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How loneliness affects sexual risk-taking behaviour

A cross-sectional study using data from a survey on young people in Skåne, Sweden.

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Abstract

Background: The high prevalence of unintended pregnancies and sexually transmitted infections among young people in Sweden are the result of a trend towards increased sexual risk-taking behaviour. While a few qualitative studies suggest that some of these young people take sexual risks as an escape from loneliness, the associations between loneliness and sexual risk-taking behavior are still not well researched. The role of personal support, however, is well recognized as a buffering factor for young people's sexual risk-taking behaviour. The aim of this study was to assess associations between feelings of loneliness and sexual risk-taking behaviour among young people in Skåne, while investigating personal support as a potential buffering factor for those who feel lonely.

Method: Data on socio-demographic factors, sexual risk-taking behaviour, loneliness and personal support among young people were drawn from a cross-sectional study on youth. The participants consisted of a random selection of people between 18 and 30 years old living in Skåne. Logistic regressions were performed to assess the associations between loneliness and sexual risk-taking behaviour. Personal support was treated as a potential buffering factor for lonely young people's sexual risk-taking behaviour.

Results: There are associations between loneliness and sexual risk-taking behaviour among young people in Skåne. The risk to engage in sexual risk-taking behaviour gradually increased with how lonely the respondents felt. The results showed similar patterns for men and women and the results remained statistically significant for all levels of loneliness. Men and women who felt very lonely were five times as likely to engage in sexual risk-taking behaviour (OR 5.5, 95 % CI: 3.05-9.94 and OR 5.0, 95 % CI: 3.21-7.85) compared to those who did not feel lonely at all. Personal support was a buffering factor for those who felt a little bit lonely. However, there are indications that personal support has a negative effect on sexual risk-taking behaviour among those who feel quite a lot or very lonely.

Conclusion: This study contributes to new knowledge on the associations between loneliness and sexual risk-taking behaviour. For future public health interventions to be more successful than previous, preventive programs can benefit from these findings by realizing that internal factors such loneliness requires more attention.

Keywords: young people, sexual behaviour, loneliness, personal support, multi-system framework

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1. Introduction

1.1 Sexual risk-taking behaviour among young people globally

With nearly half of the world's population being below 25 years old (United Nations Population Fund, 2012) there are more young people in the world than ever before. A large proportion of them live in societies were inequality, social norms, and taboos about sexuality restrict their access to adequate sexual health information, service and support. According to the High-Level Task Force for International Conference on Population and Development, well over half of the young people in low- and middle-income countries do not know about methods to prevent HIV (International Conference on Population and Development, 2013). The ability of young people to make their own informed decisions about sexuality and reproduction affects their sexual behaviour. Ignorance about methods for safe sex increases the likelihood that the young people will engage in sexual risk-taking behaviour (United Nations Population Fund, 2012). This has consequences for their own sexual health as well as for sustainable development and public health all over the world.

The definition of sexual risk-taking behaviour varies among organizations and contexts, which means it is difficult to identify a universal definition. Nonetheless, the World Health Organization has established some indicators of sexual risk-taking behaviour among young people that serve as a guide for prevention programmes. The indicators include measures of behaviour that have a direct impact on young people's, 15-24 years old, sexual health. Examples of these behaviours are: sex before the age of 15, multiple numbers of sexual partners, sex with someone not married to or living together with, inconsistent condom use, injecting drug use and commercial sex. Forced sexual relations and cross-generational sexual partnership are examples of indicators that do not have a direct impact on young people's sexual health but tend to increase their exposure to indicators directly related to potential ill health (World Health Organization, 2004).

Possible consequences of sexual risk-taking behaviour are unintended pregnancies and ill health caused by sexually transmitted infections (World Health Organization, 2014). These consequences are relatively easy to treat through accessible and timely health care. Still, pregnancy-related complications and HIV are among the leading causes of death among young people worldwide (World Health Organization, 2014). Girls and young women are especially vulnerable to harmful consequences of sexual risk-taking behaviour (United

Nations Population Fund, 2012), making this issue a gender issue as well. However, sexual health is more than the absence of disease and death. In 1994, the International Conference on Population and Development defined sexual and reproductive health as *"A state of complete physical, mental and social well-being in all matters relating to the reproductive system and to its functions and processes"* (United Nations, 1995). Twenty years later this definition is still relevant. Organizations, decision-makers and activists all over the world continue to fight for young people's rights to express their sexuality and make their own informed choices about reproduction. A healthy sexual and reproductive life presumes that these rights are respected (United Nations, 1995).

Based on the fact that many young people lack access to adequate sexual health information, service and support and that the consequences of sexual risk-taking behaviour have big effects on their own health as well as public health worldwide, one might think that universal access to sexual health services and information are the only factors behind young people's sexual risk-taking behaviour and therefore the solution to sexual ill-health. However, while these are undoubtedly important factors, young people's sexual health depends on more than just access. Socio-political structures, as well as individual factors also play a big role to the sexual health of young people (United Nations Population Fund, 2012; World Health Organization, 2004). Examples of socio-political structures are legislation, culture, inequality and norms in the community, family and among peers. Examples of individual factors are age, sex, attitude, socioeconomic status and education level. Socio-political structures as well as individual factors can contribute to both responsible and risk-taking behaviour among young people.

Examples of universally successful efforts to improve young people's sexual health include youth-friendly community-based services and rights-based comprehensive sexuality education (United Nations Population Fund, 2012). Another method proven to have been especially successful in the fight against HIV is peer education, where peers educate their peers on issues related to sexual health and rights (World Health Organization, 2004). The strength of peer education is that this method acknowledges the strong impact of peer norms on young people's sexual behaviour.

A general transparency in the society to openly discuss issues related to sexuality and sexual health has shown to be effective in lowering the consequences of young people's sexual risk-taking behaviours (Advocates for Youth, 2011). The Netherlands is an example of a country

where were successful interventions such as introduction of comprehensive sexuality education as suggested by The High-Level Task Force for International Conference on Population and Development (International Conference on Population and Development, 2013) alongside humours sexual health campaigns have led to the lowest rates of unintended pregnancies in the world (United Nations Population Fund, 2012).

