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DEMOGRAPHIC
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SURVEYS

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among Single Youths:**

An Analysis of the 2018 Cameroon Demographic and Health Survey

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ABSTRACT

In Cameroon, two-fifths of the population is between age 15 and 24. Adolescents and youths are an important social group for the development of the country and the realization of its demographic dividend. Promotion of sexual and reproductive health will enable youth to transform their potential into development.

This study aimed to identify the determinants of condom use at the last sexual intercourse among single youths, highlight gender differences in the factors associated with condom use, and identify the characteristics of youths who were less likely to use condoms. To achieve these objectives, we analyzed data from the 2018 Cameroon Demographic and Health Survey from 1,464 single females and 989 single males age 15-24. Multivariate logistic regression was used to test the study hypotheses.

Overall, 51% of the female and 66% of male youths reported using condoms at their last sexual intercourse. For both sexes, the protective factor was not having children. Among the females, belonging to the Bamileke or Mbo ethnic groups and delaying first sexual intercourse were also protective, while working in modern or service sectors was the main risk factor. Among male youths, residing in households whose heads have a higher educational level was protective, and household poverty was the main risk factor.

These findings support Cameroon's multisectoral approach to HIV/AIDS prevention among youths, and emphasize the importance of involving parents, teachers, and youths.

Key words: Condom use, determinants, gender differences, single youth, age 15-24, Cameroon, sub-Saharan Africa.

1 BACKGROUND AND OBJECTIVES OF THE STUDY

The sexual and reproductive health of young people is currently a scientific and programmatic priority in Africa, within a permanently changing socioeconomic and cultural context (Hindin et al. 2012). The growing emphasis on the sexual and reproductive health of young people reflects their significant contribution to the continent's demographic dynamics and their vulnerability to sexual and reproductive health risks (Hindin et al. 2012).

In Cameroon, the onset of the HIV/AIDS epidemic in the mid-1980s was addressed by the National AIDS Control Committee (CNLS) through HIV prevention plans beginning in 1987 through 2000 (Salla Ntounga 1993; Tsala Tsala 2004). The initial plans had limited results (Tsala Tsala 2004). Research, policies, and programs focused primarily on students and prostitutes, because these two groups had been formally identified as high-risk groups (Tsala Tsala 2004). During that time, adolescents and young people did not appear to be concerned about HIV/AIDS. By 1998, according to DHS data, the rates of having multiple sexual partners remained quite high among single male and female youth, and few reported using condoms at their last sexual intercourse (31.1% and 17.2%, respectively) (Fotso et al. 1999).

The reorganization of the CNLS in 2001 and implementation of the 2000-2005 and 2006-2010 programs aimed to improve the lives of the entire population living with HIV/AIDS, including children, adolescents and young people, and orphans. The programs used a multisectoral approach (MINSANTE 2000, 2005) and led to appreciable results. Rates of condom use at last sexual intercourse increased among single male youth, from 31.1% in 1998 to 57.3% in 2004 and 72% in 2011; and among female youth, from 17.2% in 1998 to 52.2% in 2004 and 59.5% in 2011 (Fotso et al. 1999; INS and ORC Macro 2004; INS and ICF International 2012). However, since 2011, condom use has decreased significantly among single male youth, from 72% in 2011 to 66.3% in 2018, and single female youth, from 59.5% to 50.9% (INS and ICF International 2012, 2020). Such declines in condom use may be contributing to an increase in HIV prevalence among male youth from 0.4% in 2011 to 0.7% in 2018 among those age 15-19, and from 0.6% in 2011 to 1.5% among those age 20-24 (INS and ICF International 2012, 2020).

These data suggest that approaches to the sexual health of youth should be reexamined in Cameroon to identify the factors associated with current condom use in this group, and to use this information to plan appropriate interventions. This study responds to this need by focusing on the prevalence and factors associated with condom use among single males and females age 15-24 in Cameroon, using data from the 2018 Cameroon Demographic Health Survey (CDHS). The study was designed to:

- Identify social and individual factors associated with condom use among single youths living in Cameroon.
- Identify characteristics of youths who were less likely to use condoms.
- Highlight gender differences in factors associated with condom use among single youths.

This report includes five sections: a brief literature review and conceptual framework; methodology; results; discussion of the findings; and, our conclusion and recommendations.

