

Contraceptive Use by 15-Year-Old Students at Their Last Sexual Intercourse

Results From 24 Countries

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Objectives: To identify and report cross-national patterns in contraceptive use among sexually active adolescents.

Design: A cross-national cross-sectional survey.

Setting: Data were collected in 2002 by self-report questionnaire from students in school classrooms.

Participants: A cluster sample of 33 943 students aged 15 years from 24 countries.

Main Outcome Measures: International standardized questions on ever having had sexual intercourse and contraceptive use at last sexual intercourse.

Results: The percentages of students reporting having had sexual intercourse ranged from 14.1% in Croatia to 37.6% in England; 82.3% of those who were sexually active reported that they used condoms and/or birth control pills

at last intercourse. Condom use only was most frequent and ranged from 52.7% in Sweden to 89.2% in Greece. Dual use of condoms and contraceptive pills was also relatively frequent, ranging from 2.6% in Croatia to 28.8% in Canada. The use of contraceptive pills was most frequent in northern and western Europe. No contraceptive use at last intercourse was reported by 13.2% of students.

Conclusions: A substantial minority of 15-year-olds have engaged in sexual intercourse. Condom use is the most frequent method of contraception reported by the sexually active respondents, followed by the dual use of condoms and contraceptive pills and contraceptive pills only. The proportions of poorly protected and unprotected youth remain high, and attention to international policy and practice determinants of young sexual behavior and contraceptive use is required.

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ADOLESCENT FERTILITY REGULATION and pregnancy prevention are among the major health care challenges of the 21st century in developing and developed countries.¹ Unintended pregnancies and sexually transmitted infections (STIs) are the main consequences of adolescent sexual risk behavior. Early sexual activity, particularly when associated with inconsistent use or nonuse of contraception, has serious short- and long-term health-compromising consequences because it happens before young people are developmentally equipped to handle the consequences. Moreover, in the case of pregnancy leading to birth, adverse consequences can be expected for the mother and child.¹⁻³

*For editorial comment
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Analyses of the Youth Risk Behavior Survey (YRBS) in the United States on high school students in grades 9 through 12

show declining trends of those reporting ever having had sexual intercourse, multiple partners, and unprotected or poorly protected sexual intercourse (eg, using withdrawal). These are coupled with a rising trend of contraceptive use, mainly due to the increased use of condoms.⁴⁻⁷ Data from the second national survey of sexual attitudes and lifestyles in Britain show the same tendencies.⁸ A reduction in the age at first sexual intercourse, particularly among females, has been reported worldwide.⁹ Among industrialized countries, except in some eastern European countries, these trends are associated with declines in teen pregnancies and abortions and a substantial decline in teen births.^{1,5,6,10} Nevertheless, because of the physical, psychological, and societal costs of teen pregnancies¹¹ and because most pregnancies in adolescents are due to contraceptive nonuse or failure, it is of substantial importance to understand the levels and modes of contraceptive use cross-nationally, enabling an informed perspective on the sexual behaviors of young people.

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With the exception of sterilization, and to some extent intrauterine devices because of their risks for the reproductive future of adolescents, all contraceptive methods that are appropriate for healthy adults are also potentially appropriate for healthy adolescents. However, the adequacy of each method depends on many factors, some related to the activity (eg, type of sexual behaviors, frequency of intercourse, risk of STIs), some related to the person and/or partner (eg, age, ethnicity, culture, religious beliefs, educational level, family characteristics),¹² and others associated with the contraceptive itself (eg, efficacy, availability, cost, convenience).¹³ It has been suggested that failure rates for a given contraceptive may be much higher among adolescents than among adults because of differences in both compliance and capacity to use the method correctly.^{13,14} However, others have not found such differences in contraceptive failure by age group.¹⁵