1.2 Sexual risk-taking behaviour among young people in Sweden

Sweden is another example of a high-income country that is often viewed as having a societal openness to sexuality and sexual health issues. Importantly, young people in Sweden have legal rights and access to sexuality education and sexual health information and services (Socialstryelsen & Smittskyddsinsitutet, 2011). While the HIV infection frequency is low in Sweden, high rates of unintended pregnancies and Chlamydia are a problem (Smittskyddsinsitutet, 2010). In fact, the majority of all Chlamydia cases in Sweden occur among young people. Other common sexually transmitted infections among young people in Sweden are Human Papilloma Virus, Herpes, and Gonorrhea (Forsberg, 2005). The high prevalence of unintended pregnancies and sexually transmitted infections are the result of a trend towards increased sexual risk-taking behaviour among young people (C. Herlitz & Ramstedt, 2005).

Much of what is currently known in Sweden on young people's knowledge, attitude and behaviour in regards to sexual health comes from the unpublished UngKAB-study, carried out by the Swedish Public Health Institute in 2009. With more than 15 000 respondents in the age of 15-29 from all over the country, this is the largest of its kind in Sweden. The result of the UngKAB study shows that the mean age for first sexual intercourse is around 16 years for both genders. One fourth of the respondents had sexual intercourse before the age of 15 (Heikki Tikkanen, Abelsson, & Forsberg, 2011). The UngKAB-study does not mention the gender differences among the one fourth who debuted before the age of 15. However, another Swedish study showed some gender differences when socio-demographic factors were taken into account. Young women with parents born abroad tended to have sexual debut later than those with a Swedish background. The reverse tendency was true for young men with a foreign background (Forsberg, 2005).

One fourth of the female respondents in UngKAB answered that they had been pregnant. The fact that majority of these terminated the pregnancy (Heikki Tikkanen et al., 2011) leads to

the conclusion that the pregnancies were a result of sexual risk-taking behaviour rather than a wish to reproduce. Around half of the respondents who had their latest sexual intercourse with someone they were not in a fixed relationship with did not use condom, a behaviour that they justified either improved pleasure or based on personal judgement that the partner does not have a sexual transmitted infection (Heikki Tikkanen et al., 2011). A study by Herlitz & Ramstedt (2005) shows that the prevalence of having had casual sexual intercourse without the use of condom is high among young people compared to the adult population (C. Herlitz & Ramstedt, 2005). These results indicate that young Swedes do not consider themselves to be at risk for sexual transmitted infections.

The low use of condoms among young men has also been explained with gender norms that contribute to sexual risk-taking behaviour (Ekstrand, Tyden, Darj, & Larsson, 2007) and irresponsibility in regards to testing for sexual transmitted infections (Christianson, Lalos, & Johansson, 2007). In addition to acting concurrently with socially constructed gender norms and masculine stereotypes, there seems to be ignorance on the consequences of sexually transmitted infections among young men. Research shows that condoms are thought of more as protection against pregnancy and therefore considered the women's responsibility (Ekstrand et al., 2007; Ekstrand, Tyden, & Larsson, 2011). These studies make it clear that in Sweden, the expectations on young people regarding sexual behaviour differ between the genders. At the same time, there is also a clear trend towards more sexual risk-taking behaviour among young women than they have previously engaged in (C. A. Herlitz & Forsberg, 2010; Tyden, Palmqvist, & Larsson, 2012). Despite this trend, there is less research conducted on factors behind young women's sexual risk-taking. However, a small group of young women described that they did not use a condom as a result of not having the negotiation space to require condom use by the partner (Christianson, Lalos, Westman, & Johansson, 2007). This is an important finding, rooted in structures of gender inequality, which is a heavy and complex matter to address. Since research and interventions on sexual risk-taking behaviour have focused more on access to information and services, mental health issues, and visible lifestyle factors such as alcohol consumption, it may not be a coincidence that we know so little about internal motives to women's sexual risk-taking behaviour. The finding that some women lack negotiation space to require condom use by the partner supports the idea that structures of gender inequality and internal factors such as loneliness are equally important factors behind sexual risk-taking behaviour among young people.

To minimize the potential harmful consequences of sexual risk-taking behaviour, the World Health Organization (2014) argues that young people need to know about and have access to condoms and other contraceptives as well as testing (World Health Organization, 2014). However, results from the UngKAB study demonstrate that most of the young people in Sweden who frequently engage in sexual risk-taking behaviour are well informed about the possible consequences of their behaviour, and they do have access to condoms and other contraceptives (Heikki Tikkanen et al., 2011). This implies that current efforts to minimize sexual risk-taking behaviour among young people in Sweden need to be improved or redesigned. There might be too much focus on the external factors such as access to condoms and information about safe sex, while the problem of sexual risk-taking behaviour among young people in Sweden may possibly be related to internal factors such as loneliness.

1.3 Sexual risk-taking behaviour and loneliness

Humans are social beings with a need to feel connected and approved and therefore persistent feelings of loneliness have negative effects on health. The pressure to fit in while at the same time going through major life changes often leaves young people feeling lonely (Stickley, Koyanagi, Koposov, Schwab-Stone, & Ruchkin, 2014). A commonly cited definition of loneliness is the one of Peplau & Perlman (1982): *"The aversive state experienced when a discrepancy exists between the interpersonal relationships one wishes to have, and those that one perceives they currently have"* (Peplau & Perlman, 1982). This definition emphasizes that loneliness is a negative feeling that results from one's social relationships not being satisfying. However, what is considered to be satisfying social relationships varies across societies, and among individuals with different backgrounds and ages. The situation that triggers the feeling of loneliness varies from person to person. Independent of the situation, the effects of persistent feelings of loneliness have been shown to have devastating effects on young people's mental health status. As proof of this, associations between loneliness and deliberate self-harm (Ronka, Taanila, Koiranen, Sunnari, & Rautio, 2013) and suicidality (Schinka, Van Dulmen, Bossarte, & Swahn, 2012) have been made. Despite the public health relevance, associations between loneliness and young people's sexual health is not as researched, and consequently not yet established. In search for background material on the topic, only one study was found, a cross-sectional study of US- and Russian adolescents. Although not entirely comparable to the Swedish context, the association found between loneliness and having been pregnant among Russian adolescent girls, 13-15 years old,

(Stickley et al., 2014) provides some indications on the correlation.

No such research has been made in the Swedish context, although small-scale qualitative studies imply that loneliness may be a particularly important factor shaping sexual risk-taking behaviour for young people in Sweden. HIV positive young people in Sweden explain their sexual risk-taking as a result of feelings of loneliness and little support from family and other adults (Christianson, Lalos, Westman, et al., 2007). This finding is consistent with several international studies showing that supportive and involved parents and peers reduce the probability of sexual risk-taking behaviour (Deptula, Henry, & Schoeny, 2010; Elkington, Bauermeister, & Zimmerman, 2011; Henrich, Brookmeyer, Shrier, & Shahar, 2006). Support from mothers seems to be particularly effective and mother-daughter interaction can mitigate the effect of harmful norms (Ali & Dwyer, 2011). However, a Swedish cross-sectional study shows that young people growing up in single-parent families are twice as likely to have an early sexual debut than those growing up in two-parent families. This result indicates that access to support and involvement from both parents is important for reducing young people's sexual risk-taking behaviour (Carlsund, Eriksson, Lofstedt, & Sellstrom, 2013).

