non-use of any contraception among those reporting they did not want to get pregnant. Two further papers – reporting on the same study – investigated non-use of any contraception in the last 12 months, 'gap in use and at risk' (defined as inconsistent use of any contraception and at least one episode of sexual intercourse), and inconsistent use separately of condoms or contraceptive pill in the last 3 months (Frost et al., 2007; Frost and Darroch, 2008). Further details of included studies are provided in Table 1.

Quality of papers

Most papers presented multivariate statistics or bivariate analyses with tests of difference. Moreau et al. (2011) and Wellings et al. (2013) each reported bivariate analyses, probably reflecting a lack of statistical power to conduct multivariate analyses due to small sample sizes—noted by Moreau et al. (2011). Small samples may affect the generalisability of findings, while bivariate analyses may represent spurious associations, which are explained by other variables not included in the analysis. There was a notable lack of frequency reporting, particularly in papers presenting multivariate analyses. This is important as
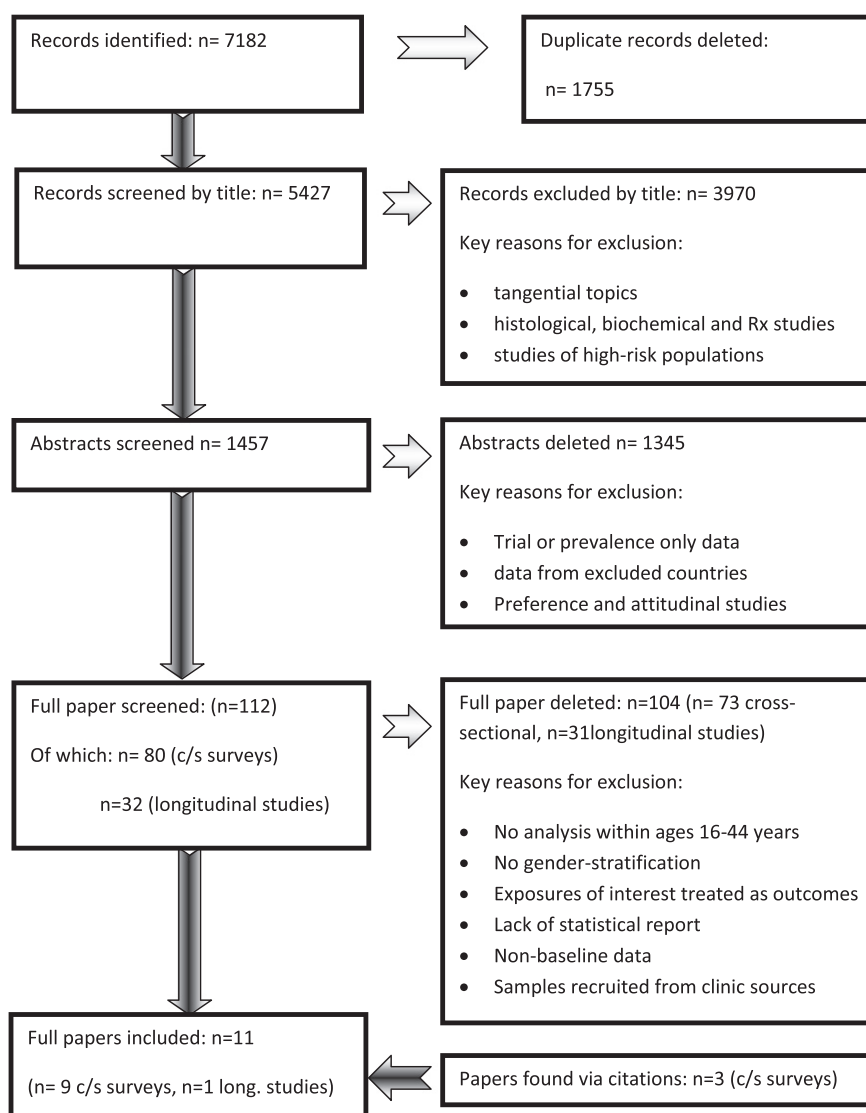
Fig. 1. Record screening and review process (includes reviews as deleted at abstract stage).

statistically significant associations may still lack utility for general populations of women where either the exposure or outcome of interest is comparatively rare. Similarly analyses were not presented for the extent of variance around a particular outcome predicted by the investigated psychosocial exposures.

Reported statistical analyses (see Tables 3–6) also showed poor attention to the risk of type 1 error arising from multiple tests of difference. This issue is considered further in the discussion section, as is construction of 'unintended' pregnancy and other concepts, and of comparator groups; both of which may have reduced the quality of some study findings.

These issues of study quality are presented for each study in Table 2 together with clarity, bias, questionnaire validity, and substantiation and generalisability. More generally some of the evidence for STI acquisition and abortion in particular is of limited value in profiling current and recent risk due to use of long reference periods such as 'within the last five years' or 'ever'.

Key findings of reported studies

Reported psychosocial factors broadly fell into the categories: substance use, health-related, formative experiences, relationship and

partner qualities, and 'other'. The 'other' category comprised sex education source, religious service attendance, and fatalistic attitudes. These categories are used to structure Tables 3–6 which present detailed findings by outcome.

