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Trends in Inequalities in the Use of Condom by Urban Teenagers in Spain

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ABSTRACT *Social and economic inequalities in condom use by adolescents have been reported previously. Also, condom use has declined during the last decade. The aim of the study was to describe trends in the use of condoms in our setting, and how these trends may differ between socioeconomic groups in boys, and separately in girls, aged 17-19 years attending school in Barcelona between 2004 and 2012. We analyzed data from three annual surveys on risk factors in secondary students, which included a representative sample of the city's population; individuals who had previously had sexual intercourse (n=1570) were included in the study. We calculated adjusted prevalence ratios (aPR) and their confidence intervals (95 % CI) using robust Poisson regression models. The prevalence of condom use among boys was 87.0 % in 2004 and 76.2 % in 2012, and 76.7 and 64.7 % among girls, respectively. This decrease was greater in adolescents with a low socioeconomic level, both in boys (aPR=0.80) and girls (aPR=0.84). The observed increase of socioeconomic inequalities in condom use in adolescents highlights a possible deterioration in good sexual practices and policies during the studied period.*

KEYWORDS *Condoms, Adolescent, Socioeconomic factors, Sexual behavior, Contraception, Trends*

INTRODUCTION

Most people have their first sexual experience and define their sexual identity and behavior during adolescence. Prevention of risky sexual behaviors during this phase is essential to the prevention of unwanted pregnancies and sexually transmitted infections.[1] In the last decade, however, Spain and other countries such as New Zealand[2] and the USA[3] have experienced a stagnation or even a decrease in condom use among teenagers, declining from 79.4 % in 2004 to 68.6 % in 2012 in Spain.[4]

The correct use of condoms during sexual intercourse is an effective way to prevent sexually transmitted diseases (STD) and unwanted pregnancies at all ages.[1,5] However, adolescents are prone to situations associated with less frequent condom use, such as the consumption of alcohol or illegal drugs,[6,7] and to risky sexual behaviors, such as having frequent sex or having several sexual partners. The lack of abilities to refuse sexual

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intercourse without condom and a negative attitude or inability to purchase and use condoms are also behaviors related to condom use failure.[8–10]

Also in this period of life, there are some factors which make teenagers more vulnerable to risky sexual behaviors, such as age at first intercourse, gender patterns, and family and social environments.[11] Engaging in sexual intercourse at an early age is associated with a lower likelihood of using a condom.[12,13] As in other European countries, the age of Spanish teenagers' first sexual experience is currently around 17 years.[14] Some studies have reported that girls are less likely to use condoms than boys,[15,16] whereas other authors have described the opposite.[17]

The family and social environment plays an essential role in transmitting values and standards, particularly those related to sexuality. Thus, adverse family environments with affective and material deprivation can increase the likelihood of risky sexual behaviors.[18] In line with this, condom use is lower among adolescents from disadvantaged social classes.[19] In turn, socioeconomic status is related to the type of school an adolescent attends,[20,21] such that students from public schools usually report more risky sexual behaviors than those from private schools.[22] The presence of social inequalities in condom use during adolescence has been reported previously,[23,24] and trends in condom use were examined in different social classes during the 1980s and 2000s.[25,26] However, trends in condom use in recent years have not been explored in detail, despite the importance of understanding how these trends vary between different social classes in order to allocate resources and design targeted public health interventions for specific population groups.

Therefore, our objective was to describe trends in the use of condoms in our setting, and how these trends may differ between socioeconomic groups (socioeconomic inequalities in trends) in boys, and separately in girls, aged 17-19 years attending school in Barcelona between 2004 and 2012.

METHODS

Study Design and Sample

We analyzed data from three city-wide surveys of risk factors among a representative sample of secondary school students (*Encuestas sobre Factores de Riesgo en Estudiantes de Secundaria* [FRESC]) conducted by Barcelona Public Health Agency in 2004, 2008, and 2012. Details of the survey methodology are provided elsewhere.[27] Briefly, we estimated that a sample size of ~1000 students would provide 3 % precision and 5 % alpha error for an estimated proportion of 50 %. Assuming 20 % non-responses, the number of students to survey was 1250. We carried out randomized sampling stratified by school type and the socioeconomic level of the school's neighborhood and considered the classroom as the sampling unit.[28] During the study period, 2630 students completed a self-administered questionnaire at their school (752 in 2004, 786 in 2008, and 1092 in 2012). Of those who completed the questionnaire, 59.7 % (n=1570) had previously had sexual intercourse at least once and were included in the study: 416 in 2004 (55.3 %), 504 in 2008 (64.1 %), and 650 in 2012 (59.5 %).

