Sexual practice associated with knowledge in adolescents in ninth grade

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ABSTRACT

INTRODUCTION: The aim of the present study was to reveal any association of sexual practice with knowledge about sex education, reproductive physiology and abortion. The study was performed in a non-intervention setting to minimize information bias.

MATERIAL AND METHODS: A cross-sectional questionnaire was handed out without prior notice to all ninth grade pupils in the Municipality of Viborg, Denmark, in 2007.

RESULTS: We found that sexual debut was associated with a greater probability of knowing that chlamydia is the most common sexually transmitted infection (STI). Knowledge of chlamydia was strongly associated with knowledge about the first symptom of pregnancy. A high general level of knowledge of STI was associated with the father being the source of the knowledge among pupils who had not yet had their sexual debut ($p < 0.04$) and among girls ($p < 0.04$). The general of knowledge of STI was associated with knowing the first signs of pregnancy and the criteria for legal abortion. A high level of knowledge of STI was significantly associated with the use of contraceptives to avoid pregnancy. The vast majority of condom users (81% compared to 56% of pill users) stated protection against STI as a reason for using contraception ($p < 0.006$). Concern about the partner's opinion was more outspoken among condom users than among pill users (19% versus 6%, condom versus pill users, $p < 0.035$).

CONCLUSION: Discrepancy between sexual knowledge and practice is a fact. The discrepancy, however, varies according to sexual experience, gender and whether the respondent's actual behaviour aimed at avoiding unwanted pregnancy or STI.

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Health education professionals have different views on what should be considered the proper goals of school-based sex education programmes and which outcomes to evaluate. Several reviews on the evidence of these issues nonetheless indicate that no existing programme will prevent the majority of youth from having sex during their school years [1, 2]. The programme strategies range from abstinence from engaging in sex as the only acceptable behaviour to a focus on communication skills and decision-making. In between are strategies focused on information about the risk and the consequence of early pregnancy and/or sexually transmitted infections (STIs). These programmes neither delay nor reduce the frequency of sex. Evaluation of these programmes suggests that the identification of social influences and social learning would be more effective in reducing the fraction of unprotected sex and postponing sexual debut.

Sources of knowledge about sex are numerous and not limited to in-school sex education. Whatever the quality of the knowledge sources, the association between information and behaviour is uncertain. The trend is currently that pornography is increasingly used as a source of knowledge [3-6]. Evaluation of interventions is often uncontrolled and biased by the intervention itself. Pseudo-endpoints are reported including delayed sexual debut and known pregnancies. The latter include wanted and potentially unwanted pregnancies which are reported with a substantial bias; thus, the potential benefit of knowledge in terms of achieving protection against unwanted pregnancies and STIs is difficult to estimate.

We hypothesized that a survey based on non-intervention and without prior notice would reveal any association between knowledge and behaviour with less bias than if the survey were performed as part of an ongoing initiative with behavioral aims. Thus, we minimized the influence of friends, peers, teachers and health professionals who might share their view if notified. In particular, we evaluated adolescents' sexual activity and use of contraceptives and assessed any association between such factors and knowledge about reproduction physiology, abortion and STIs. We aimed to find discrepancies in knowledge about sex and the reported sexual activity with the use of contraception. Previously, we reported on the contraception use and gender-specific knowledge about sex [6, 7].

MATERIAL AND METHODS

All ninth grade pupils were invited to answer a questionnaire without prior notice to teachers or pupils in the Municipality of Viborg. Approval was granted by the board of each participating school, and by the municipal School Commission and the municipal Family Department. The survey was performed four times between

ORIGINAL ARTICLE

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TABLE 1

Age at first sex by sexual activity and knowledge of abortion.

	Age at sexual debut, years	Pupils, n	p value, ANOVA
Knowledge of minor's right to abortion			0.023
Yes	14.0	27	
No	14.4	85	
Does not know	14.6	39	

1986 and 2007 [6, 7]. The survey is sampled in a municipality that came very close to the national Danish income level and distribution in 2006 (Viborg average 432,685 DKK versus 423,402 DKK).