Few studies on contraception among adolescents have been conducted across countries (see the work by Darroch et al² for a comparison in Canada, France, Great Britain, Sweden, and the United States and the work by Berne and Huberman¹⁶ for a comparison in France, Germany, the Netherlands, and the United States), and the same questions and methods have not been used across countries. The 2002 international Health Behaviour in School-aged Children (HBSC) study offers this unique opportunity.¹⁷ Since 2002, 4 standardized questions related to sexual behavior have been added to the core HBSC questions to be asked by all of the participating countries to students aged 15 years.¹⁸⁻²⁰

Of the 35 countries or regions participating in the 2002 HBSC study, 11 were not able to ask all of the sexual health questions, did not ask them of all of the students, or had a sample size that was too small (eg, Greenland, n=220); thus, 24 countries or regions are included here (**Table 1**). The questions on sexual behaviors and contraceptive use that have been adopted by the HBSC study have been derived from the YRBS and developed and supported by the US Centers for Disease Control and Prevention.²¹⁻²³

The purpose of this article is to provide an overview of the contraceptive methods reported by students (aged 15 years) at their last sexual intercourse in 24 European and North American countries.

METHODS

SAMPLING DESIGN

These analyses are based on nationally representative, cross-sectional samples of students. A common HBSC study protocol standardizes instrumentation, sampling methods, and data collection procedures in each country, with data cleaning and data set construction performed centrally. As the student sample is not a purely random sample but rather is clustered in schools and classrooms, it is necessary to take account of the effects of clustering on the potential homogeneity of data within selected schools and classrooms. Children aged 11, 13, and 15 years are the target for the international study; thus, countries time their data collection so that the mean ages within their samples are 11.5, 13.5, and 15.5 years, respectively. As these samples are drawn from schools and country teams are required to have included at least 95% of children within the age groups in the country in the sample frames, it is frequently nec-

Table 1. Prevalence of Participants Reporting Ever Having Had Sexual Intercourse by Country and Sex According to the 2002 World Health Organization Health Behaviour in School-aged Children Study

Country	Participants, No.	Boys Who Reported Having Had Sexual Intercourse, No. (%)	Girls Who Reported Having Had Sexual Intercourse, No. (%)
Austria	1227	133 (21.7)	110 (17.9)
Canada	1102	114 (24.1)	150 (23.9)
Croatia	1388	131 (21.9)	65 (8.2)
England	1675	290 (34.9)	409 (39.9)
Estonia	1237	114 (18.8)	89 (14.1)
Finland	1700	193 (23.1)	282 (32.7)
Flemish Belgium	1946	238 (24.6)	225 (23.0)
France	2505	312 (25.1)	224 (17.7)
Greece	1255	196 (32.5)	62 (9.5)
Hungary	1302	123 (25.0)	132 (16.3)
Israel	1135	167 (31.0)	49 (8.2)
Latvia	1053	86 (19.2)	75 (12.4)
Lithuania	1842	229 (24.4)	83 (9.2)
Macedonia	1342	214 (34.2)	19 (2.7)
Netherlands	1235	143 (23.3)	127 (20.5)
Poland	2110	207 (20.5)	102 (9.3)
Portugal	783	108 (29.2)	79 (19.1)
Scotland	1115	179 (32.1)	190 (34.1)
Slovenia	1010	143 (28.2)	101 (20.1)
Spain	1672	134 (17.2)	124 (13.9)
Sweden	1179	145 (24.6)	172 (29.2)
Switzerland	1434	177 (24.1)	142 (20.3)
Ukraine	1600	341 (47.1)	172 (24.0)
Wales	1096	153 (27.3)	206 (38.5)

essary to sample across school grades.¹⁷ No oversampled population groups or geographical areas are included. Strict adherence to the international protocol is required for entry into the international data set, and this has been achieved for all of the data presented here. Institutional review board approval was secured according to regulations in force in each country at the time of data collection.