Measurement and Variables

From the FRESC survey,[28] we used data from the sections on sexuality, health-related behavior, and socio-demography.

The dependent variable was condom use during the last sexual intercourse (yes/no). This variable was created from the question: "Which method of contraception

did you use the last time you had sexual intercourse?", to which participants could answer more than one of the following options: "Contraceptive pill, condoms, diaphragm, intrauterine device (IUD), rhythm method, spermicide, coitus interruptus, or another method."

The independent variables were as follows: (1) the survey year (2004, 2008, or 2012); (2) sex (boy or girl); and (3) index of household income (IHI) of the school's neighborhood, grouped by tertiles, with lower tertiles representing the most disadvantaged neighborhoods. The IHI is calculated from the following: (a) the proportion of graduates among all individuals aged ≥25 years, (b) the unemployment rate in the total active population, (c) the number of cars per 1000 inhabitants, (d) the proportion of new cars that have a high power rating, and (e) the resale value of houses. These data were unavailable for 2004, so we used data from 2008 for that year. All adolescents included in the study were assumed to have the IHI of their school's neighborhood; (4) type of school in two categories: (a) public schools and (b) independent private and government-dependent private schools. Public schools are secular and are funded entirely by the state. Independent private schools have their own values, can be religious or not (~25 % are religious), and are not funded by the state. Government-dependent private schools are subsidized by the state, and ~60 % are religious.[20,21] For the purposes of this study, both independent and government-dependent schools are referred to as "private schools."

Behavior-related adjustment variables were as follows: (1) having consumed alcohol or illegal drugs during the last sexual intercourse (yes/no); (2) having ever bought condoms (yes/no); (3) frequency of sexual intercourse, in two categories: (a) more than once per week or (b) once a week or less; (4) having ever refused sexual intercourse because it was not possible to use a condom (yes/no); (5) having ever used the emergency pill; (6) having ever tried cannabis; and (7) having a negative mood, based on the following six-item question: "How many times have you: felt very tired doing normal activities; had difficulty sleeping or staying asleep; felt out of place or sad; felt hopeless when facing the future; been nervous or tense; been bored with your things?" Answers were collected on a five-point Likert scale ranging from "never" to "always." The answers "frequently" and "always" were assigned 1 point each, and students with ≥3 points were considered to have negative mood states.

Data Analyses

All analyses were stratified by sex and survey year. We performed a chi-square test to determine variation in the prevalence of condom use over time. Raw and adjusted prevalence ratios (aPR) and their confidence intervals (95 % CI) were obtained from bivariate and multivariate Poisson generalized estimating equation (GEE) models with robust variance.[29] These models included all independent and adjustment variables mentioned above. We then further adjusted these models for interaction between survey year and socioeconomic variables. Significant interaction indicates that the association between condom use and socioeconomic variables changed over the years of study. All analyses were performed using Stata 11.

RESULTS

Overall Trends

Of the 1570 students (694 boys and 876 girls) who declared that they had previously had sexual intercourse, 1186 had used a condom the last time they had sex (75.5 %). The

prevalence of condom use was 80.5 % in 2004, 80.7 % in 2008, and 68.3 % in 2012 (Table 1).

Boys: Trends and Inequalities in Trends

Condom use decreased over time, particularly in boys from the most disadvantaged tertile (2004, 91.0 %; 2012, 69.1 %), those attending private schools (2004, 87.3 %; 2012, 77.0 %), and those who had never refused unprotected sexual intercourse (2004, 86.6 %; 2012, 72.4 %) (Table 2). We observed an increase in the use of coitus interruptus (2004, 7.3 %; 2012, 14.7 %) or no contraceptive method (2004, 0.5 %; 2012, 5.9 %), but no statistical change in the use of the contraceptive pill (9.2 to 7.7 %) or the rhythm method (0.5 to 0.7 %) (Table 1).