Interviews also show that young Swedish people take sexual risks in the search for a partner (Christianson, Johansson, Emmelin, & Westman, 2003), perhaps signifying the desire to not be lonely. The UngKAB-study demonstrates that what young people are missing the most in sexuality education is information on how they can maintain a relationship (Heikki Tikkanen et al., 2011). Being acknowledged and feelings of belonging or togetherness often define a healthy relationship. This finding implies that feeling lonely is not necessarily only about the number of people around, but also the sense of personal support received from them.

Personal support and loneliness are sometimes equated with one another. Studies show that there is an indirect association between social support through increased self-verification and decreased levels of loneliness (Wright, King, & Rosenberg, 2014). However, while loneliness is a feeling, not having social support is an actual physical state and one can exist without the other. In other words, personal support does not necessarily buffer against loneliness. As mentioned above, the external factors behind sexual risk-taking behaviour among young people have been prioritized above the often more complex structural or internal factors. This study will contribute to important knowledge on how an internal factor such as loneliness combined with an external factor such as social support is associated to sexual risk-taking among young people in Sweden.

1.4 Conceptual framework

This study is guided by a multi-system framework, based on research on adolescents' sexual risk-taking behaviour, developed by Kotchick. This framework suggests that there are three systems affecting adolescents' sexual risk-taking behaviour: the self-system, the family-system and the extra familial-system. These systems go hand-in-hand. In order to understand the rationale behind young people's sexual risk-taking behaviour, they need to be studied in relation to each other (Kotchick, Shaffer, Forehand, & Miller, 2001).

The self-system includes biological, psychological and behavioural characteristics that affect sexual risk-taking behaviour. Examples of biological factors are age, gender, ethnicity and cognitive competence. Psychological wellbeing, self-esteem, self-efficacy are examples of psychological factors. Behavioural factors include irresponsibility and a general risk taking behaviour (Kotchick et al., 2001). The psychological factors in this system could also be called internal factors and feelings of loneliness are part of psychological wellbeing. The author also includes knowledge about consequences of sexual risk-taking, attitude towards practising safe sex and general risk perception in the self-system.

The family-system includes structural variables such as family structure while growing up, socioeconomic status and parental level of education, and process variables such as parenting behaviour, supervision and support. The extra familial-system includes social networks, primarily the peers, their support, values, and norms (Kotchick et al., 2001). The family and extra family system could also be called external factors.

This multi-system framework suggests that these three systems influence sexual risk-taking behaviour as well as each other with negative as well as potential buffering factors. It is also suggested that sexual risk-taking behaviour affect the self-, the familial-, and the extra familial-system. According to the framework, socio-cultural, economic and political systems have an indirect affect on young people's sexual risk-taking behaviour through the three systems mentioned above (Kotchick et al., 2001).

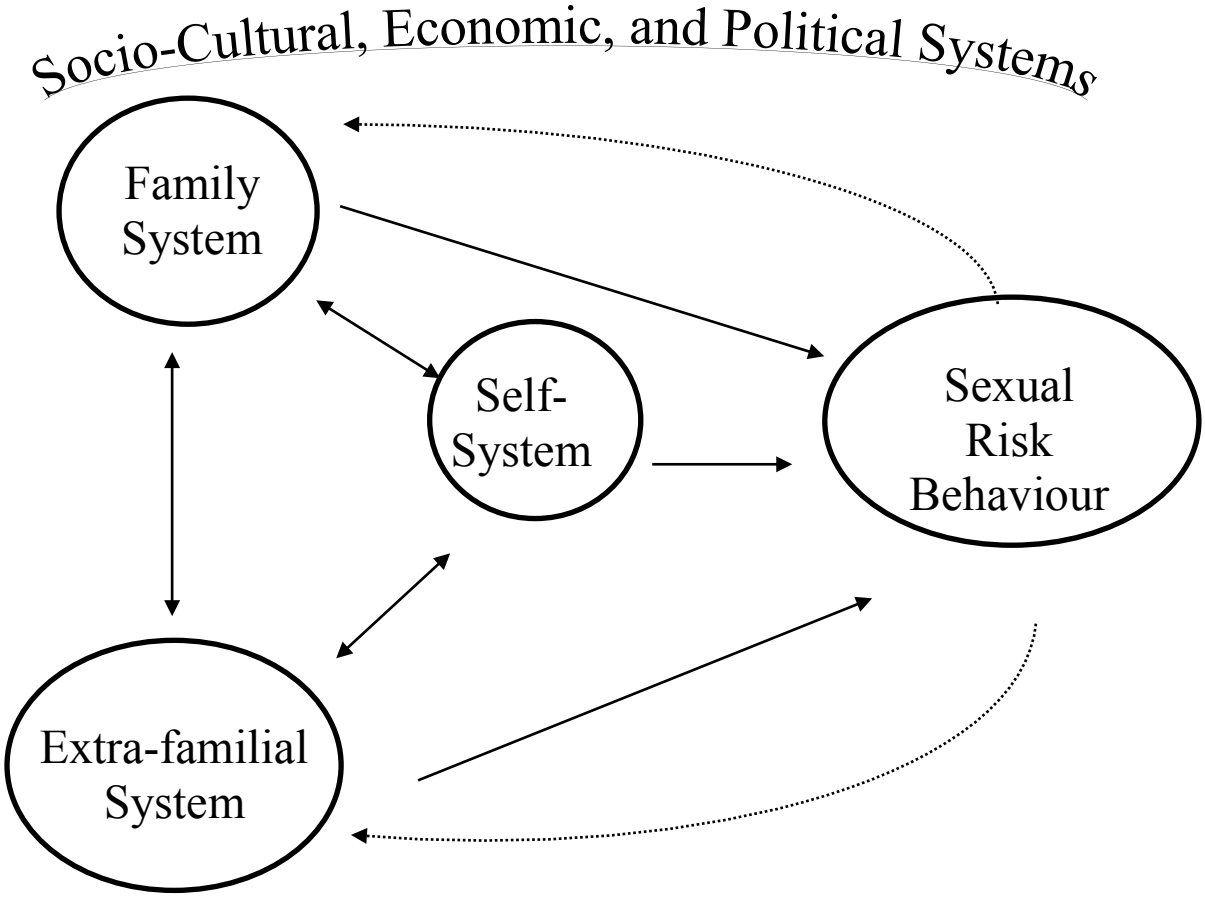

Figure 1: A Multisystem Perspective on Adolescent Sexual Risk Behaviour (Kotchick et al., 2001)

1.5 Aim and Objective

The aim of this study is to assess associations between feelings of loneliness and sexual risk-taking behaviour among youth in Skåne, while investigating personal support as a potential buffering factor for those who feel lonely. Understanding this would be a starting point in the work to prevent loneliness among young people as one way to decrease sexual risk-taking behaviour.