The questionnaire contained questions on the following: Gender, age, parent's country of origin, have you had sexual debut, age at sexual debut, number of intercourses, number of partners, use of contraception at first intercourse, were you drunk or intoxicated at your first intercourse, how long time has passed since your latest intercourse, which contraceptives have you used, did you use contraceptives at your latest intercourse, how often do you use contraception now, since your sexual debut when did you use contraception regularly, since your sexual debut when did you stop using contraceptives regularly, why do you use contraception, must your parents be informed if you visit the physician to get or discuss contraception, which sexually transmitted disease do you know, which sexually transmitted disease is the most common one, chlamydia may have which symptoms/consequences, when in the menstrual cycle is the risk of pregnancy higher, what is the first symptom of pregnancy, when is the latest gestational time for legal abortion, can a 16-year-old girl have a legal abortion without her parent's acceptance and knowledge, where did you obtain most knowledge on sex issues, do you need more or better sex education in school, what is good or bad with your sex education at school, how many of the girls do you think have had their sexual debut, how many of the boys do you think have had their sexual debut, why have you not had sex yet.

The general knowledge of STI was grouped into low, fair and good knowledge if the pupil knew at least two, four and six diseases on a list of STIs (HIV, herpes, syphilis, chlamydia, condylomas and gonorrhoea).

For statistical calculations, the χ^2-test with Yates' correction for discontinuity was applied. For evaluation of the contingency tables, the Pearson χ^2-test for independence was first performed assuming no direction of a trend. Then the table was tested with the χ^2-test for trend. For continuous variables, ANOVA was performed between group variables. For post-hoc testing, the Newman-Keul's test was used. Multivariate logistic regression analysis was performed with gender, age and sexual debut as independent variable; while sexual activity, contraception use, intentions concerning contraception use, knowledge and sources of knowledge were entered as dependent variables. The level of significance was 0.05. SPSS version 18.0 was used as the statistical software.

Trial registration: not relevant.

RESULTS

In 2007, 401 pupils were registered as attending the ninth grade in the Municipality of Viborg; 398 questionnaires were distributed and returned, but four of the returned questionnaires were blank. Therefore, a total of 394 pupils (98%) with a mean age of 15.3 years ± 1.5 years participated in the study, 218 (55%) of whom were boys. In all, 155 pupils had had intercourse/sex.

Sexual activity and knowledge abut pregnancy

Young age at sexual debut was associated with knowledge of the legal minor's right to an abortion (**Table 1**). Sexual debut was not associated with knowledge of reproduction biology and the legal limits of abortion. The experience in terms of number of intercourses clearly influenced the use of contraceptives (**Figure 1**). If the pupil used the pill, 95% (56 of 59) had had more than six intercourses. If the pupil had had more than six intercourses, 50% (56 of 115) used the pill. Paradoxically, two-thirds of those who did not use contraception gave pregnancy

FIGURE 1

Proportion of contraception use according to which type of contraception was used at latest intercourse by the total number of intercourses per pupil. Proportion of contraception use, 1.0 = 100%; number of pupils in each group in columns represented. One intercourse and 2-5 intercourses combined versus six and more intercourses, $p < 0.0001$, χ^2-test.

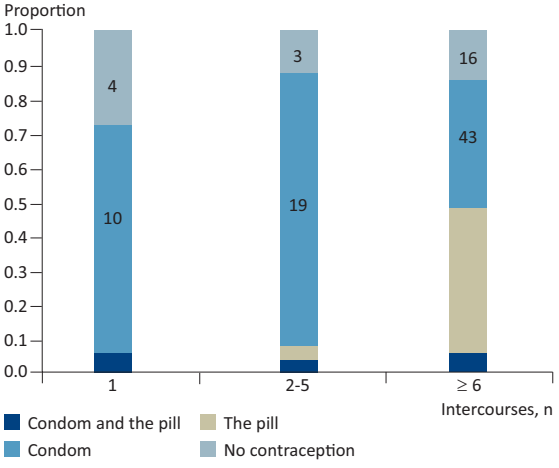

TABLE 2

The pupils' general knowledge of sexually transmitted infections by source of sex education.