Multivariate analysis adjusted for socioeconomic status and school type and stratified by survey year (Table 3) showed an aPR for condom use in 2012 of 1.20 (95 % CI 1.03–1.36) among boys in the highest IHI tertile compared to those in boys in the lowest tertile. We observed no socioeconomic inequalities for the other study years or between the different types of school.

Analysis of interaction between survey year and socioeconomic variables showed a decrease in condom use over time among adolescent boys from the lowest IHI tertile. Condom use in this group was 20 % lower in 2012 than in 2004 (aPR=0.80, 95 % CI 0.71–0.91), which is related to prevalences shown in Table 4. We observed no significant differences in condom use between 2004 and 2012 among adolescents in the middle and high IHI tertiles (aPR middle tertile=0.91, 95 % CI 0.76–1.09; aPR highest tertile=0.92; 95 % CI 0.81–1.03).

Regarding school type, condom use decreased between 2004 and 2012 among adolescents attending private schools (aPR=0.89; 95 % CI 0.82–0.97) (Table 4). Stratifying the analyses by school type, we found that condom use among boys attending public schools decreased between 2004 and 2012 in the lowest IHI tertile (aPR=0.72; 95 % CI 0.55–0.94). In contrast, in private schools, we observed a decrease in both the lowest and highest IHI tertiles (aPR=0.87, 95 % CI 0.75–0.93; aPR=0.87, 95 % CI 0.79–0.96, respectively) (Table 4).

Girls: Trends and Inequalities in Trends

We also observed differences in the prevalence of condom use by girls over time: 76.7 % in 2004 and 64.7 % in 2012. The prevalence of condom use during the last intercourse was lower in the lowest and middle IHI tertiles. These decreases followed a pattern similar to that in boys (Table 2).

Multivariate models adjusted by IHI and school type showed no socioeconomic inequalities in condom use in any of the survey years. We observed an increase in the number of individuals who used the contraceptive pill (2004, 14.9 %; 2012, 19.7 %) or no form of contraception (2004, 1.0 %; 2012, 6.0 %), although the use of contraceptive pill as the only method remained stable (2001, 12.4 %; 2012, 13.7 %). The prevalence of the use of a vaginal ring (1.0 to 3.6 %), the rhythm method (1.0 to 1.1 %), and coitus interruptus remained statistically unchanged (7.9 to 10.1 %) between 2004 and 2012 (Table 1).

Analysis of the interaction between survey year and socioeconomic level showed that girls in the lowest IHI tertile used condoms 16 % less in 2012 than in 2004 (aPR=0.84; 95 % CI 0.73–0.97). As for boys, we observed no differences in condom use over time among girls from the middle and high socioeconomic groups (aPR middle tertile=0.82; 95 % CI 0.64–1.05, aPR highest tertile=0.85; 95 % CI 0.71–1.25) (Table 4).

TABLE 1 Description of the sample. Boys and girls aged 17-19 years old who had previously had sexual intercourse. Barcelona (Spain) 2004, 2008, and 2012