Unplanned pregnancy and abortion

Current smoking, use of drugs other than cannabis in the last 12 months and depression were positively associated with unplanned pregnancy in the last year, as were first sexual intercourse <16 years, a main sex education source other than school lessons, and non-cohabitation/non-marriage—all of which were reported by Wellings et al. (2013). Of these factors, only the latter was also examined in relation to abortion: Taft and Watson (2007) reported no association between relationship status and abortion in the last year, but found that historical experience of partner violence and no insurance cover were associated with abortion. Coleman et al. (2009) reported that less frequent religious service attendance and lack of closeness to mother and to father were associated with abortion as was leaving home at an early age. Coleman et al. (2009). Detailed findings, including reported statistical analyses for these associations, are presented in Tables 3 and 4.

Table 1
Description of studies included in the review.

First author	Publ. year	Year of data collection	Country	Study type	Study name	Aim of reported analysis	Sampling strategy	Sample description	Sample size	Recruitment & data collection strategy
Mercer	2009	1999–2001	Britain	Cross-sectional survey	National Survey of Sexual Attitudes and Lfestyles-2	To describe characteristics of all heterosexual partnerships and new partnerships[a] in the previous year, and associations with condom use	National probability sample	British female residents reporting 1+ opposite sex sexual partner in the last year (16–44 years)	n = 5462 (obtained from author)	Computer-assisted face-to-face and self-completion questionnaire
Wellings	2013	2010–2012	Britain	Cross-sectional survey	National Survey of Sexual Attitudes and Lifestyles-3	Estimates of distribution of pregnancies by planning status and associated factors	National probability sample	British residents reporting a pregnancy in the last year (16–44 years)	n = 591	Computer-assisted face-to-face and self-completion questionnaire
Moreau	2011	2006	France	Cross-sectional survey	French Sexual Behaviour Survey	To examine associations between break up in the last 5 years and: self-report of abortion, STI diagnosis, condom use with a new partner in last 5 years; and chlamydia test results	2 stage probability sampling design	Women living in France who re-ported 1+ sexual partners in last 5 years (16–44 years)	n = 4540	Telephone interview incl. random sample chlamydia test using vaginal swab
Kraut-Becher	2006	1995	USA	Cross-sectional survey	National Survey of Family Growth	To relate age mixing in the general population to self-reported history of STI diagnoses, testing or treatment	National probability sample recruited via respondents to 1993 National Health Interview Survey[b]	Sexually active women aged 15–44 who had birth date information on themselves and their partners	n = 9272	Unreported
Kramer	2007	2002–2003	USA	Cross-sectional survey	National Survey of Family Growth	To model the relationship between religion and non-contracepting behaviour	Complex probability sample	Women 15–44 years at risk of unintended pregnancy (neither pregnant, intending to become pregnant, sterile, nor abstinent in 3 months prior to interview)	n = 4076	Face to face interview
Coleman	2009	1995–1997	USA	Cross-sectional survey	Chicago Health and Social Life Survey	To investigate the hypothesis that abortion with previous and/or current partner is associated with 'negative intimate relationships'	Not given	Female participants reporting sexual activity with 1+ partner in preceding 12 months (Mean age 34.54 years, sd 10.05)	n = 906	CASI. No further info given
Xaverius	2009	2002 and 2004 (pooled data)	USA	Cross-sectional survey	Behavioral Risk Factor Surveillance System (BRFSS)	To identify demographic characteristics, behavioural risk factor patterns & health care encounters of women at risk for an unintended pregnancy	Random digit dial sample of telephone numbers	Women aged 18–44 at risk for unintended pregnancy[c]	n = 55,539	Telephone survey
Frost	2007 and 2008	2004	USA	Cross-sectional survey	None given	To explore relationships between a range of predictors and women's risky contraceptive use patterns over a one-year period	List-assisted random digit dial sample of telephone numbers	US household resident women at risk for unintended pregnancy[d] (18–44 years)	n = 1978	Telephone screen followed by interview
Cavazos-Rehg	2011	1999–2007 (pooled data from 5 surveys)	USA	Cross-sectional survey	YRBS National Youth Risk Behavior Survey	To examine how age of substance use initiation and variations in use are associated with increased number of sexual partners	Three stage cluster sampling design (year, stratum, primary sampling unit)	Female high school seniors who completed data (aged 17–18 years)	n = 5725	Not given
Taft	2007	1996	Australia	Baseline longitudinal study	Australian Long. Study of Women's Health (ALSWH)	To identify factors associated with termination of pregnancy and other pregnancy outcomes among young Australian women	Random sample from national health insurance database	Women aged 18–19 selected via national health insurance database	n = 3822	Self-administered postal questionnaire—info. from ref 17

[a] New partnerships defined as those in which first sex with the partner occurred in the year prior to interview (p.208).
[b] Information from Walsemann (Kraut-Becher).
[c] Defined as respondent being fertile and not with a man who'd had a vasectomy or with a same-sex partner, not currently pregnant and who responded that they were not doing anything to prevent a pregnancy for reasons other than they wanted to become pregnant or they did not care if they got pregnant.
[d] Risk for unintended pregnancy defined as respondent having had sexual intercourse with a man in the past year, not currently pregnant or not ≤2 months postpartum, not trying to get pregnant and neither them or their partner 'contraceptively or non-contraceptively sterile' p.91 (no explanation of these terms given).

Table 2
Quality of included papers.