2 LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.1 Theoretical approaches

Three theoretical approaches to youth sexual behavior have been highlighted from the existing literature: individual, social, and political. According to the individual approach, adolescents are rational actors (Guiella 2012) who take initiative and make decisions favorable or unfavorable to the improvement of their knowledge, attitudes, and practices in sexual health. The social approach considers sexual behaviors to be the outcome of social norms and values that are internalized by youth from their family socialization (Tsala 2010; Wamoyi et al. 2015), and the influence of schools (Lloyd 2010), media (Kwankye and Augustt 2007; Oladeji and Ayangunna 2017), religious groups (Cerqueira-Santos and Koller 2016), and peers (Bingenheimer et al. 2015; Fearon et al. 2015; Tsala 2010; Yode and LeGrand 2008). The political approach suggests that the adoption of safe sexual behaviors depends upon policies, programs, and laws implemented in the field of sexual and reproductive health (Peto et al. 2000; Wamoyi et al., 2015).

Many previous studies were based on these approaches. Some that were oriented towards the social perspective used variables related to the family environment (Babalola et al. 2005; Pop and Rusu 2015; Steele et al. 2020) or the extra-family environment (i.e., schools, religious groups, workplace and peers groups) (Bingenheimer et al. 2015; Cerqueira-Santos and Koller 2016; Fearon et al. 2015; Lloyd 2010). Others that focused on the individual perspective used the psychosocial characteristics of youth (Babalola and Quénum-Renaud 2002; Krugu et al. 2016; Meekers and Klein 2002). As Goethals (quoted by Djamba, 1997) noted, "...No one theoretical position can be used alone to generate sophisticated hypotheses for research in the area of sexual behavior," especially in the case of the use of condoms for preventing HIV/AIDS.

Thus, as social phenomena are complex and can only be understood by using a systemic approach, i.e., an approach that takes into account social and individual factors and their interrelationships in the same model, most previous studies are limited. In the African context, where the family plays an important role in the socialization of children, the question should be if HIV/AIDS prevention policies among youth that focus on media and peers are effective, and what, if any, factors should be given more attention. Thus the relevance of this research, which will provide answers to the following questions:

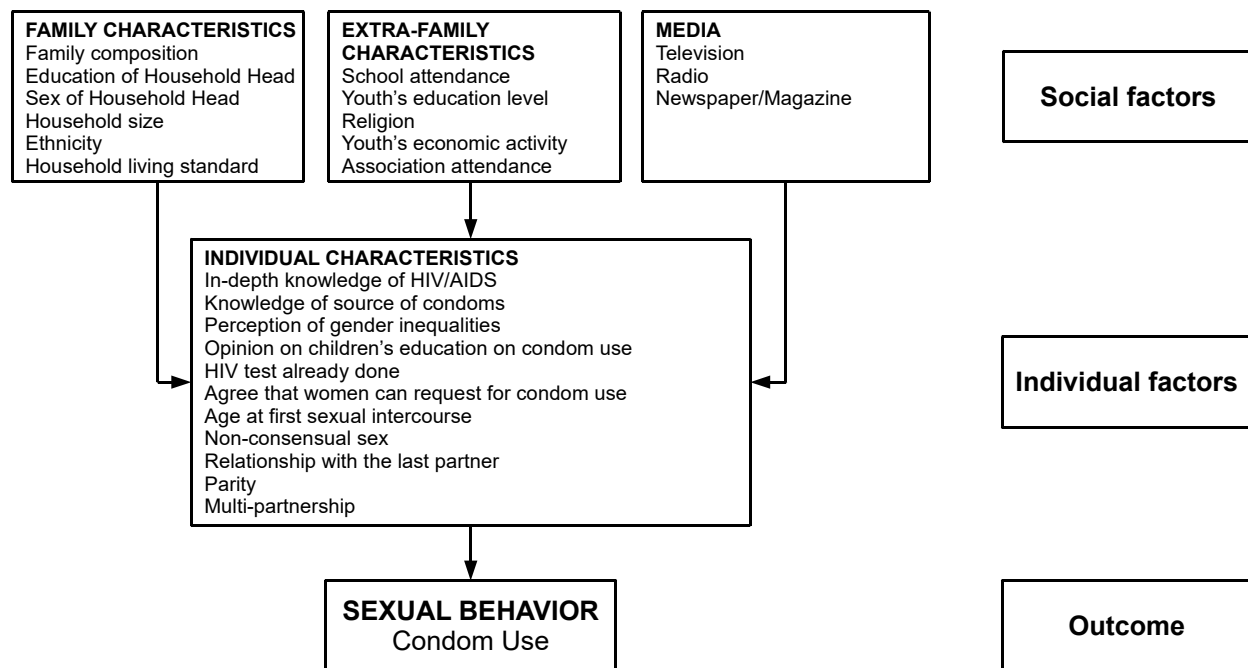
- 1) What are the social and individual factors of condom use among single youths in Cameroon? Do social factors directly influence condom use or indirectly through individual factors?
- 2) What are the priority target groups of single youth among which condom use is low?
- 3) What are the gender differences in the factors that influence condom use among single youths?