Variables	% (*n*)	% (*n*)	% (*n*)	% (*n*)	*P* value
Boys	2004 (*n* = 212)	2008 (*n* = 203)	2012 (*n* = 229)	Total (*n* = 694)	
Proportion of total sample	30.6	29.2	40.2	100	–
IHI of school district[a]					
Lowest	33.9 (72)	32.0 (65)	36.2 (101)	34.3 (238)	<0.001
Middle	42.0 (89)	30.1 (61)	20.8 (58)	30.0 (208)	
Highest	24.1 (51)	37.9 (77)	43.0 (120)	35.7 (248)	
Attending state school	30.7 (65)	26.1 (53)	31.9 (89)	29.8 (207)	0.371
Negative mood	11.9 (25)	16.8 (34)	18.5 (51)	16.0 (110)	0.130
Previous use of cannabis	73.5 (155)	70.6 (142)	66.1 (183)	69.7 (480)	0.199
Use of contraceptive pills	9.2 (19)	7.9 (16)	7.7 (21)	8.2 (56)	0.828
Coitus interruptus	7.3 (15)	3.5 (7)	14.7 (40)	9.1 (62)	<0.001
No contraceptive method	0.5 (1)	0.5 (1)	5.9 (16)	2.6 (18)	<0.001
Use of alcohol/illegal drugs in last sexual intercourse	33.0 (63)	37.4 (74)	31.3 (86)	33.6 (223)	0.375
Previously bought condoms	83.5 (177)	86.1 (174)	83.3 (229)	84.2 (580)	0.661
Sexual intercourse more than once per week	18.9 (40)	24.1 (49)	28.3 (79)	24.2 (168)	0.053
Previous refusal to have intercourse without a condom	33.6 (70)	30.2 (61)	41.0 (112)	35.6 (243)	0.040
Previous use of the emergency pill	20.2 (42)	27.2 (55)	29.8 (82)	26.1 (179)	0.053
Previous pregnancy	1.1 (2)	2.1 (4)	2.5 (7)	2.0 (13)	0.453
Used a condom in last sexual intercourse	87.0 (180)	87.6 (177)	76.2 (208)	82.8 (565)	0.001
Girls	2004 (*n* = 204)	2008 (*n* = 301)	2012 (*n* = 371)	Total (*n* = 876)	
Proportion of total sample	23.3	34.4	42.3	100	–
IHI of school district[a]					
Lowest	35.3 (72)	24.9 (75)	44.5 (165)	35.6 (312)	<0.001
Middle	34.8 (71)	41.5 (125)	22.4 (83)	31.8 (279)	
Highest	29.9 (61)	33.56 (101)	33.1 (123)	32.5 (285)	
Attending state school	40.7 (83)	24.3 (73)	34.5 (128)	32.4 (284)	<0.001
Negative mood	25.0 (51)	18.8 (56)	28.0 (103)	24.1 (210)	0.021
Previous use of cannabis	74.5 (152)	71.9 (215)	63.0 (233)	68.7 (600)	0.006
Use of contraceptive pills	14.8 (30)	12.5 (37)	19.7 (72)	16.1 (139)	0.036
Coitus interruptus	8.9 (18)	10.1 (30)	14.5 (53)	11.7 (101)	0.081
No contraceptive method	1.0 (2)	0.3 (1)	6.0 (22)	2.9 (25)	<0.001
Use of alcohol/illegal drugs in last sexual intercourse	19.9 (38)	20.7 (61)	17.6 (65)	19.2 (164)	0.585
Previously bought condoms	71.3 (144)	72.2 (216)	63.7 (235)	68.4 (595)	0.037
Sexual intercourse more than once per week	36.3 (74)	34.2 (103)	38.0 (141)	36.3 (318)	0.597
Previous refusal to have intercourse without a condom	62.5 (125)	63.9 (188)	64.0 (235)	63.6 (548)	0.928
Previous use of the emergency pill	38.4 (78)	42.6 (127)	45.1 (165)	42.7 (370)	0.306
Previous pregnancy	3.8 (7)	2.0 (6)	4.9 (18)	3.6 (31)	0.203
Used a condom in last sexual intercourse	76.7 (155)	77.7 (230)	64.7 (236)	72.0 (621)	<0.001

IHI index of household income

[a]IHI, distributed in tertiles, the higher tertile being the most advantaged

TABLE 2 Prevalence of condom use among boys and girls aged 17-19 years old in Barcelona (Spain) 2004, 2008, and 2012