Paper author	Item validity	Bias (incl. non-participation)	Clarity	Weighting, missing data, statistical analysis and report	Generalisability and substantiation of conclusions
Mercer	No discussion of item validity	Only reports on those reporting heterosexual sex within the last year. No discussion of non-respondents	Good	No discussion of missing data. Weighting of individuals and partnerships. Analysis methods appropriate. Type 1 error unmentioned	Good generalisability and conclusions well substantiated
Wellings	Validated tools: London Measure of Unplanned Pregnancy, Index of multiple deprivation, PHQ-2 depression score.	No discussion of non-respondents but excludes participants with unknown pregnancy outcomes to avoid over-representing pregnancies resulting in birth.	Good	No discussion of missing data. Weighting used. Analysis methods appropriate. No discussion of type 1 error.	Good generalisability and conclusions substantiated, though caution re small total number of participants
Moreau	No discussion of item validity and poor description of how concepts were operationalised—e.g. 'relationship break-up', 'abortion in last 5 years'	Description or comparative analysis of non-participants not given.	Relationship break up, abortion and STI all measured for period 'last 5 years', such that temporality within that cannot be determined. Poor clarity re meaning of 'sexual risk taking' as a term.	No discussion of missing data. Weighting used. Analysis methods appropriate. Multivariate analysis unadjusted for 2 of 4 vars. associated with relationship break-up on bivariate analysis: having children and being students.	Good generalisability.
Kraut-Becher	No discussion of item validity	There is likely a bias in this sample towards low-risk respondents in regular relationships, as the inclusion criteria included having knowledge of own and partners' birth dates	Unclear what constituted an 'STI' in this paper. Qualitative report of age gap 'younger', 'much younger' etc… makes interpretation of the data difficult	No discussion of missing data. Weighting used. No discussion of type 1 error. Appropriate use of bivariate tests of difference but no multivariate modelling, odds ratios or adjustments made for socio-economic variables (which are presented descriptively).	Within the review focus on *acquisition* it is important to note that reported STI diagnoses may well have occurred prior to most recent partnerships (and the exposure variable of age gap).
Kramer	No discussion of item validity	None apparent. No discussion of non-respondents	Operationalisation of 'not intending to become pregnant' was not discussed.	No discussion of missing data. Weighting used. Analysis methods appropriate. No discussion of type 1 error.	Non-contracepting behaviour included withdrawal, and calendar rhythm methods, for which contraception would usually be offered. Conclusions substantiated
Coleman	Little description of how variables of interest were operationalised.	Study focused on decision to abort, therefore only a subset of unintended pregnancies where the mother was reluctant to continue the pregnancy. No discussion of non-respondents	Conflates 'history of abortion' and 'decision to abort'. Poor delineation of study objectives examining 1. predictors of abortion and 2. impact of abortion	No discussion of missing data, or weighting and little discussion of analysis. No discussion of type 1 error.	Possible under-report acknowledged by authors.
Xaverius	Key outcome and alcohol exposures do not specify time frame or consistency of use.	No discussion of non-respondents. Inclusion of emergency contraception as a contraceptive method may bias results.	Lack of clarity regarding inclusion of women ambivalent about pregnancy in the 'high risk' group.	No discussion of missing data, or weighting and little discussion of analysis. No discussion of type 1 error.	Difficult to assess due to other quality concerns
Frost 2007 & 2008	Difficult to assess the definition of inconsistent use and how its composite measure was constructed from collected data.	Acknowledged bias against including those without a phone or absent. Definition of women 'at risk of unintended pregnancy' based on 'not trying to get pregnant'. This included $n = 470$ who then reported they would be 'very pleased' to become pregnant and $n = 444$ 'a little pleased'.	Lack of clarity regarding treatment of condom breakage and slippage.	Lots of bivariate associations—risk of type 1 error unaddressed. Weights applied to reduce biases of non-response & underrepresentation of subgroups. No CIs given for odds ratios.	Limited in only looking at genital herpes and genital warts—this may affect prevalence for example and may not be transferable to bacterial STIs
Cavazos-Rehg	Intensity categories for substance use previously used elsewhere, validity not discussed	Sample taken from students enrolled in high school so misses excluded individuals	Alcohol use items not described	Each participant given weight to account for over-sampling of ethnic groups. Statistical methods appropriate and well-described.	May have achieved more useful data by treating 0–1 partner as the reference group, not 0 partners.
Taft	Validity not discussed. Wording of items and how composite variables generated is well described.	None	Difficult to ascertain exclusion/inclusion of never pregnant respondents, though comparing table and text it appears these were allocated as 'no' responses to abortion.	No discussion of missing data. Probability weights used to reflect over-sampling of rural and remote areas. No description of socio-economic variables adjusted for.	Good generalisability though caution needed regarding small total number of participants reporting pregnancy from which associations derived.

Table 3
Psychosocial associations with unplanned pregnancy.

	Explanatory variable	Outcome variable	Nature of association	Statistics	Study
Substance use (alcohol, drugs and smoking)	Use of drugs other than cannabis in last year	Unplanned pregnancy in previous year	Use of drugs other than cannabis in last year associated with higher rates of UP	OR 3.41 (95% CI 1.64–7.11) $p = 0.0038$ (adj. for age)	Wellings 2013
	Current smoker	Unplanned pregnancy in previous year	Current smoking status associated with experience of UP when compared with never smoked	OR 2.47 (95% CI 1.46–4.18) $p = 0.0017$ (adj. for age)	Wellings 2013
Health-related factors	Current depression[a]	Unplanned pregnancy in previous year	Current depression associated with higher rates of UP. Comparator group not specified	OR 1.96 (95% CI 1.10–3.47) $p = 0.0221$ (adj. for age)	Wellings 2013
Formative experiences	First sexual intercourse <16 years	Unplanned pregnancy in previous year	First sexual intercourse <16 years associated with higher rates of UP	OR 2.88 (95% CI 1.77–4.57) $p < 0.0001$ (adj. for age)	Wellings 2013
	Main sex education source (school, other)	Unplanned pregnancy in previous year	Main sex education source not school lesson associated with higher rates of UP	OR 1.84 (95% CI 1.12–3.00) $p = 0.0153$ (adj. for age)	Wellings 2013
Partner or relationship qualities	Relationship status (not married or cohabiting or no partner)	Unplanned pregnancy in previous year	No cohabiting or marriage associated with higher rates of UP than those reporting marriage, civil partnership or cohabitation	$p < 0.0001$ in chi-square test	Wellings 2013

[a] Measured as score >2 on PHQ-2.