2.2 Conceptual framework

Our conceptual framework (Figure 1) shows how we used a systemic approach to highlight the determinants of condom use among single youth. The framework is based on the health belief model (HBM) of Rosenstock (1966, 1974) and the social learning theory (SLT) of Rotter (1954) and Bandura (1977). These

theories focus on behavioral change. According to the HBM, an individual's preventive practices with regard to a disease depend on the severity of the disease, the individual's perceptions of their susceptibility to the disease, the potential benefits from preventative practices, and the barriers to adopting such practices (Chaisamrej et al. 2009; Glanz et al. 2002). The model considers the influences of the social environment and other motivating factors such as the media, knowledge of health problems, a person's self-efficacy (i.e., one's belief in one's ability to succeed) in adopting preventive practices, and other individual characteristics (Glanz et al. 2002). The SLT explicitly suggests that interactions between individuals and their social environment affect preventive practices. We assessed the influence of social environment via the family characteristics (family composition, education of the household head (HH), sex of the HH, household size, household living standard, and ethnicity), extra-family characteristics (school attendance and youth's education level, religion, youth's economic activity, and association attendance), and media exposure.

Figure 1 Conceptual framework



2.2.1 Family characteristics

Family characteristics are important factors in socialization and social control. Young people living with both parents are known to be less likely to engage in risky sexual behaviors than those living in single-parent families or stepfamilies (Guiella 2012; Pop and Rusu 2015; Steele et al. 2020). Previous studies have not assessed the association between living in an extended or large family and sexual risk behaviors. We hypothesized that there is a positive association between living in large family and condom use among young people because parents and other adults can be involved in the sexual education of children. Since several studies have shown that female heads of households invest more than their male counterparts in their children, in terms of time, money, emotional support, and education (Clevenot and Pilon 1996; Pilon 1996), we anticipated that living in a female-headed household is positively associated with condom use.

In addition, young people who live in a household headed by a highly educated individual would likely be better informed about the prevention of STIs/HIV/AIDS. Similarly, those living in a household with a high

living standard may have the financial support necessary for accessing services and purchasing condoms. However, in a context where female condoms are not used and men make most decisions about sexual intercourse, the household living standard may be more associated with condom use among young men than young women. In Africa, the ethnic group is the place where cultural models are produced and reproduced. Sexual norms and values, the elements of these models, are transmitted to children within the family in their early childhood. According to Rwenge (2004), the Bamileke ethnic group may have higher rates of condom use than other ethnic groups because it has a high level of social control and strong social cohesion. The combination of these factors may increase the awareness of Bamileke youths about the negative consequences of HIV/AIDS on survival of the family group.

2.2.2 Extra-family characteristics

Socialization and social control of children continue outside the family in school, peer groups, and religious organizations, which can influence condom use. School attendance and a high level of education are positively associated with condom use because they improve young people's knowledge of sexual health and the prevention of STIs/HIV/AIDS (Lloyd 2010). In the Cameroon context, where HIV/AIDS prevention through peer education has been implemented (MINSANTE 2010, 2014), we hypothesized the same positive association between condom use and peer group attendance (Bingenheimer et al. 2015; Fearon et al. 2015). This may be due to the tendency of youths to do what they believe their friends are doing, or what they believe their friends think they should do. These are respectively called "the descriptive and injunctive norms perspectives" (Collado, Staats and Sancho, 2017).

In previous studies concerning Cameroon, such as those undertaken by Rwenge (2012) and Tsala (2010), the association between the economic activity of youth and the use of condoms has not been assessed, although it can also highlight the influence of peers. Frequent contact with peers and other persons allows those working in the modern or informal sectors of the economy to have a better knowledge of HIV/AIDS and its prevention methods, and have greater condom use than those working in more isolated areas such as farms.

As another source of social control, religion can provide positive and normative behaviors among young people. However, in Ghana, Takyi (2003, quoted by Tsala, 2010) found a negative and significant association between religion and condom use: compare to those who declared no religion, Catholic, Protestant, other Christian, and Muslims were less likely to report condom use. In Cameroon, Tsala (2010) found a nonsignificant association between the two variables. Indeed, in this country, most religious denominations advocate sexual abstinence before marriage and disapprove of condom use (Rwenge 2012). As a result, these groups do not actively participate in the fight against HIV/AIDS that promotes condom use.