	Boys				Girls			
	2004 ($n=212$)	2008 ($n=203$)	2012 ($n=279$)		2004 ($n=204$)	2008 ($n=301$)	2012 ($n=371$)	
Variables	% (n)	% (n)	% (n)	P value	% (n)	% (n)	% (n)	P value
IHI of schools' district[a]								
Lowest tertile	91.0 (61)	87.5 (56)	69.1 (67)	0.001	76.4 (55)	78.7 (59)	65.0 (106)	0.050
Middle tertile	84.3 (75)	90.2 (55)	75.9 (44)	0.106	75.4 (52)	77.0 (94)	56.1 (46)	0.003
Highest tertile	86.3 (44)	85.7 (66)	82.2 (97)	0.723	78.7 (48)	77.8 (77)	70.0 (84)	0.300
Type of school								
State	86.2 (56)	83.0 (44)	74.4 (64)	0.170	76.5 (62)	73.6 (53)	66.7 (84)	0.273
Private	87.3 (124)	89.3 (133)	77.0 (144)	0.004	76.9 (93)	79.0 (177)	63.6 (152)	<0.001
Negative mood								
No	83.3 (158)	89.2 (149)	74.3 (165)	<0.001	76.8 (116)	77.7 (185)	64.3 (169)	0.001
Yes	91.3 (21)	79.4 (27)	87.5 (42)	0.404	76.5 (39)	76.4 (42)	65.7 (65)	0.236
Previous use of cannabis								
No	92.7 (51)	87.9 (51)	78.3 (72)	0.045	88.2 (45)	84.5 (71)	76.3 (103)	0.112
Yes	84.8 (128)	87.3 (124)	74.9 (134)	0.008	72.8 (110)	75.2 (158)	57.6 (132)	<0.001
Use of alcohol/illegal drugs in last sexual intercourse								
No	89.0 (113)	89.5 (111)	75.8 (141)	0.001	77.5 (117)	77.5 (179)	64.3 (193)	0.001
Yes	86.7 (52)	85.1 (63)	77.4 (65)	0.271	73.7 (28)	76.7 (46)	66.7 (42)	0.451
Previously bought condoms								
No	81.8 (27)	82.1 (23)	63.6 (28)	0.106	82.5 (47)	82.7 (67)	65.9 (87)	0.007
Yes	87.9 (153)	88.5 (154)	78.8 (178)	0.009	75.0 (108)	75.6 (161)	64.1 (148)	0.013
Frequency of sexual intercourse								
≤1 per week	91.0 (152)	92.8 (142)	82.1 (161)	0.004	88.3 (113)	86.6 (168)	73.6 (167)	<0.001
>1 per week	70.0 (28)	71.4 (35)	61.0 (47)	0.412	54.8 (42)	60.8 (62)	50.0 (69)	0.239
Previous refusal to have intercourse without a condom								
No	86.6 (116)	87.9 (124)	72.4 (113)	0.001	66.7 (50)	72.8 (75)	50.4 (65)	0.001
Yes	87.0 (60)	86.9 (53)	81.2 (91)	0.481	82.3 (102)	79.7 (149)	72.4 (168)	0.065
Previous use of the emergency pill								

No	90.1 (145)	89.8 (132)	78.5 (150)	0.002	87.1 (108)	87.4 (146)	76.1 (150)	0.006
Yes	76.2 (32)	81.8 (45)	71.2 (57)	0.370	60.3 (47)	64.6 (82)	50.9 (83)	0.057
Previous pregnancy								
No	88.9 (144)	87.0 (160)	78.6 (195)	0.009	79.6 (137)	78.2 (222)	66.1 (224)	<0.001
Yes	0 (0)	75.0 (3)	57.1 (4)	0.214	28.6 (2)	33.3 (2)	37.5 (6)	0.916
Do not know	83.3 (5)	100 (6)	42.9 (6)	0.028	60.0 (3)	100.0 (3)	42.9 (3)	0.240

IHI index of household income

[a]IHI, distributed in tertiles, with the higher tertile representing the most advantaged group

TABLE 3 Trends in condom use according to socioeconomic position and associated factors in adolescent boys and girls aged 17-19 years. Barcelona 2004, 2008, and 2012

	Boys			Girls		
	2004	2008	2012	2004	2008	2012
Variables	rPR (95 % CI)	rPR (95 % CI)	rPR (95 % CI)	aPR[a] (95 % CI)	aPR (95 % CI)	aPR (95 % CI)
IHI of schools' district[b]						
Lowest tertile	ref	ref	ref	ref	ref	ref
Middle tertile	0.93 (0.82–1.05)	1.03 (0.89–1.18)	1.09 (0.89–1.35)	0.96 (0.83–1.10)	1.01 (0.88–1.16)	1.11 (0.93–1.32)
Highest tertile	0.95 (0.83–1.08)	0.98 (0.84–1.13)	1.19 (1.03–1.36)	1.02 (0.89–1.16)	0.96 (0.83–1.11)	1.20 (1.08–1.33)
Type of school						
State school	ref	ref	ref	ref	ref	ref
Private school	1.02 (0.90–1.15)	1.08 (0.94–1.25)	1.04 (0.89–1.22)	0.99 (0.85–1.15)	1.11 (0.95–1.30)	0.98 (0.85–1.13)

rPR raw prevalence ratio, *aPR* adjusted prevalence ratio, *IHI* index of household income