QUESTIONNAIRE

The self-administered, anonymous, classroom-administered survey consists of a standard questionnaire developed by the HBSC international research network. Variables include sociodemographics, general health, interpersonal relationships, school environment, exercise and leisure-time activities, diet, substance use, and sexual behavior. Only students aged 15 years are asked the sexual health questions because the overwhelming majority of younger students have not yet experienced sexual intercourse. In addition, across participating countries, it was believed that many schools and parents would find such questions too sensitive to ask of younger students, putting in jeopardy the rest of the survey. Sexual behavior was measured by items adopted from the YRBS²¹⁻²³: sexual experience (ever having had sexual intercourse), condom use (having used a condom at last sexual intercourse), and contraceptive use (having used specified methods to prevent pregnancy at last sexual intercourse). The response options for contraceptive use in all of the countries included condoms, oral contraceptives (birth control pills), withdrawal, spermicides (spray or foam), and an other option. In addition, 7 countries asked about emergency contraception and another 7 asked about natural or biological methods (such as the rhythm method).

STATISTICAL ANALYSIS

Inconsistent or unfeasible responses resulted in excluding students from the analyses if they reported having used all of the contraceptive methods ($n=38$) or inconsistently reported use of contraceptive methods, condoms, or sexual intercourse ($n=574$). Students who reported condom use on the condom question but not on the contraception question were credited with condom use as a contraceptive. Only those students who reported that they had ever had sexual intercourse (26.3% of boys and 19.1% of girls) were included in subsequent analyses.

All of the sexually active students were classified as to the extent to which they were protected against pregnancy at their last sexual intercourse according to the contraceptive methods they reported using. This classification was constructed to reflect the efficacy and developmental appropriateness of contraceptive methods used by such young people, and it comprised well-protected, poorly protected, and unprotected groups. The first group was created by combining use of condoms and/or contraceptive pills to represent sexually active students well protected against pregnancy. No other contraceptive methods explicitly asked about in the survey were regarded as providing efficacious, developmentally appropriate protection. The second group were students considered poorly protected. Poorly protected students did not report either condom or birth control pill use but did report 1 or more methods that we do not regard as efficacious (eg, withdrawal) or that are potentially effective but of questionable appropriateness for adolescents (eg, spermicides, natural methods). Finally, those classified as unprotected reported using no method of protection at all.

Spermicides ($n=274$ students), the cap ($n=7$ in Ukraine), diaphragms ($n=4$ in Ukraine and $n=11$ in Greece), and pessary ($n=1$ in Hungary) were regarded as other methods of potential or supplemental efficacy. Students who reported having used other methods could not be classified in either the well-protected or poorly protected category because analyses of the open-ended question asked in some countries showed that students reported a range of methods of varying efficacy and appropriateness—including injectable contraceptives, implants or intrauterine devices, emergency contraception, and natural methods. Hence, the category of other was dropped from all of the subsequent analyses.

Statistical analyses were conducted with SUDAAN release 9.0.1 statistical software (Research Triangle Institute, Research Triangle Park, North Carolina) to take into account the clustering effects inherent in the sampling design.

RESULTS

Overall, the rate of nonresponse to the question on ever having had sexual intercourse was 1.9%, and 7659 students reported that they had ever had sexual intercourse. In the 24 countries, percentages of ever having had sexual intercourse ranged from 14.1% (Croatia) to 37.6% (England). Significantly more girls than boys reported ever having had sexual intercourse in Finland and Wales ($P<.001$) (Table 1).

CONTRACEPTIVE PILLS AND CONDOMS

In total, 82.3% of sexually active students reported that they or their partner used condoms and/or birth control pills at their most recent intercourse and as such can be considered as protected against pregnancy regardless of any supplemental methods used. Across all of the 24 countries or re-

gions, 58.1% of students reported using condoms but not contraceptive pills, 8.4% reported using contraceptive pills but not condoms, and 15.7% reported using both methods together (dual users). However, these global figures mask differences across countries (**Figure 1**).

Condom use ranged from 52.7% in Sweden to 89.2% in Greece. More than 8 in 10 students used condoms in 6 countries (Austria, France, Macedonia, Israel, Spain, and Greece). More boys than girls reported using a condom at their last intercourse (78.4% vs 67.9%, respectively; $P<.001$), with boys reporting significantly more use of condoms than girls in 12 countries (data not shown).