2.2.3 Media exposure

Television, radio, and magazines are the main channels through which young people receive HIV/AIDS prevention messages in Cameroon from the government and its partners. It has been hypothesized that the likelihood of using condoms should be higher among youths who are more exposed to these media messages than among others (Bessinger 2004; Muli and Lawoko 2014; Oladeji and Ayanganna 2017; Ntshiqqa et al. 2018). Indeed, according to these researchers, the influence of the media depends largely on its contents. For example, in Cameroon, awareness campaigns implemented by the Ministry of Public

Health and NGOs such as the “Association Camerounaise de Marketing Social” (ACMS) and the Cameroon National Association for Family Welfare (CAMNAFAW) via television and other communication channels enable young adults to improve their knowledge, attitudes, and practices in sexual health (Rwenge 2012).

2.2.4 Individual characteristics

Individual factors include youths’ knowledge, attitudes, and behaviors related to sexuality and STIs/HIV/AIDS. Most previous researches have hypothesized that there is a positive association between knowledge of HIV/AIDS, awareness of its severity, and adoption of positive HIV prevention attitudes and practices. However, in adjusted multivariate analyses, knowledge of HIV/AIDS was not associated with any risky sexual behavior among men in Rwanda (Rugigana et al. 2014), contrary to the results found among female youths in Cameroon (Rwenge 2012).

Knowledge of AIDS leads youths to the realization that those whose HIV test results are negative should take more precautions to preserve their status, and those with positive results should do the same to protect their partners (Barrere 2012). Other individual factors that facilitate the use of condoms include knowing where to obtain condoms, being in favor of sex education for children, being in favor of gender equality, and thinking that a woman has the ability to ask her partner to use condoms. In contrast, early entry into sexual activity, the occurrence of nonconsensual sex, and the occurrence of casual sex are risk factors (Rwenge 2012; Tsala 2010).

We hypothesized in this study that family and extra-family characteristics as well as media exposure lead to positive results in condom use among youths only when they are accompanied by improvement in their individual characteristics, which act as mediators and which may explain how social factors are associated with condom use among youths.

3 METHODOLOGY

3.1 Data

The data for this study came from the 2018 DHS survey conducted in Cameroon by the National Institute of Statistics (INS), in collaboration of the Ministry of Public Health (MSP). Among its specific objectives, two explicitly dealt with knowledge and attitudes about STIs and AIDS, sexual behaviors, and HIV testing.

The 2018 CDHS survey was nationally representative, household-based, and designed to provide population and health indicator estimates at the national, urban-rural, and regional levels. For more details about the sampling and technical assistance for the 2018 CDHS survey, see the final report (INS and ICF International 2020).

The sample for this study included 1,464 single female youths and 989 single male youths age 15-24 who answered the question about condom use during the last sexual intercourse that occurred in the 12 months before the survey. Single female or male youths are those who declared during the survey that they were never married or were not currently living with a partner.

3.2 Variables

Table 1 shows the variables used in the analyses. Variables listed in the conceptual framework that were not available in the 2018 CDHS data included participation in associations (which provides information about peers' influence), knowledge of the source of condoms, opinion on children's education on condom use, and occurrence of nonconsensual sex.