Unprotected sexual intercourse

Detailed findings concerning unprotected sexual intercourse are presented in Table 5. Studies reported variously on non-use of any method, non-use of condoms at first and last sex with most recent partner, and inconsistent use of condoms and of oral contraceptives. Kramer et al. (2007) found that none of four measures of religious affiliation were related to contraceptive non-use in women aged 20–24 years. Mercer et al. (2009) found that condom use at first sex with most recent partner was associated with meeting a partner while travelling (but not other ad-hoc scenarios like social venues) and an age difference between partners of less than 5 years (compared to a male partner 5+ years older). Mercer et al. (2009) also found that condom use at last sex with most recent partner was more common among those reporting less stable partnerships.

In contrast Frost et al. (2007) reported that 'gap in method use and at risk' (i.e. non-use of any method among women reporting at least one episode of vaginal intercourse) was higher among cohabiting women compared to married women. This outcome was also higher among those reporting no current relationship, a belief that one's partner is *not* monogamous, a fatalistic attitude to pregnancy, 2+ children and a lack of health insurance, based on bivariate analyses (Frost et al., 2007). Various differential findings were also reported for health insurance by Frost and Darroch (2008); Frost et al. (2007), and for these other exposures in relation to non-use and inconsistent use of condoms and other methods, all based on bivariate analyses. Furthermore Xaverius et al. (2009) reported on current non-use of contraception among those not wishing to get pregnant; finding that smoking and obesity were positively associated with non-use. In contrast, leisure time physical activity, and alcohol consumption (binge, heavy,

Table 4
Psychosocial associations with abortion.

	Explanatory variable	Outcome variable	Nature of association	Statistics	Study
Substance use (alcohol, drugs and smoking)	–	–	–	–	–
Health-related factors	Health insurance cover	Self-report of never or ever reporting a pregnancy termination	Private health insurance cover associated with lower rate of abortion compared to no insurance cover	OR 0.43 (95% CI 0.26–0.72) *adjusted for 'all socio-economic variables listed' p.136*	Taft 2007
Formative experiences	Closeness to mother in childhood	Self-report of ever having an abortion	Lack of closeness to mother in childhood associated with abortion	$p < 0.01$	Coleman 2009
	Closeness to father in childhood	Self-report of ever having an abortion	Lack of closeness to father in childhood associated with abortion	$p < 0.05$	Coleman 2009
	Leaving home at an early age (age not specified)	Self-report of ever having an abortion	Leaving home at an early age associated with abortion	$p < 0.05$	Coleman 2009
Partner or relationship qualities	Experience of partner violence >12 months ago[a]	Self-report of never or ever reporting a pregnancy termination	Partner violence >12 months ago was associated with abortion, compared to no violence at all	OR 2.07 (95% CI 1.08–3.97) *OR adjusted for 'all socio-economic variables listed' p.136*	Taft 2007
	Current relationship status (single, married, de facto, widowed/separated/divorced)	Self-report of never or ever reporting a pregnancy termination	Relationship status was not associated with report of pregnancy termination	Married OR 1.08 (95%CI 0.44–2.66), de facto OR 1.94 (95%CI 1.17–3.21), w/s/d OR 2.36 (0.25–21.9) *ref group single*	Taft 2007
	Break-up of relationship within last 5 years	Self-report of abortion in last 5 years	Break-up in the last 5 years was positively associated with abortion in the last 5 years	9.1% v 5.1% $p < 0.0001$	Moreau 2011
Other	Frequency of religious service attendance	Self-report of ever having an abortion	less frequent religious service attendance associated with abortion	$p < 0.0001$	Coleman 2009

[a] Derived as a dichotomous component of a composite variable created from 3 items which relate to 'ever been in a violent relationship with a partner/spouse?', and two items concerned with experience of violence (not partner specific) in the last 12 months.

Table 5

Psychosocial associations with unprotected sexual intercourse.