The variation in contraceptive pill use was even greater than that in condoms, ranging from around 3% in Croatia and Greece to around 48% in Flemish-speaking Belgium and the Netherlands. More girls than boys reported that contraceptive pills were used at last sexual intercourse (29.0% vs 20.2%, respectively; $P<.001$), with significantly higher reports of pill use among girls in 5 countries. Hungary is the only country where more boys than girls significantly reported that the contraceptive pill was used at their last sexual intercourse (18.7% vs 9.1%, respectively; $P=.01$).

The dual use of condoms and contraceptive pills was more prevalent overall (15.7%) than the use of contraceptive pills alone. In 6 countries (Wales, Switzerland, France, Canada, Flemish Belgium, and the Netherlands), more than 20% of young people reported the concurrent use of these 2 methods. The reporting of dual condom and contraceptive pill use was similar for boys and girls in most countries.

METHODS OTHER THAN CONDOMS AND CONTRACEPTIVE PILLS

Table 2 presents the methods other than condoms and birth control pills that were asked of all of the students: morning-after pill, withdrawal, and natural or biological methods. The proportions of these methods are shown both for all of the sexually active students and for those who were categorized as poorly protected, having reported neither condom use nor contraceptive pill use at last intercourse.

MORNING-AFTER PILL

Seven countries offered the response option of emergency contraception: 8.2% of students in these countries reported using emergency contraception, ranging from 2.9% in Finland to 14.2% in France. Overall, 10.1% of students who did not use condoms or pills at their most recent intercourse reported having used the morning-after pill, from 7.2% in Scotland to 15.8% in France. There was no significant difference in rates of emergency contraception use between those who used condoms and/or contraceptive pills and those who did not (8.2% vs 10.1%, respectively; $P=.09$).

WITHDRAWAL

Withdrawal was reported by 11.6% of students, ranging from 3.1% in Croatia to around 25% in Slovenia and

Lithuania. Withdrawal was reported by more than 10% of students in 13 countries and by 19.4% of students who did not use condoms or contraceptive pills. Reliance on withdrawal by such students exceeded 20% in 11 countries, with more than half of unprotected students in Greece and Slovenia reporting reliance on withdrawal as their primary contraceptive means.

NATURAL METHODS

Only 7 countries offered the response option of natural or biological methods: 3.7% of students reported having used a natural contraceptive method, with the highest rate in Slovenia (9.4%). Among students who did not use condoms or contraceptive pills, 5.0% reported the use of a natural contraceptive method, with a high of 20.4% in Slovenia.

USE OF SINGLE AND MULTIPLE CONTRACEPTIVE METHODS AT LAST INTERCOURSE

Use of a single method of contraception was most frequent. Among the sexually active students reporting only 1 contraceptive method including efficacious as well as nonefficacious methods, condom use was the most popular. Among the 4704 students reporting use of only 1 contraceptive method, 81.1% reported having used condoms, followed by 12.0% reporting use of contraceptive pills. The ranking is similar for both boys and girls, but rates are significantly different (condoms only: 88.5% of boys vs 71.7% of girls, $P < .001$; contraceptive pills only: 6.8% of boys vs 17.7% of girls, $P < .001$). Among the 1967 students who reported use of more than 1 contraceptive, the combination of contraceptive pills and condoms (dual method) was the most popular (61.1%) for both sexes, followed by the use of condoms with something other than contraceptive pills (32.1%). The combination of contraceptive pills and something other than condoms was not as frequent (5.1%). Only 31 students (1.6%) chose combinations not involving condoms or contraceptive pills (ie, withdrawal, morning-after pill, and/or natural methods).