Table 1 Variables used in the analyses

Concepts	Variables*	Definition	Specifications
Family environment	<ul style="list-style-type: none"> Family composition Household size Sex of the household head (HH) Education level of the HH Household living standard Ethnicity 	<ul style="list-style-type: none"> Based on the combination of the kinship with the household head (HH) Number of the household's members Self-explanatory Highest educational attainment of the HH Wealth index built using the socioeconomic characteristics of housing Self-explanatory 	<ul style="list-style-type: none"> 1) Nuclear; 2) Extended; 3) Head with children; 4) Head with children and others; 5) Others (Nuclear: a couple and their dependent children; Extended: a couple with dependent children and others; Others: complex or neither parent present) 1) 1-3; 2) 4-6; 3) 7-8; 4) 9+ 1) Male; 2) Female 1) No education; 2) Primary; 3) Secondary; 4) Higher 1) Highest; 2) Fourth; 3) Middle; 4) Second; 5) Lowest
Extra-family environment	<ul style="list-style-type: none"> Youth's education level Religion Youth's economic activity 	<ul style="list-style-type: none"> Youth's highest educational attainment Self-explanatory Self-explanatory 	<ul style="list-style-type: none"> 1) North; 2) Beti-Boulou; 3) Bassa; 4) Bamileke; 5) Mbo; 6) North-West/South-West; 7) Others 1) No education and primary; 2) First cycle of secondary; 3) Second cycle of secondary; 4) Higher 1) Catholic; 2) Protestant; 3) Muslim; 4) No religion or animist 1) Not working; 2) Modern and services; 3) Sales; 4) Agriculture; 5) Manual (Modern sector: reported occupations were professional, technical and managerial)
Media exposure	<ul style="list-style-type: none"> Degree of media exposure 	<ul style="list-style-type: none"> Index built with three variables: frequency of watching TV, frequency of listening to radio, and frequency of reading newspaper/magazine 	<ul style="list-style-type: none"> 1) Not exposed; 2) Low exposure; 3) Moderately exposed; 4) Highly exposed
Individual characteristics	<ul style="list-style-type: none"> In-depth knowledge of AIDS Perception of gender inequalities HIV test already done Agree that women can ask their partner to use condom Age at first sex Multi-partnership Relationship with the last sexual partner Parity 	<ul style="list-style-type: none"> Built using the youths' knowledge of the HIV/AIDS' means of prevention (CP and DP) and transmission (JP, HLP and SPN)** Built using youths' opinions of the fact that a man beat his wife (GNA, GNB, GNC, GND and GNE)*** Self-explanatory Self-explanatory Age at coital debut Number of sexual partners during the last 12 months Self-explanatory Permits to know if the respondent has/has not at least one child 	<ul style="list-style-type: none"> 1) Has in-depth knowledge of AIDS; 2) Does not have 1) Not favorable; 2) Less favorable; 3) Very favorable 0) No; 1) Yes 0) No; 1) Yes 1) Less than 15; 2) 15-19; 3) 20+ 1) 1; 2) 2+ 1) Boyfriend not living together; 2) Casual partner 1) No; 2) Yes
Sexual behavior	<ul style="list-style-type: none"> Condom use at last sexual intercourse 	<ul style="list-style-type: none"> Obvious 	<ul style="list-style-type: none"> 0) No; 1) Yes

* Not related to any concept, the place of residence has been included among the variables of interest. It was constructed using the variable "v022 or mv022: sample strata". Yaounde and Douala have been recoded to 1) large towns, all other urban strata (Adamaoua-urban, Centre-urban, East-urban, Far North-urban, Littoral-urban, North-urban, North-West-urban, West-urban, South-urban and South-West-urban) to 2) small towns and rural strata (Adamaoua-rural, Centre-rural, East-rural... South-rural) to 3) rural.

** CP=always using condom during sex to reduce risk of getting HIV; DP=one sex partner only, who has no other partners. reduce risk of getting HIV; JP=can get HIV from mosquito bites; HLP=a healthy-looking person can have HIV; SPN=can get HIV by supernatural means.

***GNA=beating justified if wife goes out without telling husband; GNB=beating justified if wife neglects the children; GNC=beating justified if wife argues with husband; GND=beating justified if wife refuses to have sex with husband; GNE=beating justified if wife burns food.

3.3 Statistical analyses

In the analyses, condom use at the last sexual intercourse was the dependent variable and the others were independent variables. Descriptive statistics, frequencies, and percentages were computed to describe the social and individual characteristics of the respondents, as well as the variation of the percentages of the respondents who used condoms at the last sexual intercourse during the 12 months before the survey. Logistic regression analyses were used to identify determinants of condom use at last sex and the characteristics of youths who were less likely to use condoms.

As we hypothesized in our conceptual framework that family and extra-family characteristics and media exposure are associated with condom use through their individual characteristics, seven logistic regression models were used among single male youths and the same models among female youths. This included the full model (see Table 4) and another other six models, which were produced by controlling each of the three types of social characteristics by individual ones.

Models 1, 3, and 5 display the effects of social characteristics, in the presence of the place of the residence. Model 1 includes the family environment variables, Model 3 the extra-familial environment variables, and Model 5 media exposure (see Figure 1 and Table 1) with the addition of place of residence.

Models 2, 4, and 6 display the effects of social characteristics, in the presence of the place of the residence and the individual characteristics. Model 2 includes the family environment variables, Model 4 the extra-familial environment variables, and Model 6 media exposure (see Figure 1 and Table 1) with the addition of the individual characteristics and place of residence.

The full model includes all independent variables.

In all analyses, sampling weighting was used to account or adjust for disproportionate sampling and nonresponse. The multistage sampling design was also taken into account.