	Explanatory variable	Outcome variable	Nature of association	Statistics	Study
Substance use (alcohol, drugs and smoking)	Any alcohol use (no further definition given)	Current non-use of contraception among those not seeking to get pregnant	Any alcohol use was *less* commonly reported among women reporting non-use of contraception than among those using contraception	OR 0.73 (95%CI 0.67–0.79). Difference in weighted prevalence $p < 0.001$ *(adj. for race, age, education, marital status, income, employment, insurance status)*	Xaverius 2009
	Binge alcohol use (five or more drinks on any one occasion) (no further definition given)	Current non-use of contraception among those not seeking to get pregnant	Binge drinking was *less* commonly reported among women reporting non-use of contraception than among those using contraception	OR 0.89 (95%CI 0.80–0.99) Difference in weighted prevalence $p < 0.001$ *(adj. for race, age, education, marital status, income, employment, insurance status)*	Xaverius 2009
	Heavy alcohol use (no further definition given)	Current non-use of contraception among those not seeking to get pregnant	Heavy alcohol use was *less* commonly reported among women reporting non-use of contraception than among those using contraception	OR 0.85 (95%CI 0.73–0.98) Difference in weighted prevalence $p < 0.001$ *(adj. for race, age, education, marital status, income, employment, insurance status)*	Xaverius 2009
	Current smoker	Current non-use of contraception among those not seeking to get pregnant	Current smoker associated with non-use of contraception (comparator group not specified)	OR 1.20 (95%CI 1.11–1.31) Difference in weighted prevalence $p < 0.001$ *(adj. for race, age, education, marital status, income, employment, insurance status)*	Xaverius 2009
Health-related factors	BMI (underweight/normal/overweight/obese)	Current non-use of contraception among those not seeking to get pregnant	Obesity (BMI > 29) was more common among those not using contraception, while over and underweight were not.	Obese OR 1.23 (95%CI 1.12–1.34), overweight OR 1.01 (95%CI 0.92–1.10), underweight OR 0.99 (95%CI 0.79–1.24) Difference in weighted prevalence $p < 0.001$ *(adj. for race, age, education, marital status, income, employment, insurance status)*	Xaverius 2009
	Insurance cover	No method use[a]	No cover compared to private associated with higher report of 'no method', while Medicaid compared to private was not	No cover 13% versus private cover 6.7% $p < 0.05$ (unadjusted). Medicaid 9.2% (*p* value not given compared to private or no cover)	Frost 2007
	Insurance cover	Inconsistent use of pill[b]	No cover compared to private associated with lower risk of inconsistent use of pill, while Medicaid compared to private was not.	No cover: OR 0.49 $p < 0.05$ (based on multivariate logistic regression). Medicaid: OR 0.69. *Ref group private cover*	Frost 2008
	Insurance cover	'Gap in method use, at risk'[d]	No cover compared to Medicaid associated with higher report of 'gap in method, at risk', and Medicaid compared to private was also associated with higher report of gap in method, at risk	No cover 14.8%% versus Medicaid 23.9% $p < 0.05$ (unadjusted). Medicaid 23.9% versus private cover 12.4% $p < 0.05$ (unadjusted).	Frost 2007
	Insurance cover	Inconsistent use of condoms[c]	Insurance coverage and condom use were not associated	No cover: OR 0.86 (based on multivariate logistic regression). Medicaid: OR 0.1.84. *Ref group private cover*	Frost 2008
Formative experiences	–	–	–	–	–
Partner or relationship qualities	Belief in current partner monogamy: Yes (or no partner) v No	No method use[a]	Belief current partner is monogamous: lower 'no method use' among those reporting 'no'	$p < 0.05$ (unadjusted)	Frost 2007
	Belief in current partner monogamy: Yes (or no partner) v No	'Gap in method use, at risk'[d]	Belief current partner is monogamous: gap in use, at risk higher among those reporting 'no'	$p < 0.05$ (unadjusted)	Frost 2007
	Partnership status (married, cohabiting, unmarried and not cohabiting)	Inconsistent use of pill[b]	Significantly lower report of inconsistent pill use among those not cohabiting or married compared to those married, but no significant difference between cohabiting and married	Not cohabiting: 45.8% compared to married: 34.73% $p < 0.05$. OR 0.84—ref. group married. Cohabiting 34.3%, OR 0.63. Adj. for fatalism, method & provider satisfaction and parity	Frost 2008

	Partnership status (married, cohabiting, unmarried and not cohabiting)	Inconsistent use of condoms[c]	Significantly lower report of inconsistent condom use among those not cohabiting or married compared to those cohabiting	Not cohabiting: 53.2% compared to cohabiting: 72.3% $p < 0.05$. OR 0.80—referent group married. Adj. for fatalism, method and provider satisfaction and parity	Frost 2008
	Difference in age between partners	Condom use at first sex with most recent partner	New partnerships where male partner was within 5 years of woman's age were more likely to use condoms at first sex than if partner 5 + years older	OR 1.7 (95% CI 1.17–2.48). Adjusted for interaction of <20 years and age difference between partners OR 0.68 (95%CI 0.32–1.45) $p = 0.313$ *Referent group: male partner 5 + years older.*	Mercer 2009
	partnership type (married/ cohabiting/regular partners/ not (yet) regular partners)	Condom use at last sex with most recent partner	Non-use of condoms at last sex was positively associated with stability of partnership	Condom use at last sex among co-habiting women: OR 1.24 (1.00–1.55). Condom use at last sex among women with not (yet) regular partners: OR 5.12 (4.12–6.37) (95% CIs) (ref group married)	Mercer 2009
	Place where met partner	Condom use at last sex with most recent partner	Meeting a partner while travelling versus meeting a partner in other ways was associated with condom use at first sex	(68.1% v 47.9% $p = 0.049$). *The association between condom use at first sex and meeting a partner while travelling declined with age from 92.2% among women <20 years to 34.6% among women aged 35–44 years ($p = 0.018$)*	Mercer 2009
	Marital status (married, cohabiting, formerly married, formerly cohabiting)	'Gap in method use, at risk'[d]	Cohabiting compared to marriage associated with higher report of 'gap in use, at risk'	Cohabiting: 18.8% v Married: 12.8% $p < 0.05$ (unadjusted)	Frost 2007
	Duration of current relationship: >4 yrs, 2–4 yrs, 6–23 months, <6 months, no relationship	'Gap in method use, at risk'[d]	Duration of current relationship: No relationship associated with 'gap in use, at risk' compared with relationship of 4 + years and with relationship of 2–4 years	No relationship: 21.3% v >4 yr relationship: 13.8% and v. 2–4 yr relationship: 11.5% $p < 0.05$ (unadjusted)	Frost 2007
Other	Leisure time physical activity (no further detail given)	Current non-use of contraception among those not seeking to get pregnant	Undertaking leisure time physical activity (compared to not doing so) was associated with lower report of current non-use of contraception	OR 0.73 (95%CI 0.67–0.80) for exercise in high risk women. *(adj. for race, age, education, marital status, income, employment, insurance status). Ref group: low risk women*	Xaverius 2009
	Fatalistic attitude towards pregnancy and birth control[e]	'Gap in method use, at risk'[d]	Fatalistic attitude towards pregnancy and birth control associated with 'gap in use, at risk'	Fatalistic attitude: 19.2% v non-fatalistic attitude: 12.9% $p < 0.05$ *Adjusted for full model though no further detail given*	Frost 2007
	Fatalistic attitude towards pregnancy and birth control[e]	No method use[a]	Fatalistic attitude towards pregnancy and birth control associated with 'no method'	Fatalistic attitude: 14.3% v non-fatalistic attitude: 5.2% $p < 0.05$ *Adjusted for full model though no further detail given*	Frost 2007
	Current religious affiliation	Current non-use of contraception among those not intending to get pregnant	Current religious affiliation not associated with current non-use of contraception	None: 1.03 (95%CI 0.65–1.61), Catholic 1.03 (95%CI 0.71–1.52), Fundamentalist protestant 1.26 (95%CI 0.84–1.9) ref. group: mainstream protestant. Adj. for race, marital status, age, parity, income, education, and interaction between age and denomination	Kramer 2007
	Childhood religious affiliation	Current non-use of contraception among those not intending to get pregnant	Childhood religious affiliation not associated with current non-use of contraception	None: 0.79 (95%CI 0.51–1.22), Catholic 1.05 (95%CI 0.69–1.59), Fundamentalist protestant 0.96 (95%CI 0.62–1.49) ref. group: mainstream protestant. Adj. for race, marital status, age, parity, income, education, and interaction between age and denomination	Kramer 2007