UNPROTECTED AND POORLY PROTECTED STUDENTS

Overall, 13.2% of students reported that no contraceptive method was used at last sexual intercourse, ranging from 5.0% in Greece and 5.2% in the Netherlands to more than a quarter in Croatia (26.5%) and Poland (26.9%). However, in 10 countries, the percentage remained below 10% (**Figure 2**).

Overall, no significant differences existed by sex for reporting having used no method of contraception (boys, 13.3%; girls, 13.0%; $P = .07$). However, in some countries, the sex gap in nonuse of contraceptives was striking. For example, in Ukraine, 33.3% of girls but only 14.5% of boys reported no contraception during their last sexual intercourse ($P < .001$). This difference between girls and boys was reversed in Canada (8.0% vs 17.5%, respectively; $P = .09$), Switzerland (2.8% vs 10.2%, respectively; $P = .007$),

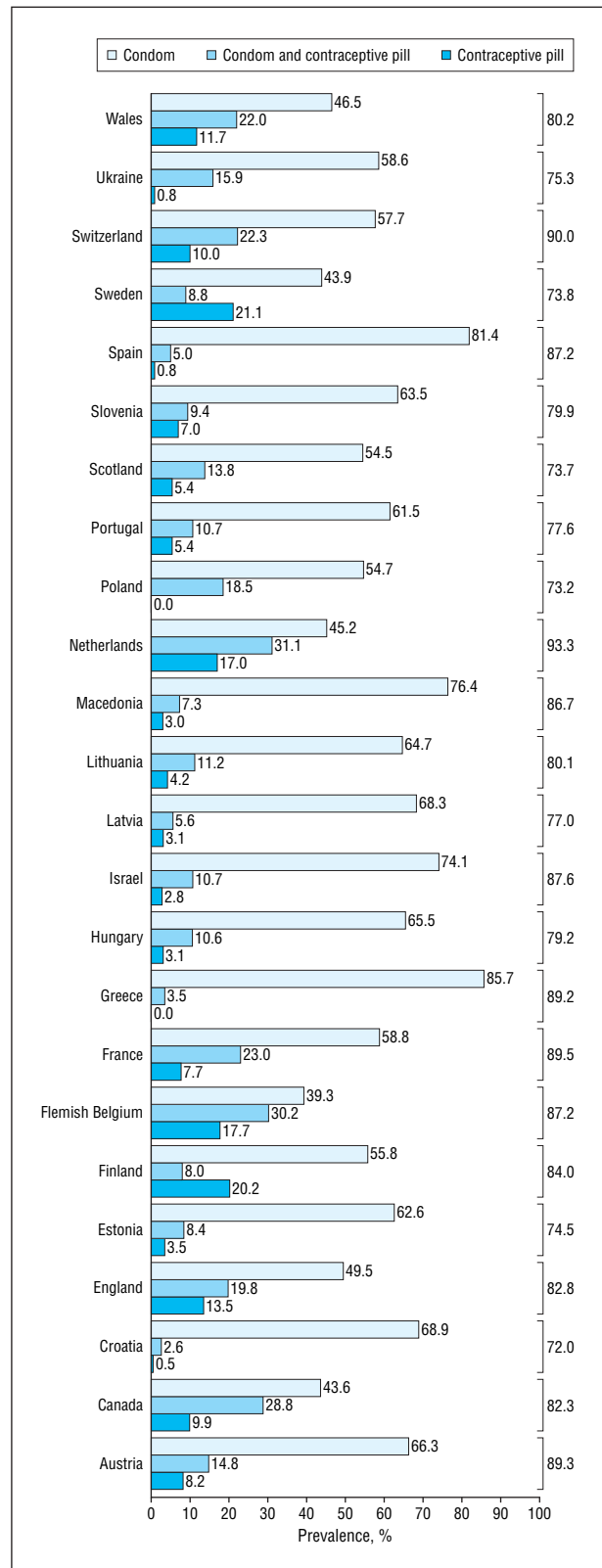


Figure 1. Prevalence of reported condom use, contraceptive pill use, and dual use of condoms and contraceptive pills at last sexual intercourse by country according to the 2002 World Health Organization Health Behaviour in School-aged Children study.

the Netherlands (1.6% vs 8.4%, respectively; $P = .04$), and England (11.0% vs 17.6%, respectively; $P = .03$).