The analyses were conducted with STATA 16 software. The probability thresholds were 0.001, 0.01 and 0.05.

4 RESULTS

4.1 Background characteristics of the respondents

Table 2 presents the percentage distribution of the sample. Overall, 51% of female youths and 66% of male youths reported that they used condoms at their last sexual intercourse. Most female youths lived in extended family households (32%) or in single-parent households with children and others (20%). Most of the male youths lived in extended family households (25%) or in other types of households with neither parent present or with a complex structure (31%). More than two-fifths of youths lived in households with at least seven members (57% of the females and 46% of the males). The percentage of youths living in a female-headed households is higher among female youths (39%) than male youths (27%). The majority of female and male youths lived in households with heads who had attained secondary or tertiary education (58% and 63%, respectively). The majority of female and male youths were Bamileke (25% and 28%, respectively), Beti-Boulou (31% and 29%, respectively), or from the Northern ethnic groups (12% and 18%, respectively).

Table 2 Percent distribution of single females and males age 15-24 who had sexual intercourse within the 12 months before the 2018 CDHS by selected characteristics

Background characteristics	Single females (n=1,464)		Single males (n=989)	
	Number	%	Number	%
A) CONDOM USE AT THE LAST SEXUAL INTERCOURSE				
Yes	745	50.9	655	66.3
No	719	49.1	334	33.7
B) FAMILY CHARACTERISTICS				
Family composition				
Nuclear	267	18.2	171	17.3
Extended	462	31.6	248	25.1
Head with children	206	14.1	109	11.0
Head with children and others	297	20.3	152	15.3
Others	231	15.8	310	31.3
Household size				
[1-3]	186	12.8	251	25.4
[4-6]	440	30.1	287	29.0
[7-8]	357	24.4	187	18.9
[9+]	480	32.8	264	26.7
Sex of the household's head				
Male	892	60.9	722	73.0
Female	572	39.1	267	27.0
Education level of the household's head				
No education	125	8.7	89	9.2
Primary	472	33.0	270	28.0
Secondary	647	45.3	481	49.9
Higher	186	13.0	125	13.0
Household Wealth Index				
Lowest	63	4.3	36	3.7
Second	211	14.4	141	14.2
Middle	303	20.7	235	23.8
Fourth	411	28.0	254	25.7
Highest	476	32.5	323	32.6
Ethnicity				
North	179	12.2	179	18.2
Beti-Boulou	460	31.4	289	29.3
Bassa	89	6.1	43	4.4
Bamileke	371	25.4	281	28.4
Mbo	70	4.8	54	5.4
North-West/South-West	141	9.6	62	6.2
Others	155	10.6	81	8.1

Continued...

Table 2 Percent distribution of single females and males age 15-24 who had had sexual intercourse within the 12 months before the 2018 CDHS by selected characteristics (*continued*)

Background characteristics	Single females (n=1,464)		Single males (n=989)	
	Number	%	Number	%
C) EXTRA-FAMILY CHARACTERISTICS				
Religion				
Catholic	711	48.6	473	47.8
Protestant	489	33.4	270	27.3
Muslim	94	6.4	136	13.7
Other Christians	124	8.4	52	5.2
Others	46	3.1	58	5.8
Youth's education level				
No education and primary	212	14.5	137	13.9
First cycle of secondary	518	35.4	362	36.7
Second cycle of secondary	515	35.2	366	37.1
Higher	219	15.0	123	12.4
Youth's occupation				
Not working	777	53.1	233	23.5
Modern and service	172	12.0	95	9.6
Sales	215	14.7	133	13.5
Agriculture	198	13.5	224	22.7
Manual	102	7.0	304	30.7
D) MEDIA EXPOSURE				
Not exposed	260	17.8	146	14.8
Low exposure	536	36.6	329	33.3
Moderately	514	35.1	424	42.9
Highly	153	10.5	90	9.1
E) INDIVIDUAL CHARACTERISTICS				
No. Sex. partners last 12 months				
1	1259	86.0	628	63.6
2+	205	14.0	360	36.4
Age at first sex				
<15	204	14.0	136	13.7
15-19	1130	77.5	774	78.3
20+	124	8.5	79	8.0
In-depth knowledge of AIDS				
No	871	60.5	561	57.2
Yes	569	39.5	420	42.8
Perception of gender inequalities				
Not favorable	1076	75.3	651	68.0
Less favorable	300	21.0	267	27.9
Very favorable	53	3.7	39	4.1
Have already done an HIV test				
No	366	25.0	425	43.0
Yes	1098	75.0	563	57.0
Agree that women can ask their partner to use condom				
No	283	19.6	125	12.9
Yes	1158	80.4	845	87.1
Relationship with the last partner				
Boyfriend not living together	1418	96.9	841	85.0
Casual partner	46	3.1	148	15.0
Number of children				
0	1013	69.2	875	88.5
1+	451	30.8	113	11.5
F) OTHER				
Area of residence				
Rural	458	31.3	318	32.2
Small town	541	37.0	380	38.5
Large town	465	31.7	290	29.4
Total	1,464	100.0	989	100.0