[a] No method use defined as no contraceptive use for entire 12 months.

[b] Inconsistent pill used defined by its inverse: *'Women who had not missed a single active pill in the past three months were considered consistent users'.*

[c] Inconsistent condom use defined by its inverse: *'Women whose partners had used a condom every time they had sex and had always put it on before beginning sexual contact were considered consistent users'.*

[d] 'Gap in method use, at risk defined as a gap in use and at least one episode of heterosexual intercourse and not pregnant'

[e] Fatalistic attitude derived from 1 of 3 measures of attitudes towards avoiding pregnancy; i.e. agreement with statement "It doesn't matter whether I use birth control or not; when it is my time to get pregnant, it will happen".

Table 6
Psychosocial associations with multiple sexual partnerships and STI acquisition.

	Explanatory variable	Outcome variable	Nature of association	Statistics	Study
Substance use (alcohol, drugs and smoking)	Intensity of alcohol use (non-use, experimental/ new, moderate, heavy). No further description given.	'During your life, with how many people have you had sexual intercourse?' Never, 1, 2, 3, 4, 5, 6 or more	Positive dose response between intensity of alcohol use and number of sexual partners (controlled for race/ethnicity and age at interview)	6 + ptns v 0: exp users OR6.9–12.0, mod users OR7.0–16.5, heavy users OR20.0–40.5. 2–5 ptns v 0: exp users OR2.0–7.3, mod users OR5.6–7.3, heavy users OR9.8–10.3. 1ptn v 0: exp OR1.4 (non-sig), mod users OR1.8–2.8, heavy users OR2.6–3.2	Cavazos-Rehg 2011
	Intensity of marijuana use in (non-users, experimental/new users 1–9 uses, moderate users 10–99 uses, heavy users 100+ uses)	'During your life, with how many people have you had sexual intercourse?' Never, 1, 2, 3, 4, 5, 6 or more	Positive dose response between intensity of marijuana use and number of sexual partners (controlled for race/ethnicity and age at interview)	6 + ptns v 0: exp users OR range 1.3–6.3, mod users OR range 6.7–11.2, heavy users OR range 9.2–57.5. 2–5 ptns v 0: exp users OR2.2–4.9, mod users OR2.2–3.3, heavy users OR6.2–22.1. 1ptn v 0: exp users OR1. (non-sig), mod users OR1.0 (non-sig) heavy users OR1.9 (non-sig)	Cavazos-Rehg 2011
	Age of onset of marijuana use (<13, 13–14, 15+ years)	'During your life, with how many people have you had sexual intercourse?' Never, 1, 2, 3, 4, 5, 6 or more	Onset of heavy marijuana use aged 15+ and aged ≤12 were both associated with higher number of partners compared with non-users (controlled for race/ethnicity and age at interview)	Onset of heavy marijuana use age 15+ OR 6.2 for 2–5 ptns v 0 ptns. Onset of heavy marijuana use age ≤12 OR 22.1 for 2–5 ptns v 0 ptns. (adj. for race/ethnicity and age at interview)	Cavazos-Rehg 2011
	Daily cigarette smoking: have you ever smoked cigarettes daily, that is to say at least 1 cigarette every day for 30 days ? Y/N	'During your life, with how many people have you had sexual intercourse?' Never, 1, 2, 3, 4, 5, 6 or more	Smoking assoc with partner numbers irrespective of intensity BUT risk greater for daily users (controlled for race/ethnicity and age at interview)	6 + ptns v 0: Non-daily users OR range 2.1–2.9; daily users OR range 5.6–9.7. 2–5 ptns v 0: non-daily users OR range 1.7–1.9, daily users OR 3.1–4.6. 1ptn v 0: non-daily users OR range 1.4–1.7, daily users OR 1.5–3.2	Cavazos-Rehg 2011
Health	–	–	–	–	–
Formative experiences	–	–	–	–	–
Partner and relationship qualities	Age of current or most recent male partner (≥3 years younger, 0–2 years older or younger, 3–5 years older, ≥6 years older)	Self-report of any STI diagnosis ever	Women in their late 30s with current or most recent partners much younger than them are significantly more likely to report an STI diagnosis than those with other partners	Chi-square = 12.87 d.f. = 1 p < 0.001 (unadjusted)	Kraut-Becher 2006
	Age of current or most recent male partner (≥3 years younger, 0–2 years older or younger, 3–5 years older, ≥6 years older)	Self-report of any STI diagnosis ever	35–39 year old women with current or most recent partners close in age were significantly less likely to report an STI than either those with either younger OR older partners	Chi-square = 7.76 d.f. = 1 p < 0.01	Kraut-Becher 2006
	Age of current or most recent male partner (≥3 years younger, 0–2 years older or younger, 3–5 years older, ≥6 years older)	Self-report of any STI diagnosis ever	Women aged 40–44 years old with much younger current or most recent partners were significantly more likely to report an STI diagnosis than those with other current or most recent partners	Chi-square = 5.32 d.f. = 1 p < 0.05	Kraut-Becher 2006
	Break-up of relationship within last 5 years	Diagnosis of chlamydia trachomatis at time of study participation (via vaginal smear)	Break-up in the last 5 years was positively associated with diagnosis of chlamydia at the time of study participation among women aged 30+ years only	p = 0.01 3% v 0.8%. *Stratification by age found the association only held true for those aged 30 + 1.8% v 0.2% p = 0.002 for women*	Moreau 2011
	Break-up of relationship within last 5 years	Self-report of any STI in last 5 years (no further definition given)	Break-up in the last 5 years was positively associated with self-report of STIs in last 5 years among women aged 30+ years only	OR 2.1 (95% CI 1.3–3.4) p = 0.002 *Adjusted for age, level of education, homosexual experience ever, lifetime number of sexual partners. Despite age adjustment stratification by age found the association only held true for those aged 30 + 5.5% v 1% p < 0.001 for women*	Moreau 2011