The objective is to examine the following hypotheses: (1) That young people who feel lonely are at an increased risk of engaging in sexual risk-taking behaviour; (2) That personal support is a buffering factor on the potential negative effects of loneliness on sexual-risk taking behaviour.

2. Methodology

2.1 Data collection

The data in this study was drawn from a cross-sectional study on youth, performed by Agardh at Lund University. The data collection took place between January and March 2013 in Skåne, a county in southern Sweden. An internet-based questionnaire was sent to 7000 persons between the ages of 18-30 years with permanent residence in Skåne. The 19-page questionnaire included 79 pre-validated questions.

2.2 Participants

The invitation to participate was sent to persons randomly drawn from the Swedish Central Population Registry. Potential participants received an introductory letter with information about the study and the voluntary nature of study participation, a guarantee of anonymity and confidentiality, as well as information regarding opportunities for contact with health professionals if the issues raised questions or concerns. The letter included a link to a server that provided an opportunity to answer on-line. Three reminders were sent out, and the last one also included a printed version of the questionnaire. The questionnaire was administered and answered in Swedish. After completing the questionnaire, the respondents received one cinema ticket as compensation for their time spent on filling in the questionnaire.

2.3 Inclusion and exclusion criteria for participants

A total of 2968 persons responded to the questionnaire, representing 45% of all recipients (n= 6668). Of the respondents, 82 % answered electronically and 18 % answered by mail. A number of respondents (n=779) were excluded due to lack of information concerning gender, lack of sexual experience (defined as vaginal and anal intercourse or oral sex).

2.4 Measures

The original questionnaire assessed socio-demographic factors, such as area of origin, educational level, occupation and travelling experience; social relations, support, participation, and social capital; lifestyle factors such as alcohol consumption and drug use; mental health; stress; risk taking; sexuality and sexual behaviour in Sweden and abroad;

experience of sexual harassment; experience of physical and sexual violence and coercion in Sweden and abroad. However, only the measures relevant to the purpose of this study were included. These were: sex, age, parents' birthplace, family structure when growing up, parental education level, type of relationship with latest sexual partner in Sweden and use of condom during latest sexual intercourse. The variables measuring experience of loneliness during last 30 days and personal support were also included.

2.5 Independent variables

Sex was classified as male or female.

Age was dichotomised into: 18-24 and 25-30 years old. United Nations (UN) defines young people as those between 15 and 24 years old. This definition is for statistical purpose and UN emphasises the tolerance to other definitions based on the context (United Nations Department of Economic and Social Affairs). This study includes people 18-30 years old, all of them considered young people. Background data therefore include studies of people between 15-30 years old.

Parents' birthplace was used to identify people with an immigrant background. The options were: both parents born in Sweden, one of the parents born abroad or both parents born abroad. The answers were dichotomised into "Both parents born in Sweden" and "One or both parents born abroad".

Family structure when growing up was measured to identify which adults were around for most of the young persons childhood and adolescence. The response alternatives were: grew up with both parents, grew up with mother, grew up with father or grew up with other person. These were dichotomized into "with both parents" or "with one parent or other person".

Parental education level was used as an indicator of social position since younger persons might not have finished their training or might lack regular employment or income. Response alternatives were: 9-year compulsory school, 2-years of high school, 3 to 4-years of high school, university and other types of schools. This variable was then dichotomized into "high level of education" if at least one parent had a university degree and the other alternatives were coded as "low level of education".

Loneliness was one of the items in the Hopkins Symptom Checklist (HSCL-25), which

measures mental health status. Respondents are presented with 25 items describing various problems and inconveniences that people sometimes experience. For each item respondents were asked to answer on a scale from 1 ("not at all") to 4 ("very much"), "How much has this problem bothered or distressed you during the last month, counting today?" Loneliness was categorised into the following four categories: "not at all", "a little bit", "quite a lot" and "very much".

Having someone who gives personal support was measured by the question: do you feel that you have someone who can give you a proper personal support to deal with the problems and stressors in life? The answering alternatives were dichotomised into "yes" and "no".

2.6 Dependent variables

The variable measuring sexual risk-taking behaviour was created by a combination of two sexual risk-taking behaviour indicators from the original questionnaire as shown below.

Type of relation to the latest sexual partner in Sweden. The response alternatives were dichotomised into "in a fixed relationship with the person" (defined as married, living together or another steady relationship) and "not in a fixed relationship with the person" (defined as earlier partner, friend, casual contact, commercial sex partner or other non-regular partner).

Use of condom during last sexual intercourse in Sweden. The response alternatives were "Yes" or "No".

To generate the definition of sexual risk-taking behaviour, a two-by-two matrix was created that combined responses from these two variables. The group of people who answered that they had their latest sexual intercourse with someone they were not in relationship with and did not use condom was considered a high-risk group. The rationale behind this approach was an attempt to really capture the actual risk takers.

Table 1: Sexual risk-taking behaviour; having had the latest sexual intercourse with someone with whom respondent was not in a relationship, and during which condom was not used.

	Type of relationship (fixed)	**Type of relationship (other)**
Condom use (Yes)	Low risk	Medium risk*
Condom use (No)	Medium risk*	High risk

**For the purpose of the logistic regression analysis, the low and medium risk groups were combined into one category as "low risk group" for sexual risk–taking behaviour (the comparison group).*

2.7 Statistical analysis

Data were analysed using SPSS version 22. The process of analysis followed four main steps. First, frequency tables showing distribution of background variables were created. Secondly, cross-tabulations with Pearson's Chi Square were used to describe the distribution of background variables according to the sexual risk-taking behaviour. Thirdly, logistic regressions were performed to calculate the crude odds ratios (OR) with 95 % Confidence Intervals (CI) for the association between loneliness and sexual risk-taking behaviour. Since previous studies have shown a difference in risk taking behaviour among males and females' with experience of loneliness (Stickley et al., 2014), they were analysed separately. Adjusted odds ratios (OR) were then calculated by stepwise adjustment for the effect of age, parents' birthplace, parental education, and family structure in a logistic regression model. Personal support was treated as a potential buffering factor for lonely young people's sexual risk-taking behaviour. Lastly, this interaction were analysed by testing for the effect modification between personal support and loneliness on sexual risk-taking behaviour in a logistic regression model. The crude odds (OR) and adjusted ratios (OR) with 95 % Confidence Intervals (CI) were reported from that analysis.