[a]aPR, models were adjusted for negative mood, previous use of cannabis, use of alcohol/illegal drugs in last sexual intercourse, previously bought condoms, previous refusal to have intercourse without a condom, previous use of the emergency pill, pregnancy

[b]IHI, distributed in tertiles, with the higher tertile representing the most advantaged group

TABLE 4 Trends in socioeconomic inequalities in condom use among boys and girls aged 17-19 years old. Barcelona 2004, 2008, and 2012

	Boys			Girls		
	2004	2008	2012	2004	2008	2012
Variables	aPR[a] (95 % CI)	aPR (95 % CI)	aPR (95 % CI)	aPR (95 % CI)	aPR (95 % CI)	aPR (95 % CI)
IHI of schools' district[b]						
Lowest	ref	0.99 (0.88–1.12)	0.80 (0.71–0.91)	ref	0.97 (0.80–1.17)	0.84 (0.73–0.97)
Middle	ref	1.06 (0.92–1.21)	0.91 (0.76–1.09)	ref	1.02 (0.85–1.22)	0.82 (0.64–1.05)
Highest	ref	0.96 (0.84–1.10)	0.92 (0.81–1.03)	ref	1.03 (0.84–1.26)	0.85 (0.71–1.25)
Type of school						
State	ref	0.94 (0.79–1.13)	0.87 (0.73–1.04)	ref	0.91 (0.76–1.09)	0.86 (0.73–1.00)
Private	ref	1.02 (0.94–1.12)	0.89 (0.82–0.97)	ref	1.05 (0.93–1.18)	0.83 (0.73–0.95)
Type of school						
State school						
Lowest IHI	ref	0.90 (0.69–1.16)	0.72 (0.55–0.94)	ref	1.01 (0.75–1.36)	0.89 (0.75–1.04)
Middle IHI	ref	0.78 (0.47–1.29)	0.96 (0.77–1.20)	ref	0.87 (0.60–1.28)	0.96 (0.80–1.15)
Highest IHI	ref	1.48 (1.15–1.92)	1.44 (1.40–1.49)	ref	0.64 (0.58–0.71)	0.59 (0.46–0.77)
Private government-dependent/private schools						
Lowest IHI	ref	1.04 (0.92–1.18)	0.87 (0.75–0.93)	ref	0.95 (0.75–1.20)	0.80 (0.64–0.97)
Middle IHI	ref	1.15 (0.97–1.37)	0.87 (0.68–1.10)	ref	1.13 (0.83–1.54)	0.79 (0.52–1.21)
Highest IHI	ref	0.91 (0.80–1.03)	0.87 (0.79–0.96)	ref	1.08 (0.86–1.34)	0.87 (0.70–1.08)

aPR adjusted prevalence ratios, *IHI* index of household income

[a]aPR resulting including adjusting variables and the interaction with socioeconomic variables: IHI, school type, and school type stratified by IHI, in each case. For boys, models were adjusted by the following: IHI, type of school, negative mood, use of alcohol/illegal drugs in the last sexual intercourse, previously purchased condoms, and frequency of sexual intercourse. In girls, models were adjusted by the following: IHI, type of school, previous use tried cannabis, use of alcohol/illegal drugs in last sexual intercourse, frequency of sexual intercourse, previous refusal to have intercourse without a condom, and previous use of the emergency pill

[b]IHI, distributed in tertiles, with the higher tertile representing the most advantaged group

Similar to the results seen among boys, stratifying the analyses by school type showed a decrease in condom use among girls attending private schools (aPR=0.83; 95 % CI 0.73–0.95) (Table 4). Among girls attending public schools, those in the highest tertile of IHI showed a significant decreased condom use (aPR=0.59; 95 % CI 0.46–0.77), while in private schools, condom use decreased in the lowest IHI tertile (aPR=0.80; 95 % CI 0.64–0.97) (Table 4).

DISCUSSION

Our results show that the prevalence of condom use decreased between 2004 and 2012 among both boys and girls aged 17–19 attending schools in the city of Barcelona. We also found that between 2008 and 2012, this decrease was more striking in disadvantaged social classes, as well as among those attending private schools.