and any) were negatively associated with non-use of condoms in this study.

STIs and multiple sexual partners

A variety of psychosocial variables were reported to be associated with diagnosis of STI or self-report of STI acquisition and multiple partnerships (Table 6). Cavazos-Rehg et al. (2011) reported a 'dose response' between greater partner numbers and greater intensity of both alcohol use and marijuana use; in addition to earlier onset of heavy marijuana use. Kraut-Becher and Aral (2006) investigated self-report of STI diagnosis ever; for women aged 35–44 years, having a partner aged 3 + years younger was positively associated with having a diagnosis. Similarly, an age difference between partners of less than two years was negatively associated with STI diagnosis compared to larger age gaps (in which the male partner was either younger or older)(Kraut-Becher and Aral, 2006). Moreau et al. (2011) found relationship break-up in the last 5 years to be associated with chlamydia diagnosis at the time of participation and with self-report of any STI in the last 5 years.

Differences in types and strengths of psychosocial associations across outcomes

None of the included papers reported on substance use in relation to abortion, and none reported on formative experiences in relation to unprotected intercourse, STI acquisition or multiple sexual partnerships. All psychosocial factors that were reported for more than one outcome showed the same direction of association, with the exception of alcohol use and relationship status.

Relationship status was investigated in relation to a number of outcomes. Not cohabiting/being married was associated with experiencing an unplanned pregnancy in the last year (Wellings et al., 2013), with condom use at last sex with most recent partner (Mercer et al., 2009), and with a variety of condom and contraceptive pill use variables (Frost et al., 2007; Frost and Darroch, 2008). However it was not associated with lifetime report of abortion (Taft and Watson, 2007). Variation was also found in correlates of alcohol use. A positive association between partner numbers and intensity of alcohol use was reported by Cavazos-Rehg et al. (2011). This contrasts with the findings of Xaverius et al. (2009) who reported lower alcohol use among individuals who were not using contraception and did not wish to get pregnant.

Presentation of models and explanations

Most discussion or presentation of explanation or theory was confined to interpretation of findings. No reference was made to cognition models – such as Protection Motivation Theory (Rogers and Prentice-Dunn, 1997) or the Theory of Planned Behaviour (Ajzen, 2012) – which have been applied to the investigation of pre-cursors to sexual risk taking. Rationales for selection of psychosocial variables for investigation were limited to reference to existing empirical evidence. Most papers reported only post hoc explanations. Taft and Watson (2007) outline how unplanned pregnancies may result from coercive unprotected sex within abusive relationships. Kraut-Becher and Aral (2006) make reference to disassortative mixing between older and younger sexual networks as potentially exposing young women to relationships with older men where an imbalance of power inhibits assertion of condom use. Kramer et al. (2007) state that puritanical religious values in the USA may discourage discussion of sexual health leading to higher rates of unintended pregnancy. Cavazos-Rehg et al. (2011) posit that associations for alcohol, smoking and marijuana indicate that disinhibition explanations of how alcohol is associated with sexual risk behaviours may be flawed. Moreau et al. (2011) posit that 'Relationship break-ups… represent a transitional period associated with higher risks of negative sexual health outcomes'.