2.8 Ethical approval

The Ethical Review Board in Lund, Sweden, has approved the original study.

3. Results

3.1 Characteristics of the study participants

Altogether, 2968 young people responded to the questionnaire, which corresponds to 45 % response rate. 41.5 % of the respondents were males and 58.5 % were females. Table 2 shows the socio-demographic characteristics, sexual behaviour characteristics, feelings of loneliness, experience of personal support and sexual risk-taking behaviour (as defined in this study) of the respondents. The socio-demographic characteristics were evenly distributed between the sexes. Around one third of the respondents had the latest sexual intercourse with someone they were not in a fixed relationship with. Around three fourths didn't use condom during latest sexual intercourse. However, there were some gender differences in these sexual behaviour characteristics. More males than females reported having had the latest sexual

intercourse with someone they were not in a fixed relationship with, while the inverse was true for not using condom during latest sexual intercourse. About one fourth of the respondents (26%) had felt lonely quite a lot or very much during the last 30 days. Females felt lonely to a higher extent than males. Conversely, more males reported not having personal support. About 20% of males and 16 % of the females had experience of sexual risk-taking behaviour as defined in this study.

Table 2: Socio-demographic and sexual behaviour characteristics, experience of loneliness, personal support and valid percent (%) among 18-30 year old persons in Skåne.

Variables	**Male n (%)**	**Female n (%)**	**Total n (%)**
Sex			
Male			1228 (41.5 %)
Female			1733 (58.5 %)
Age			
18-24	840 (69.0 %)	1168 (68.0 %)	2011 (68.4 %)
25-30	378 (31.0 %)	549 (32.0 %)	928 (31.6 %)
Parents birthplace			
Both parents born in Sweden	851 (69.8 %)	1267 (73.4 %)	2119 (71.9 %)
One or both born in another country	369 (30.2 %)	459 (26.6 %)	828 (21.8 %)
Family structure when growing up			
With both parents	956 (78 %)	1316 (76.2 %)	2273 (77 %)
With one parent or other person	269 (22 %)	410 (23.8 %)	679 (23 %)
Parental education level			
High	727 (59.7 %)	1036 (60.4 %)	1764 (60.1 %)
Low	491 (40.3 %)	679 (39.6 %)	1170 (39.9 %)
Relation to the latest sexual partner in Sweden			
In a fixed relationship	648 (61.2 %)	1167 (74.9 %)	1816 (69.3 %)
Other	411 (38.8 %)	392 (25.1 %)	803 (30.7 %)
Use of condom at latest sexual intercourse in Sweden			
Yes	306 (29.0 %)	311 (20.0 %)	618 (23.6 %)
No	750 (71.0 %)	1246 (80.0 %)	1996 (76.4 %)
Feeling lonely			
Not at all	609 (50.4 %)	600 (35.0 %)	1212 (41.4 %)
A little bit	348 (28.8 %)	605 (35.3 %)	953 (32.6 %)
Quite a lot	163 (13.5 %)	310 (18.1 %)	473 (16.2 %)
Very much	88 (7.3 %)	198 (11.6 %)	287 (9.8 %)
Have personal support			

Yes	1040 (85.4 %)	1514 (88.1 %)	2558 (87.0 %)
No	178 (14.6 %)	204 (11.9 %)	382 (13.0 %)
Sexual risk-taking behaviour			
Low risk	833 (79.3 %)	1293 (83.6 %)	2127 (81.8 %)
High risk*	218 (20.7 %)	254 (16.4 %)	472 (18.2 %)

**The high-risk group for sexual risk-taking behaviour included those who had their latest sexual intercourse with someone they were not in a fixed relationship with and did not use condom.*

Table 3 presents the prevalence of sexual risk-taking behaviour according to socio-demographic characteristics, loneliness, and personal support. The younger age group were more sexual risk-taking than the older. Those with both parents born in Sweden took more sexual risks than those with one parent or both born in another country. Neither family structure when growing up nor parents' education level seem to matter for the respondents sexual risk-taking behaviour. The prevalence of high-risk sexual behaviour increased as reported levels of feelings of loneliness increased. Almost one fourth of those with experience of sexual risk-taking behaviour did not have personal support. Those who didn't have personal support took more sexual risks than those who had personal support.

Table 3: Prevalence of sexual risk-taking behaviour according to socio-demographic characteristics, level of loneliness and personal support.

	Sexual risk-taking behaviour	
	Low risk	**High risk**
Sex		
Male	833 (79.3%)	218 (20.7%)
Female	1293 (83.6%)	254 (16.4%)
Age		
18-24 years	1355 (79.2%)	356 (20.8%)
25-30 years	751 (87.0%)	112 (13.0%)
Parents' Birthplace		
Both parents born in Sweden	1534 (80.3%)	376 (19.7%)
One or both born in another country	583 (86.2%)	93 (13.8%)
Family structure when growing up		
With both parents	1639 (82.0 %)	359 (18.0 %)
With one parent or another person	480 (81.1 %)	112 (18.9 %)
Parental education level		
High	1254 (81.4 %)	286 (18.6 %)
Low	852 (82.2 %)	184 (17.8 %)
Loneliness		
Not at all	987 (90.3 %)	106 (9.7 %)
A little bit	684 (80.2 %)	169 (19.8 %)

Quite a lot	290 (73.4 %)	105 (26.6 %)
Very much	147 (64.5 %)	81 (35.5 %)
Personal support		
Yes	1884 (82.5 %)	400 (17.5 %)
No	227 (76.4 %)	70 (23.6 %)

**The high-risk group for sexual risk-taking behaviour included those who had their latest sexual intercourse with someone they were not in a fixed relationship with and did not use condom.*