Table 2. Prevalence of Morning-After Pill, Withdrawal, and Natural or Biological Methods During Last Sexual Intercourse by All Sexually Active Participants and by Those Who Did Not Report Either Condom or Contraceptive Pill Use According to the 2002 World Health Organization Health Behaviour in School-aged Children Study^a

Country	Participants Who Reported Using Morning-After Pill, No. (%)		Participants Who Reported Using Withdrawal, No. (%)		Participants Who Reported Using Natural or Biological Methods, No. (%)	
	All Sexually Active Participants	Non-Pill or Condom Users	All Sexually Active Participants	Non-Pill or Condom Users	All Sexually Active Participants	Non-Pill or Condom Users
Austria	...	...	14 (5.8)	7 (26.9)	1 (0.4)	1 (3.8)
Canada	...	...	54 (20.5)	13 (27.7)	...	...
Croatia	...	...	6 (3.1)	1 (1.8)	...	...
England	...	...	54 (7.7)	18 (15.4)	...	...
Estonia	...	...	23 (11.3)	8 (15.4)	7 (3.4)	3 (5.8)
Finland	14 (2.9)	7 (9.2)	23 (4.8)	13 (17.1)	...	...
Flemish Belgium	44 (9.5)	7 (11.9)	75 (16.2)	8 (13.6)	...	...
France	76 (14.2)	9 (15.8)	45 (8.4)	11 (19.3)	...	...
Greece	...	...	50 (19.4)	15 (53.6)	...	...
Hungary	15 (5.9)	4 (7.5)	44 (17.3)	14 (26.4)	1 (0.4)	0
Israel	...	...	21 (9.7)	2 (7.4)	...	...
Latvia	...	...	19 (11.8)	9 (24.3)	...	...
Lithuania	...	...	80 (25.6)	24 (38.7)	...	...
Macedonia	...	...	52 (22.3)	8 (25.8)	...	...
Netherlands	...	...	...	3 (16.7)	...	...
Poland	...	...	54 (17.5)	0	26 (8.4)	0
Portugal	...	...	9 (4.8)	6 (14.3)	...	...
Scotland	21 (5.7)	7 (7.2)	28 (7.6)	18 (18.6)	...	...
Slovenia	...	...	62 (25.4)	26 (53.1)	23 (9.4)	10 (20.4)
Spain	...	...	25 (9.7)	9 (27.3)	...	...
Sweden	15 (4.7)	8 (9.6)	17 (5.4)	6 (7.2)	...	...
Switzerland	...	...	20 (6.3)	8 (25.0)	4 (1.3)	2 (6.3)
Ukraine	...	...	43 (8.4)	14 (11.2)	15 (2.9)	5 (4.0)
Wales	42 (11.7)	8 (11.3)	39 (10.9)	17 (23.9)	...	...
Total No.	2774	495	7824	1387	2086	420

^aEllipses indicate that the given method was not offered as a response option to participants from these countries.

The rate for suboptimal protection for all of the countries goes up to 16.7% if we add the unprotected and poorly protected groups as defined earlier. The proportion of unprotected or poorly protected students then ranges from 6.3% in the Netherlands to around 27% in Poland and Croatia. In 8 countries, more than 1 in 5 students reported either no protection or inappropriate protection against pregnancy, and more girls than boys reported that they were poorly protected (4.6% vs 2.6%, respectively; $P < .001$).

COMMENT

These analyses present a unique opportunity to illuminate the cross-national differences and similarities in adolescent contraceptive use with data that have been collected in a comparable fashion. In the 24 industrialized countries studied, it is clear that condom use as well as dual condom and contraceptive pill use followed by contraceptive pill use alone are the most frequently reported contraceptive methods at last sexual intercourse.