	Knowledge level of STI, n (%)				p value[b]		
	low	fair	good	all[a]	all	gender m/f	sex debut yes/no
Paper-based source[c]							
No	14 (8)	62 (37)	91 (54)	167	0.49	0.21/0.39	0.28/*0.049*
Yes	12 (5)	83 (38)	128 (58)	219			
Screen-based source[d]							
No	16 (7)	89 (41)	114 (52)	219	0.18	0.73/0.2	0.72/ 0.16
Yes	10 (6)	56 (33)	105 (61)	171			
Person-based source[e]							
No	7 (7)	34 (32)	65 (61)	106	0.43	0.97/0.25	0.09/0.94
Yes	19 (7)	111 (39)	154 (54)	284			
Father as source							
No	22 (7)	128 (40)	170 (53)	320	*0.033*	0.39/*0.04*	0.2/*0.039*
Yes	4 (6)	17 (24)	49 (70)	70			
Friends/peers as source							
No	11 (7)	45 (31)	91 (62)	147	0.11	0.81/*0.028*	0.08/0.47
Yes	15 (6)	100 (68)	128 (87)	243			
All[a]	26 (7)	145 (37)	229 (59)	390			

STI = sexually transmitted infections.
a) Excluding four pupils who did not indicate sex debut or gender; b) Pearson's χ^2-test, significant values are marked in italics; c) Books + magazines + periodicals + written material pornography; d) TV + Internet + CD/DVD; e) Father + mother + physician + community nurse + friends/peers.

as the reason compared with 93% of contraception users ($p < 0.002$).

Knowledge of sexually transmitted infections

Pupils who had had their sexual debut more likely knew that chlamydia was the most common STI in Denmark (72% versus 61%, debut versus no debut, $p < 0.02$). Multivariate analysis revealed that sexual debut was associated with knowing the symptoms of chlamydia ($p < 0.01$, adjusting for gender and age). The pupils' knowledge of chlamydia was strongly associated with knowing the first symptom of pregnancy, but sexual debut had no effect on this finding ($p < 0.001$, data not shown). General knowledge of STI was estimated to be low in 26 (7%), fair in 147 (37%) and good in 221 (56%) pupils. Good knowledge of STI was not associated with sexual activity; instead, it was associated with the father as the source of knowledge ($p < 0.03$, test for trend) and with gender (multivariate analysis including age, $p < 0.001$). The father was typically an important source if the pupil had not had his or her sexual debut and was a girl (**Table 2**). More pupils without sexual debut stated that their knowledge came from paper-based media compared with those who had had sex ($p < 0.02$, test for trend). Better knowledge on STI was associated with knowing the first signs of pregnancy and the limits of legal abortion (**Table 3**). This trend was strongest among those adolescents who had not had their sexual debut ($p < 0.001$, test for trend).

Good knowledge of STI was significantly associated with the use of contraceptives to avoid pregnancy. The vast majority (81%) of condom users compared with pill users (56%) gave protection against STIs as the reason for their use of contraception ($p < 0.006$, χ^2-test). Pupils not using contraception provided answers on STIs similar to those of the other sexually active pupils.

DISCUSSION

The main positive findings were that pupils with sexual debut knew the limits of legal abortion and were aware that chlamydia is the most common STI. The general knowledge of all pupils was good and adolescents' knowledge on pregnancy was associated with STI. Moreover, their behaviour seemed adequate: The pill was used when the adolescent had sex frequently and intended to avoid pregnancy and condom users gave more consideration to STI.

Discrepancies were mainly found in connection with STI. Sexual activity did not correlate with good knowledge about STIs, which may be considered worrying. Condom use was not clearly associated with good knowledge about condoms and STI prevention. More than half of the pill users said that they made use of contraception because of STI. This challenged the perception that knowing the right thing to do will eventually affect pupils' behaviour accordingly [8]. Moreover, whatever knowledge is acquired in adolescence is counteracted by the observed decrease in condom use with

TABLE 3

The pupils' general knowledge of sexually transmitted infections by knowledge on sexual health and reasons to use contraception.

	Knowledge level of STI, n (%)			
	low	fair	good	All, n (%)
First sign of pregnancy[a, b, e]				
Menostasia	12 (4)	107 (36)	177 (60)	296 (100)
Other	14 (14)	40 (41)	44 (45)	98 (100)
Knowledge of rights of legal abortion[a, c, e]				
Yes	20 (6)	135 (38)	203 (57)	358 (100)
No	6 (17)	12 (33)	18 (50)	36 (100)
Reason to use contraception[d]				
Avoid pregnancy	6 (4)	58 (41)	76 (54)	140 (100)
Other	3 (21)	3 (21)	8 (57)	14 (100)

a) Three pupils without sexual debut did not answer the questions and were grouped under Other and No, respectively.
For all pupils: b) $p < 0.001$; c) $p < 0.038$; d) $p < 0.021$.
For pupils without sexual debut e) $p < 0.001$.

increasing age and with greater numbers of partners [9, 10]. Therefore, continued focus is required by the adolescent to maintain safe sexual behaviour, build condom-use negotiation skills and promote condom use [8, 9, 11-14]. The reason that these aspects should be encouraged is that condom use among adolescents is a valid indicator of STI risk [13, 15]. On the other hand, more positive attitudes towards sexuality and willingness to engage in sex more frequently were found in women when condoms were used regularly [16]. The pupils who frequently had intercourse in our study, however, primarily made use of the pill. This indicates that priority was given to avoiding pregnancy.