3.2 Association between loneliness and sexual risk-taking behaviour

Table 4 gives the unadjusted and adjusted odds ratios and 95% confidence intervals for the impact of loneliness on sexual risk-taking behaviour. Compared to those not feeling lonely at all, the risk to engage in sexual risk-taking behaviour when feeling a little bit lonely increased more than three times for the males (OR 3.4, 95 % CI: 2.33-4.93) and almost doubled for the females (OR 1.7, 95 % CI: 1.18-2.55). The likelihood of engaging in high-risk sexual behaviour for both males and females gradually increased as feelings of loneliness increased. However, this trend was slightly steeper for the females. Males who felt lonely quite a lot had more than a quadrupled risk to engage in sexual risk-taking behaviour (OR 4.3, 95 % CI: 2.67-6.93), whereas the risk for the females increased by threefold (OR 3.2, 95 % CI: 2.11-4.82). Males and females who felt very lonely were five times as likely to engage in sexual risk-taking behaviour (OR 5.5, 95 % CI: 3.05-9.94 and OR 5.0, 95 % CI: 3.21-7.85) compared to those who did not feel lonely at all. Sexual behaviour among males appears to be more negatively affected by loneliness already when they feel just a little bit lonely. Though, the gender differences diminish with increased feelings of loneliness. When feeling very lonely, males and females are basically at an equally increased risk to engage in sexual risk-taking behaviour. Looking at both males and females together there was an increasing trend towards engaging in more risky sexual behaviour the lonelier the respondents felt.

Table 4: Association (Odds ratios, 95% Confidence intervals) between loneliness and sexual risk-taking behaviour.

	High sexual risk-taking behaviour* (Crude or unadjusted OR 95% CI)		
	Male	**Female**	**Total**
Loneliness			
Not at all	Ref	Ref	Ref
A little bit	3.5 (2.38-5.00)	1.8 (1.20-2.59)	2.3 (1.76-2.98)
Quite a lot	4.1 (2.55-6.50)	3.3 (2.20-5.00)	3.4 (2.52-4.62)

Very much	6.0 (3.33-10.68)	5.2 (3.33-8.07)	5.1 (3.64-7.20)
	High sexual risk-taking behaviour* (Adjusted[§] OR 95% CI)		
	Male	**Female**	**Total**
Loneliness			
Not at all	Ref	Ref	Ref
A little bit	3.4 (2.33-4.93)	1.7 (1.18-2.55)	2.4 (1.87-3.20)
Quite a lot	4.3 (2.67-6.93)	3.2 (2.11-4.82)	3.8 (2.77-5.16)
Very much	5.5 (3.05-9.94)	5.0 (3.21-7.85)	5.7 (3.99-8.08)
Age			
18-24 years	1.8 (1.27-2.64)	1.5 (1.06-2.00)	1.6 (1.27-2.04)
25-30 years	Ref	Ref	Ref
Parents Birthplace			
Both parents born in Sweden	Ref	Ref	Ref
One or both born in another country	0.5 (0.37-0.81)	0.7 (0.48-0.98)	0.6 (0.48-0.80)
Family structure when growing up			
With both parents	Ref	Ref	Ref
With one parent or other person	1.1 (0.76-1.65)	1.0 (0.75-1.45)	1.0 (0.83-1.37)
Parental education level			
High	Ref	Ref	Ref
Low	0.9 (0.63-1.23)	1.0 (0.72-1.29)	0.9 (0.75-1.16)
Gender			
Male			Ref
Female			0.6 (0.46-0.71)

[§] *Stepwise adjusted for age, parents' birthplace, family structure when growing up and parental education level (and gender in the total).*

** High sexual risk-taking behaviour is defined as those who had their latest sexual intercourse with someone they were not in relationship with and did not use condom.*

3.3 Effect modification between loneliness and personal support on sexual risk-taking behaviour

Table 5 demonstrate the mediating effect of social support on the association between feelings of loneliness and sexual risk-taking behaviour. Personal support was a buffering factor for both males and females who felt a little bit lonely. These results were statistically significant (see table 5). Nonetheless, personal support had negative influence on sexual risk-taking behaviour for males and females who felt quite a lot or very lonely. The males who

felt very lonely and did not have personal support had nearly a five times higher risk to engage in sexual risk-taking behaviour (OR 4.7, 95 % CI: 1.66-13.58), for those who did have personal support the risk increased to six times as high (OR 5.9, 95 % CI: 3.03-11.64). The figures for the females look similar to those for the males. Those who felt very lonely and did not have personal support had more than three times higher risk to engage in sexual risk-taking behaviour (OR 3.3, 95 % CI: 1.63-6.95), for those who did have personal support the risk increased to almost six times as high (OR 5.6, 95 % CI: 3.43-9.18). Overall, the males had a slightly increased risk to engage in sexual risk-taking behaviour compared to the females. This was true for all levels of loneliness and regardless of personal support.

Table 5: Analysis of the effect modification between loneliness and personal support regarding high sexual risk-taking behaviour among 18-30 year old persons in Skåne.

	High sexual risk-taking behaviour* (Crude or unadjusted OR 95% CI)		
	Male	**Female**	**Total**
Synergy loneliness and personal support			
Not at all lonely with or without support	Ref	Ref	Ref
A little bit lonely with support	3.5 (2.40-5.16)	1.7 (1.13-2.49)	2.2 (1.71-2.95)
A little bit lonely without support	3.4 (1.62-7.31)	2.6 (1.27-5.44)	2.9 (1.73-4.91)
Quite a lot lonely with support	4.4 (2.65-7.543)	3.5 (2.26-5.31)	3.6 (2.61-4.94)
Quite a lot lonely without support	3.3 (1.46-7.50)	2.5 (1.09-5.70)	2.8 (1.58-5.03)
Very lonely with support	6.7 (3.45-12.97)	5.9 (3.60-9.52)	5.8 (3.96-8.49)
Very lonely without support	4.6 (1.64-12.94)	3.4 (1.67-7.03)	3.6 (1.99-6.35)
	High sexual risk-taking behaviour* (Adjusted§ OR 95% CI)		
	Male	**Female**	**Total**
Synergy loneliness and personal support			
Not at all lonely with or without support	Ref	Ref	Ref
A little bit lonely with support	3.4 (2.32-5.04)	1.6 (1.10-2.44)	2.4 (1.81-3.15)