Trends in Condom Use

The observed decrease in condom use between 2004 and 2012 is consistent with the results of other studies of the same period in other developed countries.[2,4] In contrast, the prevalence of risky sexual behaviors has decreased in some countries, such as Canada, where the prevalence of condom use increased between 2003 and 2010.[30]

The decrease in condom use observed in our study may be due to reduced perception of the risk of pregnancy or HIV and other STDs, or because of greater acceptance of pregnancy,[31,32] either because of the lack of hope for the future or because it is seen as an opportunity of family independence.[33] In addition, some teenagers reported that they did not use condoms because they reduce the enjoyment of sexual intercourse.[32,33]

There may be an association between decreased condom use and improved access to the emergency pill, as has been the case in Spain since 2009. We observed an association between previous use of the emergency pill and failure to use condoms during the last sexual intercourse. Nevertheless, the emergency pill does not appear to have caused changes in the prevalence of condom use nor is it commonly used as a contraceptive method, as in other countries where emergency pills are bought without prescription.[34]

We observed an increase in the use of coitus interruptus and failure to use contraception among boys during this period, which would explain the decrease in condom use. Among girls, we observed an increase in the use of the contraceptive pill in combination with other methods, such as condoms, and also of failure to use contraception. Thus, while more girls used more than one contraceptive method to prevent pregnancy and STDs in 2012, there are also more girls who do not use contraception to protect against those outcomes.

Condom use is also related to preventive programs. Previous studies suggest that contraception use at first sexual intercourse is associated with subsequent use, such that 84 % of women who currently use contraception had also used it during their first sexual intercourse.[24] In the 1980s and 1990s in the USA, condom use increased among adolescents from disadvantaged social classes in response to HIV prevention campaigns,[25] although this tendency has plateaued since 2000.[3] While prior sexual education is essential to the success of prevention programs, sexual education aimed only at improving knowledge does not modify behaviors and

habits;[35] this also applies to prevention programs for other risky behaviors. In Spain, sexual education is insufficient in that it is not mandatory, it begins at age 14 years, much later than in other European countries, and does not achieve minimum standards.[36] In addition, preventive programs underway between 2008 and 2012 have likely been undermined by the financial crisis, which began in 2008 in Spain as elsewhere.[37]

Condom Use among Disadvantaged Social Classes

We found that the decrease in condom use is more striking among adolescents from disadvantaged social classes. This result is not consistent with previous reports that showed similar improvements in condom use in all socioeconomic groups. A study of three generations of Swedish women showed that condom use between 1981 and 2001 increased to a similar extent in all social classes and found no socioeconomic inequalities in any of these cohorts.[26] Similarly, a UK study found that the rate of unwanted pregnancies during adolescence decreased across all social classes,[38] although some social inequalities remained at the end of that study.

Familial socioeconomic position is associated with condom use, such that the children of parents with high socioeconomic status tend to use condoms more than those whose parents have a lower socioeconomic status.[39] Moreover, as observed by other authors, a closer social and family environment can prevent risky behaviors among adolescents[40] through relationships with neighbors or neighborhood recreational options. Neighborhoods with limited safe and healthy recreational options for adolescents are more likely to have a higher prevalence of adolescent sexual activity.[41]

Our results show a decrease in condom use, especially among students from private schools. While we did not observe inequalities between school types for any survey year, the decrease in condom use during the study period was more marked in private schools. However, this finding could be due to a smaller representativeness of students from state schools.

The proportion of private government-dependent schools that are religious schools is ~60 %,[20] and religiousness has been associated with lower contraceptive use.[42] It is also possible that risky sexual behaviors are increasing among students with lower socioeconomic status because the nature of the source database did not allow us to distinguish between students attending private government-dependent schools and those attending private schools, which likely come from the most socioeconomically advantaged families.[21]

Several studies have explored differences in sexual behavior between types of school and have found that pupils in public schools are less aware of contraceptive methods and are more likely to undertake risky sexual activities,[22,43] although these results are not consistent with ours.

Trends in Gender Patterns of Condom Use

The concept of gender includes all factors related to the different ways men and women socialize, including family and social roles, the social construction of sexuality, and the unequal power relationship between genders. This concept is manifested in female and male roles[44] and female and male stereotypes linked to sexuality and is highly conditioned by myths and erroneous beliefs about sexuality.[33,45] This pattern appears to be strengthened during adolescence.