The inconsistency concerning knowledge and protection against STIs could be explained if those who have experienced STI do not pass their knowledge on to others. This would imply that protection against STI carried more stigma than unwanted pregnancy [14]. In sum, we found no association between sexual debut and knowledge of legal abortion.

Longitudinal interview studies confirmed that inconsistent condom use was associated with more STI and pregnancy histories among 16-to-19-year-olds [13, 15, 17]. One potential way to approach the variance was to seek other screen- and paper-based sources than school-based curricula for information about sex [3-6].In the studies, we performed from 1986 onwards, we consistently found that 10-20% of adolescents do not use any form of contraception [6, 7]. The pupils who used no form of contraception displayed no particular lack of knowledge or intentions. Brown et al found that no-contraceptive users felt that condoms reduced their sexual pleasure and feared partner reactions if they were to initiate condom use [14].

Bartz et al found that when girls said that they were committed to avoiding pregnancy, half of their coital events were unprotected [8]. Therefore, our finding of discrepancies between knowledge and behaviour had logical parallels [8-11, 13, 14]. The extent seemed less than reported by previous studies, but that may due to our low-risk setting.

Gebhardt et al found that the use of condoms in adolescents and their preparation for condom use correlated with safe sex behaviour; however, having condoms at home and carrying condoms were associated with a willingness to engage in unsafe sex at baseline [11]. The perception of risk was inadequate as only 25% may perceive that they take a sexual health risk in situations when they actually do [18]. A Finnish study found a more frequent use of the pill if adolescents were more sexually active and at true risk of pregnancies [12]. With less use of condoms, women underestimate the risk of STI from regular partners [10]. However, these studies were performed in settings with a considerable STI risk.

Other factors than right knowledge may influence behaviour, including the perception of norm and alcohol; thus, a Norwegian study found that adolescent girls' contraceptive use was influenced by what people close to them expected them to do [15]. The boys' behaviour was guided by a moral norm or a desire to avoid a bad conscience afterwards. Similarly, the intake of drugs/alcohol when engaging in sex was an eyesore for adult's views on adolescents' sexual behavior. A cohort study concluded that alcohol was part of the adolescent's maturing and predicted greater sociability [17]. Further, alcohol intake was associated with less impulsivity in childhood, higher quality friendships and greater peer acceptance. The intake of alcohol, thus, was not counterproductive in the adolescent's view and not modified by the right knowledge or sex education taught at school.

A review by the Cochrane Collaboration on reproductive health in adolescents concluded that most interventions appeared to have a positive effect on knowledge and attitudes, but the effect on behaviour was less consistent [18]. Mass media programmes yielded mixed results on behaviour: Community-based programmes delayed sexual debut, while workplace- and health facility-based programmes increased contraceptive use. One cannot preclude the information bias these programmes inevitably harbour when they are evaluated, i.e. that their effect may be overestimated. Others reported that parental influence on adolescent behaviour showed links between a safer sexual activity and more involved parenting, particularly family activities and father knowledge [19]. Coley et al emphasize the different and positive influence by fathers on youth problem behaviours compared to mothers. We confirm the father's impor-

Ninth grade at a school in Viborg Municipality, 2007.

tance as a source of information on sex, in particular for girls and pupils who have not had their sexual debut. We minimized the potential influence on answers by fellow students, teachers and peers by our design. We hypothesize that the father's advice tends to complement the opposite sex's knowledge. The father was stated as an important source of knowledge in 18% of all adolescents, so one must be cautious about the quantitative impact of the father and rather underline his valuable extra qualitative input [19]. The father may be a stronger role model than the mother for the adolescent's future (non-) risk taking behaviour [20].

CONCLUSION

We conclude that discrepancy between knowledge and practice is a fact despite access to knowledge about sex and sex education at school. The discrepancy, however, shows differences with respect to sexual debut and experience, gender and whether the intention was to avoid unwanted pregnancy or STI.

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