Condoms, even if not the best method to prevent pregnancy with a first-year failure rate of 14.5% for those younger than 18 years when used alone,⁵ have the advantage of also protecting against STIs. As such, they are

generally promoted among young people for their accessibility and appropriateness. Our findings are consistent with recent national surveys showing that condoms are the most common contraceptive method among young adolescents.^{2,15,24,25} Oral contraceptives, the most reliable and effective method to prevent pregnancy asked about in the HBSC study given that no other long-lasting hormonal method was included, are the second most common contraceptive method reported by young people in our sample. Again, our findings are in line with the latest comparable studies given the fact that they are far less frequent in younger adolescents than in older adolescents.^{2,15,24,25} Use of the dual method, offering simultaneous protection against pregnancy and STIs, has a very low failure rate (first-year failure rate of 1.1% among those younger than 18 years)⁵ and was reported by 15.8% of students in this survey, which is quite high compared with the 5% rate found in the 2001 US YRBS.²⁵ However, Darroch et al² found in their comparison of 5 industrialized countries that the rate of dual method use was the lowest in the United States, as did Berne and Huberman¹⁶ when the United States was compared with France, Germany, and the Netherlands.

Seven countries offered emergency contraception as a response category, a potential protection against both teen pregnancies and abortions. Rates ranged between 2.9% in

Finland and 14.2% in France. This range of prevalence is confirmed by the literature.^{26,27} Such high rates in France can be explained by the fact that emergency contraception has been available over the counter in France since 1999 and through school nurses since 2001.²⁸ Most studies have found that emergency contraception use is preceded by another method of contraception; condom failure and forgetting to use the pill are the most commonly cited.^{29,30} Like others,^{30,31} we found no significant differences in rates of emergency contraception use between condom and/or contraceptive pill users and others.

Finally, it is of particular concern to find that in the 24 countries studied here, 16.6% of sexually active students aged 15 years were either unprotected or poorly protected against pregnancy during their last intercourse, with a high of more than a quarter of students unprotected in Poland and Croatia. A fifth of students not using condoms or contraceptive pills reported relying on withdrawal for contraception. This rate went up to more than half of non-condom and contraceptive pill users in Greece and Slovenia. Withdrawal requires a high degree of motivation and discipline and appears to be a challenge for adolescent couples, reaching a failure rate of 24.8% among girls younger than 18 years in the first year.⁵

In the 7 countries that included natural methods as a choice, rates were up to 9.4% in Slovenia and 8.4% in Poland. For such methods, the typical failure rate has been reported to be 20% for all age groups, but it is recognized that adolescents may have particular problems complying with the requirements.¹³

SEX DIFFERENCES

Reports of contraceptive methods usually reveal sex differences, and this has been consistently observed for condoms and contraceptive pills in the YRBS since 1991.⁷ Indeed, we found that more boys reported use of condoms, significantly so in 12 countries. Girls tended to report more use of oral contraceptives, perhaps because they are more aware of their own contraceptive pill use. Hungary offers a coherent picture with prevalence rates higher in boys than girls for contraceptive pill use as well as for sexual intercourse. Hungarian boys may have sexual intercourse with older girls who are more likely to use contraceptive pills.

GEOCULTURAL DIFFERENCES

Geographical patterns emerge in oral contraceptive use: young people in northern and western Europe were more likely to use oral contraceptives than those in southern and eastern Europe. However, no clear pattern was found for condoms. Moreover, there seems to be a pattern for higher levels of effective protection against pregnancy in western Europe. With the exception of Macedonia, no countries from central or eastern Europe had high numbers of well-protected students. Such patterns could be explained by accessibility and affordability of contraceptives and reproductive health services to young people² as well as by variance in the cultural salience of traditional values and religion.