With extra-family characteristics, the majority of youths were Catholic (49% of female and 48% of male youths) or Protestant (33% of female and 27% of male youths). The level of education did not vary by gender, with the proportions approximately the same at no education or primary level (15% of female and

14% of male), at the first cycle of secondary level (35% and 37%), the second cycle of secondary level (35% and 37%), and the higher level (15% and 12%). About 53% of female youths were not working during the survey, 15% worked in the sales sector, 14% in agriculture, 12% in the modern sector or services, and 7% were manual workers. Among male youths, these proportions are 24%, 14%, 23%, 10%, and 31%, respectively.

The proportion of youths not exposed or with low exposure to the media is higher among female youth compared to male youth (54% and 48%, respectively).

With the individual characteristics, 40% of females and 43% of male youths had an in-depth knowledge of HIV/AIDS. The proportion of female youths who had been tested for HIV/AIDS (75%) was higher than that for male youths (57%). The majority of individuals do not approve of gender inequalities (75% of females and 68% of males) and they agreed that women can request the use of condoms by their partners (80% and 87%, respectively). About 14% of male and female youths had their first sexual intercourse before age 15. This proportion is 78% at age 15-19 and 8% at age 20-24. About 14% of females and 36% of the male youths had multiple sexual partners in the 12 months before the survey; fewer female youths (3%) than male youths (15%) had sex with casual partners during this period; and 31% and 12%, respectively, reported at the time of the survey that they had already had at least one child born alive.

4.2 Bivariate associations of social and individual factors with condom use

Table 3 presents the association between each independent variable and condom use at last sex among single youths who lived in Cameroon in 2018. For both sexes, some social factors (except family composition, sex of household head, and youth's religion) and having at least one child were significantly associated with condom use. For both sexes, the number of sexual partners, the perception of gender inequalities, the relationship with last partner, being supportive of women who can request condom use by their partners, and being tested for HIV were not significantly associated with condom use. Household size, the household head's education level, the youth's education level, and age at first sexual intercourse were associated with condom use among female youths only and having an in-depth knowledge of HIV among only the male youths.

Among female youths, at the family level, the proportion of condom use is lower than the national average (51%) in households with nine members or more (44.8%). The head of household's educational level is positively associated with condom use. For example, the proportion of condom use is higher than the national average in households headed by someone with higher education (59%) and lower in those whose heads had no education (40%). For both sexes, a similar association was observed between the household living standard and condom use. At the same level, among female youths, ethnicity was also associated with the dependent variable. The proportion of condom users is higher among the Bamileke (62%) and the Mbo (67%) ethnic groups than the others. Among male youths, the same is observed (75% and 66%), although for males, these two ethnic groups do not differ significantly from Bassa (68%) and "others" (70%).

Table 3 Proportion of single youths age 15-24 who used condom at the last sexual intercourse during the 12 months before the 2018 CDHS by gender and their selected characteristics