In this study, the prevalence of condom use was lower among girls than boys in all survey years, and the decrease in condom use was slightly higher than in boys. In

Spain, 71 % of boys and 63 % of girls aged 14-18 years use condoms during sexual intercourse; in 19–24-year olds, these rates decrease to 54 and 53 %, respectively, probably due to more frequent use of other contraceptive methods.[46]

Our finding that girls use condoms less frequently than boys is consistent with other reports.[16,23,30] This may be because girls usually have more stable relationships than boys and perhaps also more frequent unprotected intercourse, as suggested by van Empelen and Kok.[47] In this case, the best alternative to condoms is hormonal contraception such as the contraceptive pill, despite its inability to prevent STDs; the use of this method increased in 2012. Another possible explanation is an increase in the gender stereotypes in our context, as found in previous studies,[32,45] leading adolescent girls to cede to their male partners' wishes to have sex without using condoms.

During the study period, we observed no variation in the prevalence of condom use among adolescents who had ever refused to have sexual intercourse without using a condom. Thus, it is important to educate adolescents about the importance of avoiding risky sexual behaviors and to discuss the use of contraception before intercourse; which has been shown to be associated with more frequent use of contraception in adolescents.[13]

The observed decrease in condom use may have contributed to the increased incidence of STDs observed in recent years.[48] However, it is not clear whether trends in teenage pregnancy in Barcelona[49] might also be associated with decreased condom use, although the rate of pregnancies may be increasing in disadvantaged districts.[50]

Limitations

This study has various limitations. First, the method used to collect data on contraceptive methods used during the last intercourse varied between surveys. The 2012 questionnaire included additional options for the contraceptive method used (emergency pill, vaginal ring, and no method), which would account for the higher number of individuals who reported in the 2012 survey that they used "no method." These individuals may have chosen another method in the 2004 and 2008 surveys, such as coitus interruptus, although the prevalence of use of coitus interruptus did not decrease in the 2012 survey in favor of no contraceptive method.

Second, the questionnaires did not specify the type of condom used (male or female): both types are barrier methods that protect from STDs and pregnancy, although female condoms are less effective than male condoms.[1]

Third, one of the socioeconomic indicators was the IHI of the schools' district, which may not precisely capture students' individual socioeconomic level. In addition, the IHI for 2008 was also used for 2004 because of the lack of data for that year, although this is reasonable because the financial crisis started at the end of 2008. It was also possible to use data for a different index from 1996 (ICEF 1996), but since this index is computed using a distinct method from that used for the IHI, and that 2008 is closer in time to 2004, we preferred to use the 2008 IHI for analysis of the 2004 survey.

Fourth, it may not be appropriate to use the type of school as a socioeconomic variable because of the difficulty in accurately distinguishing between the high and low and middle socioeconomic levels, given that independent private schools could not be separated from government-dependent private schools. In contrast, the results obtained using the socioeconomic level of the schools' district seem to be more consistent with those of other studies in which lower socioeconomic status was

related to greater risky behavior.[19] Furthermore, a UK study suggests that between-school differences are more due to the characteristics of the schools' environment than to the school itself.[51]

Fifth, this study analyzed behavior in 17- to 19-year olds attending the last year of secondary school or intermediate vocational training in Barcelona, and these individuals represent only a relatively small proportion of this age group.[52]

Sixth, responses to questionnaires on sexual behavior are often incomplete or false because of social desirability or embarrassment.[53,54] However, these questionnaires are anonymized, self-reported, and administered online and on paper, which likely minimizes potential biases.

CONCLUSIONS

We observed a significant decrease in the use of condoms between 2004 and 2012 among 17- to 19-year-old adolescents attending school in the city of Barcelona. This decrease was more striking among boys and girls with lower socioeconomic status, as well as among those studying in independent private or government-dependent private schools.

We recommend the application of the Sexual and Reproductive Health Act of 2010,[55] which highlights the need for adolescents to receive accurate information on sexual health. In this regard, sexual and affective education is key to improving adolescents' communication and relationship skills. Sexual education strategies for adolescents should be reinforced, taking into account the gender perspective, stressing the ability to negotiate contraception and the desirability of buying and carrying condoms. It is also necessary to apply the 2010 Act's point on universal access to contraception and free condoms for adolescents.

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