A little bit lonely without support	3.6 (1.68-7.77)	2.6 (1.26-5.45)	3.1 (1.85-5.32)
Quite a lot lonely with support	4.8 (2.82-8.08)	3.3 (2.16-5.09)	4.0 (2.90-5.61)
Quite a lot lonely without support	3.3 (1.44-7.61)	2.4 (1.06-5.63)	2.9 (1.61-5.25)
Very lonely with support	5.9 (3.03-11.64)	5.6 (3.43-9.18)	6.3 (4.24-9.34)
Very lonely without support	4.7 (1.66-13.58)	3.3 (1.63-6.95)	4.1 (2.28-4.48)
Age			
18-24	1.9 (1.29-2.70)	1.5 (1.06-2.01)	1.6 (1.27-2.07)
25-30	Ref	Ref	Ref
Parents' Birthplace			
In Sweden	Ref	Ref	Ref
Other country	0.6 (0.37-0.81)	0.7 (0.47-0.96)	0.6 (0.47-0.79)
Family structure when growing up			
With both parents	Ref	Ref	Ref
With one parent or other person	1.1 (0.72-1.58)	1.0 (0.73-1.43)	1.0 (0.80-1.33)
Parental education level			
High	Ref	Ref	Ref
Low	0.9 (0.64-1.24)	1.0 (0.75-1.34)	1.0 (0.77-1.18)
Gender			
Male			Ref
Female			0.6 (0.46-0.71)

[§] *Adjusted for age, parents' birthplace, family structure when growing up and parental education level (and gender in the total).*

**High sexual risk-taking behaviour is defined as those who had their latest sexual intercourse with someone they were not in relationship with and did not use condom*

4. Discussion

The key finding was the confirmation of hypothesis 1: that an association exists between loneliness and sexual risk-taking behaviour among young people in Skåne. The risk to engage in sexual risk-taking behaviour gradually increased with how lonely the respondents felt. The results showed similar patterns for men and women. The results remained statistically significant for all levels of loneliness. Hypothesis 2: that personal support is a buffering factor for the potential negative effects of loneliness on sexual risk-taking behaviour was true for low levels of loneliness. However, personal support had a negative

effect on sexual risk-taking behaviour among those who felt quite a lot or very lonely. This section will discuss these main findings in more detail.

4.1 Young people who feel lonely are at an increased risk of engaging in sexual risk-taking behaviour

The potential association between loneliness and young people's sexual risk-taking behaviour was confirmed by the results of this study. Due to the shortage of preceding studies aiming to investigate this association, just one quantitative study found: the cross sectional study on loneliness and risk-taking behaviour among Russian and U.S adolescents. The results from this study showed a significant association among young women (Stickley et al., 2014), however the indicator used to measure sexual risk-taking behaviour, "having been or having made someone pregnant", might not be the optimal indicator to measure young people's sexual risk-taking behaviour. Still, its result suggests, if weakly, that there is an association between loneliness and sexual risk-taking behaviour among young people.

Our study defined sexual risk-taking behaviour as "having had the latest sexual intercourse with someone they were not in relationship with and did not use condom". By using a combination of indicators of sexual risk-taking behaviour defined by the World Health Organization, these findings show a stronger association. Our findings are supported by the result from a qualitative Swedish study where young people, 18-22 years old, described that they took sexual risks in pursuit of the togetherness associated with a healthy relationship (Christianson et al., 2003).

In Sweden, sexual risk-taking behaviour among young women has been explained with lack of negotiation space to require their partners to use condoms (Christianson, Lalos, Westman, et al., 2007). Young men's sexual risk-taking behaviour has commonly been explained by gender norms and macho ideals (Christianson et al., 2003; Ekstrand et al., 2007). These internal and external factors behind young people's sexual risk-taking behaviour can be explained by Kotchick's multisystem framework. According to this framework, age, gender and psychological factors are part of the self-system that affect young people's sexual risk-taking behaviour (Kotchick et al., 2001). The results of our study suggest that loneliness is an important factor in young people's sexual risk-taking behaviour, potentially as important as factors like gender norms, macho ideals and psychological factors. However, in reality none of these factors work independently, but instead go hand-in-hand. For example, the reason

that young men feel lonely and/or do not have someone to talk confidentially with might be due to existing masculinity stereotypes. The reason that young women feel that they do not have the negotiation space to require their partners to use condoms might be due to loneliness and/or lack of personal support.

Our findings further demonstrated an increased vulnerability for lonely young men to engage in sexual risk-taking behaviour compared to lonely young women. Examples of three psychological factors that, according to Kotchick's multi-system framework, can negatively affect sexual risk-taking behaviour among young people are: ignorance about the consequences of sexual risk-taking behaviour, a negative attitude towards contraceptives and a general perception that their behaviour is of low risk (Kotchick et al., 2001). These internal factors are often associated with masculine stereotypes (Christianson, Lalos, & Johansson, 2007; Ekstrand et al., 2007) which are easily reinforced through external factors such as peer norms (Ali & Dwyer, 2011). The influence of masculine stereotypes and peer norms might be one explanation of why lonely young men proved to be more vulnerable to sexual risk-taking behaviour than the lonely young women.

A study carried out by the Swedish Public Health Institute shows that fewer young men than women visit the youth centres (Ungdomsbarometern, 2014). This behaviour not only restricts young men from opportunities to access information and services, it also restricts the skilled health care professionals at the youth centres to detect early tendencies of loneliness and to take appropriate action. The young men's absence from the youth centres might partly explain their slightly higher risk for their sexual risk-taking behaviour in relation to loneliness. This behaviour likely creates pressure on the young women to take responsibility for sexually transmitted infections and pregnancy testing, which reinforces gender norms and makes young men and women more vulnerable to sexual risk-taking behaviour.

Despite the higher vulnerability to sexual risk-taking behaviour among young men, the results of our study still indicate that there is a gradually increased risk for sexual risk-taking behaviour with level of loneliness among both young men and women. This finding demonstrates the importance of preventive efforts that focus on early discoveries of loneliness among young people. Further, the results provide clear indications on how important it is for preventive sexual health efforts to have a perspective that looks critically upon structures that promote stereotypical gender roles and that put various groups of young people in situations where they feel lonely.

4.2 Personal support as a buffering factor on the potential negative effects of loneliness on sexual-risk taking behaviour

Personal support was expected to be a buffering factor for all levels of loneliness. Correspondingly, the results of this study indicate that personal support is a buffering factor for sexual risk-taking behaviour among young people who feel a little bit lonely. However, personal support did not appear to be a buffering factor for all cases, rather negative for those who felt quite a lot or very lonely.