Discussion

The findings of this review of probability surveys suggest that a range of psychosocial factors are associated with adverse sexual health outcomes for women of reproductive age in the general population; and are worthy of further investigation as identifiers of sexual health intervention need in primary care settings. Substance use and relationship qualities emerged as the most commonly investigated factors that were found to correlate with a range of outcomes. Most notably, smoking was associated with both unplanned pregnancy and with non-use of contraception, while ever being a daily smoker was associated positively with lifetime partner numbers. Wider partner age difference was associated with both non-use of condoms at first sex and with report of lifetime STI diagnosis (for women aged 35–44 years (18)). Nonetheless this review highlights a difficulty in drawing conclusions across studies which vary in the exposures and outcomes of interest and in how those exposures and outcomes are constructed. The fact that unprotected intercourse was the most commonly reported outcome across the review likely reflects its perceived relevance to both STIs and unplanned pregnancy, and its higher relative prevalence.

Inconsistencies in the literature

Inconsistencies in the direction of reported associations between relationship status and contraception and condom use may reflect use of condoms instead of other contraception among women not in regular relationships. Alternatively, these associations may be unduly influenced by how risk behaviour is defined, and how the comparator group of non-risky individuals are defined. For example, the finding that inconsistent use of oral contraceptives was lower among those without health insurance (compared to those with health insurance) may result from failing to take account of differences in rates of oral contraceptive prescription between those with and without health insurance (Frost and Darroch, 2008). The negative association between alcohol use and unprotected intercourse (Xaverius et al., 2009) may be an artefact of how key variables were operationalised (although smoking and obesity were positively correlated with unprotected intercourse in the same study). For example, emergency contraception users were classified along with other contraceptive users to form the 'low risk' group. Similarly, 'high risk' women were defined as women not using contraception who were ambivalent about pregnancy, as well as those explicitly not wanting to get pregnant.

Limitations

In addition to variable construction, other issues may affect the review findings. A small number of papers were excluded due to lack of statistical information about the population (e.g. studies potentially outside the age bounds could not be considered where means and standard deviations were not provided). This lack of detail also extended to the description of items and derived variables, of which few were reported to be validated or piloted. A number of papers reporting on wider age bounds were also excluded.

As the purpose of this review was to identify psychosocial correlates of current (rather than historic) risk of adverse sexual health outcomes, studies that reported outcomes with long reference periods – such as lifetime number of sexual partners – were of limited use. Conversely, long reference periods for exposures do not carry the same concern and may increase the acceptability of sensitive items (such as report of first sex before the age of 16 years, or of early marijuana use).

The atheoretical and explorative focus of these studies was also reflected in the large number of associations investigated, with no reported post-hoc Bonferroni adjustment or other approaches to account for the possibility of type I error. Also, many papers will likely report only a subset of all analyses undertaken, such that reported non-significant findings may not be exhaustive. This is likely to be a product

of publication bias towards significant findings which may also have influenced this review through non-publication of relevant studies.

Differences in the types of psychosocial factors reported across different outcomes may reflect different disciplinary research interests, mirroring the historical distance between reproductive and sexual health services as products of different clinical specialisms. Specifically there appears to be a greater research interest in the influence of formative experiences on abortion and unplanned pregnancy (which has been led by sociologists); and in substance use in relation to sexual risk behaviours (which has been led by public health). These disciplinary divides are partially reflected in the profiles of the authors of the included papers.

Conclusions

This review demonstrates that a number of psychosocial variables may be associated with sexual risk behaviours and/or adverse sexual health outcomes in general populations of women, suggesting that they may help identify sexual health need in primary care settings. The rarity of recent unplanned pregnancy, STI acquisition or abortion in these large population studies indicates that any psychosocial assessment tool should focus only on identifying sexual risk.

Future research should therefore focus on psychosocial correlates of prospective risk of pregnancy (non and inconsistent/ineffective use of any contraceptive method) and of unprotected intercourse with regard to STI risk (non-use and incorrect use of condoms) (Visser and Smith, 2000). Investigations should seek to model the relative contribution of different psychosocial questions to different sexual risk behaviours, and to identify and understand interactions between those psychosocial variables.

There are two important caveats for policy makers and clinicians in relation to these findings—their interpretation and their utility. First, the reported associations require cautious interpretation as they may represent spurious rather than explanatory relationships. For example, binge drinking may help identify women who would benefit from CAS and/or STI screening, but may not contribute to the need for those services. Second, the usefulness of psychosocial exposures as questions that target sexual health interventions in primary care settings cannot be determined only on the statistical strength of their association with sexual morbidity. The utility of psychosocial questions in such settings will also depend upon their acceptability and prevalence.

The acceptability to patients and practitioners of psychosocial questions will be of primary importance, and contingent on how those questions are asked and responses provided. However, the prevalence of psychosocial factors in primary care populations of women will also impact on their utility—i.e. rare psychosocial factors such as recent incarceration will be able to identify and address few instances of sexual risk. Related to this, it is important to use absolute measures to ascertain the amount of sexual risk which can be accounted for by different psychosocial questions. Further research is also needed to better understand how risk of unplanned pregnancy and risk of STI acquisition are related, in order to plan efficient co-delivery of CAS and STI screening services. These concerns are the subject of further tool development work by the authors.

Funding statement

Conflict of interest statement

The authors declare that there are no conflicts of interest.

Transparency document

The Transparency document associated with this article can be found in the online version.

Acknowledgments

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