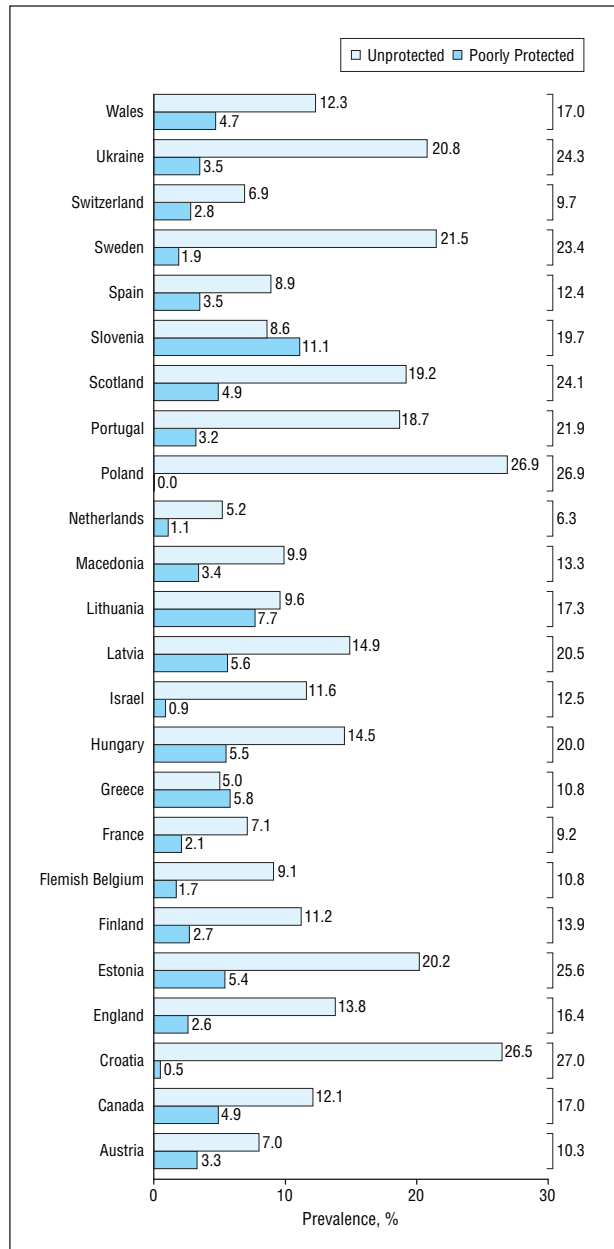


Figure 2. Prevalence of reported unprotected participants (sexually active participants who reported no use of any contraception at last intercourse) and poorly protected participants (sexually active participants who reported use of withdrawal, the morning-after pill, or natural or biological methods of contraception but not use of contraceptive pills or condoms at last intercourse) at last intercourse by country according to the 2002 World Health Organization Health Behaviour in School-aged Children study.

CONCLUSIONS

Successful strategies to prevent adolescent pregnancies include community programs to improve social development, education in responsible sexual behavior, and improved contraceptive counseling and delivery.³² In particular, the role of parents in terms of communication with adolescents and monitoring has recently been highlighted.³³⁻³⁵ Accurate information about adolescents' sexual practices and readiness to use specific contraceptive methods for birth control and STI pre-

vention should guide the development of interventions that more effectively promote healthy sexual behaviors.^{2,8,15} Such information is essential to help understand changes in adolescent pregnancy and STI patterns as well as to monitor the progress of public health activities.³⁶ The geographical and cultural patterns of protection against pregnancy might be linked to the broader social acceptance of sexuality among young adolescents, access to contraceptives, and information about these and other medical services.^{2,15} From this perspective, the HBSC study has an important role to play in providing valuable, cross-cultural information on the sexual health of young people and should help to encourage policy makers to address apparent cross-national inequalities in the use of efficacious contraception in the adolescent population. However, additional analytical work (eg, analysis of risk and protective factors associated with sexual behaviors and their outcomes) is required to provide greater insight into variations in contraceptive use and the reproductive health of future generations. Such cross-country comparisons will help countries to identify factors or approaches from more successful countries that may be adapted with due regard to cultural appropriateness.

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