According to Kotchick, external factors related to the familial and extra-familial system can influence sexual risk-taking behaviour in both directions (Kotchick et al., 2001). In this study, personal support was a buffering factor for those who reported that they felt a little bit lonely, meaning that these respondents might have a network of supporting peers and/or support from home. Results from previous studies have shown that support from family is a buffering factor for young people's sexual risk-taking behaviour (Ali & Dwyer, 2011; Elkington et al., 2011; Henrich et al., 2006; Kotchick et al., 2001). Peers who promote safe sexual behaviour create norms that have a positive effect on the attitude and behaviour of young people around them (Kapadia et al., 2012). A network of supporting peers and/or support from home protect from potential negative influence from other sources, which might lead to fewer assumptions about how other young people behave. In the case of low levels of loneliness that might stem from temporary circumstances, this network of supporting peers and/or support from home can be a buffering factor for young people's sexual risk-taking.

Despite the positive effects of personal support described above, external factors related to the familial and extra-familial system can also influence sexual risk-taking behaviour in negative ways (Kotchick et al., 2001). According to the results of this study, personal support rather exposed those who felt "quite a lot or very lonely" to increased sexual risk-taking behaviour. It is not clear who provided the personal support to the respondents in this study. Evidence shows that it is the support from specific persons that is the buffering factor in regards to sexual risk-taking behaviour. For young people, these persons could be family, other adults or peers with attitudes that are positive for sexual health (Deptula et al., 2010; Elkington et al., 2011; Henrich et al., 2006). For those who feel "quite a lot or very lonely", the perceived personal support might be conditional, from a stranger or from a temporary partner. Perhaps, then, the negative effect found in our study could be better explained by knowing who provided the personal support.

If young people perceive the threat of feeling lonely more than that of sexual risk-taking behaviour, they might rather take sexual risks with strangers in search of a solution to their loneliness than protect themselves against the negative consequences of sexual risk-taking behaviour. It is possible that those young people who felt quite a lot or very lonely perceived the threat of loneliness to be worse than that of sexual risk-taking behaviour. This assumption is supported by a qualitative Swedish study where detained youth described that the chance of feeling comfort and closeness as a result of sexual risk-taking exceeded the risk of a potential sexually transmitted infection or pregnancy (Lindroth & Lofgren-Martenson, 2013).

As earlier described, Sweden is generally considered to be progressive in its socio-political structures such as legislation, culture, and gender equalities. And as a result of this, Swedish young people have easy access to both sexual health information and services. Nonetheless, twice as many men as women reported in the UngKAB study that they do not have a person that they can talk confidentially with (Heikki Tikkanen et al., 2011). These numbers, in combination with the results from this study, suggest that loneliness increases the likelihood to engage in sexual risk-taking behaviour, indicating that the information and preventive interventions might not be as accessible or effective as they seem to be, especially not for young men. The fact that 25% of all respondents in the UngKAB want someone to talk about sexual health with (Heikki Tikkanen et al., 2011) further highlights the need to improve or redesign current preventive interventions.

Similarly to young people's perceived support from family and other adults, the family structure while growing up and parents' level of education have been proposed to influence sexual risk-taking behaviour among young people (Kotchick et al., 2001). However, the rationale behind how these factors actually influence behaviour is not well described. When these two factors were adjusted for in this study, they did not influence the risk to engage in sexual risk-taking behaviour. It can be presumed that personal support from caring adults when growing up is a buffering factor for young people's sexual risk-taking, independent of the family structure. Personal support from health care professionals, teachers or other mentors could possibly be equally effective as the support from family members in mitigating the potential negative effect of loneliness on young people's sexual risk-taking behaviour.

The results of this study suggest that the issue of personal support is more complex than expected. Personal support did not necessarily buffer against the feeling of loneliness, especially not for those who felt quite a lot or very lonely. It is possible that these young

people are more likely to interpret any contact as personal support, meaning, for instance, that their support might come from a temporary partner instead of a caring adult. Increased focus on providing appropriate personal support to all young people could prevent them from developing feelings of loneliness, which would be beneficial for young men and women's sexual health. However, the relationship to the person providing the support likely determines the type of influence—either positive or negative—on the young person's sexual behaviour.

4.3 Methodological considerations

This study presents results from an association that has not been widely explored. The assumption that loneliness affects sexual risk-taking behaviour can be drawn from literature on loneliness and its affect on mental health, and from literature on mental health and its affect on sexual risk-taking behaviour. However, most of the existing evidence treats loneliness and sexual risk-taking behaviour as two separate topics, not directly affecting one another. To the knowledge of the author, no research of this sort and size has been carried out in Sweden. The findings of this study show that associations between feelings of loneliness and sexual risk-taking behaviour are important to investigate further to develop policies that support healthy sexual behaviour among young people.

The strength of this study is that it combines the World Health Organization's indicators of sexual risk-taking behaviour that separately might not measure high risk behaviour in the Swedish context, but when combined, they add up to an actual sexual health risk. This study focuses on the high-risk takers rather than also including the medium and low risk takers, that is, those who had their latest sexual intercourse with someone they were not in a fixed relationship with and without condom. The multi-system framework used in this study proved to be very useful in identifying the influence of internal and external factors combined, which reflects the complexity of real life influences.

Validity

The cross-sectional design of the study makes it impossible to know the direction of causality. The assumed direction is that those who feel lonely are more likely to engage in sexual risk-taking behaviour due to their loneliness. However, as suggested by Kotchick et al (2001), it might be the other way around that those who more frequently engage in sexual risk-taking behaviour end up feeling lonelier.

Using secondary data provides some limitations. Not all details that would have been relevant to the study were included since there were no data on them. For example, it would have been relevant to know the relationship to the person the respondents answered that they received personal support from. In the questionnaire, loneliness was one of 25 other variables in a tool to measure mental health status. This means that only one statement was used to measure loneliness. This creates difference in the measurement when compared to some studies, where the UCLA loneliness Scale (a 20 item instrument) is used to measure loneliness.

Reliability

The measures used in this study were developed from pre-validated questions sent to persons randomly selected from the Swedish Central Population Registry. Reliability was estimated with P-value less than 0.05. When analysing the data, possible confounding factors like age, parents' birthplace, family structure when growing up and parental level of education were controlled for. The statistical methods used are considered appropriate for the purpose and the results provided answers to the two hypotheses of the study.

4.4 Conclusion

This study contributes to new knowledge on the associations between loneliness and sexual risk-taking behaviour that might have been overlooked in previous studies. For future public health interventions to be more successful than previous, preventive programs can benefit from these findings by realizing that internal factors such loneliness requires more attention. However, interpretations needs to be made with caution and preferably followed with a study of qualitative design. This would make it possible to further investigate the association between internal factors and sexual risk-taking behaviour among young people. It is of importance to continue to strengthen the efforts to promote accessible services and information, and to eliminate stereotypical gender roles and discrimination in relation to sexuality and reproduction.

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