Background characteristics	Single females		Chi-square P-value	Single males		Chi-square P-value
	%	95% CI		%	95% CI	
A) FAMILY ENVIRONMENT						
Family composition			0.504			0.895
Nuclear	52.4	[45.1,59.7]		66.6	[57.3,74.8]	
Extended	47.6	[41.8,53.6]		66.2	[59.9,72.0]	
Head with children	55.2	[47.3,62.9]		70.8	[59.7,79.9]	
Head with children and others	49.9	[44.0,55.8]		65.6	[55.3,74.7]	
Others	53.1	[46.6,59.6]		64.8	[59.2,70.0]	
Household size			0.032			0.061
[1-3]	53.4	[45.8,60.9]		70.6	[63.4,76.8]	
[4-6]	53.9	[48.6,59.2]		66.3	[59.8,72.3]	
[7-8]	53.9	[48.0,59.8]		70.6	[63.2,77.0]	
9+	44.8	[40.1,49.6]		59.0	[51.4,66.3]	
Sex of the household's head			0.536			0.715
Male	50.2	[46.3,54.1]		65.8	[61.8,69.6]	
Female	52.0	[47.6,56.3]		67.5	[59.1,74.9]	
Education level of the household's head			0.050			0.057
No education	40.1	[30.5,50.5]		54.5	[42.5,66.0]	
Primary	49.4	[44.5,54.4]		65.2	[58.0,71.8]	
Secondary	52.2	[47.5,56.9]		67.3	[62.8,71.4]	
Higher	58.6	[49.9,66.9]		75.0	[64.5,83.2]	
Household Wealth Index			0.002			<0.001
Lowest	37.3	[22.0,55.7]		26.8	[14.3,44.6]	
Second	38.6	[32.5,45.0]		46.1	[35.5,57.1]	
Middle	49.0	[44.0,54.0]		70.1	[63.8,75.7]	
Fourth	55.2	[49.0,61.2]		70.9	[64.1,76.9]	
Highest	55.6	[50.7,60.4]		73.0	[66.7,78.6]	
Ethnicity			<0.001			0.037
North	42.9	[33.6,52.8]		62.2	[52.6,71.0]	
Beti-Boulou	49.4	[44.4,54.4]		61.0	[54.5,67.1]	
Bassa	45.8	[32.9,59.3]		68.1	[52.1,80.8]	
Bamileke	62.4	[56.3,68.0]		74.9	[68.9,80.1]	
Mbo	66.6	[55.5,76.2]		65.6	[52.4,76.7]	
North-West/South-West	43.2	[32.2,54.9]		58.1	[44.3,70.7]	
Others	39.7	[32.3,47.7]		69.6	[57.0,79.8]	
B) EXTRA-FAMILIAL ENVIRONMENT						
Religion			0.158			0.878
Catholic	52.9	[48.2,57.5]		67.3	[62.3,72.0]	
Protestant	47.4	[42.2,52.7]		63.9	[55.5,71.5]	
Muslim	61.8	[48.5,73.5]		67.2	[57.1,76.0]	
Other Christians	48.2	[38.4,58.2]		62.3	[47.9,74.8]	
Others	41.6	[26.4,58.5]		69.9	[54.0,82.2]	
Youth's education level			0.003			0.099
No education and primary	40.3	[33.4,47.5]		57.6	[48.1,66.5]	
First cycle of secondary	48.2	[43.3,53.2]		65.1	[59.3,70.4]	
Second cycle of secondary	55.1	[50.3,59.8]		68.9	[63.4,73.8]	
Higher	57.4	[49.1,65.4]		71.6	[61.7,79.9]	
Youth's occupation			0.022			<0.001
Not working	53.9	[49.4,58.3]		69.5	[61.2,76.7]	
Modern and services	43.0	[36.6,49.6]		75.1	[64.5,83.4]	
Sales	56.1	[47.9,64.0]		71.3	[61.4,79.4]	
Agriculture	43.3	[35.6,51.5]		51.3	[44.5,58.1]	
Manual	44.8	[33.9,56.3]		69.8	[63.5,75.5]	
C) MEDIA EXPOSURE						
Not exposed			0.003			<0.001
Low exposure	38.0	[30.5,46.3]		49.1	[40.2,58.0]	
Moderately	52.5	[47.5,57.5]		65.3	[59.2,70.9]	
Highly	53.4	[48.4,58.4]		71.4	[65.4,76.8]	
	58.3	[48.4,67.6]		73.5	[61.6,82.8]	

Continued...

Table 3 Proportion of single youths age 15-24 who used condom at the last sexual intercourse during the 12 months before the 2018 CDHS by gender and their selected characteristics (continued)

Background characteristics	Single females		Chi-square P-value	Single males		Chi-square P-value
	%	95% CI		%	95% CI	
D) INDIVIDUAL						
No. Sex. partners last 12 months			0.474			0.873
1	50.4	[47.2,53.5]		66.1	[61.5,70.3]	
2+	53.9	[44.8,62.7]		66.7	[60.2,72.5]	
Age at first sex			0.002			0.842
<15	39.0	[33.2,45.2]		68.6	[59.0,76.9]	
15-19	53.4	[49.7,57.0]		65.7	[61.3,69.8]	
20+	48.2	[38.7,57.8]		67.6	[53.5,79.1]	
In-depth knowledge of AIDS			0.593			0.033
No	52.1	[48.4,55.7]		63.7	[59.0,68.1]	
Yes	50.4	[45.6,55.3]		70.4	[65.4,75.0]	
Perception of gender inequalities			0.128			0.209
Not favorable	50.9	[47.5,54.4]		68.0	[63.2,72.4]	
Less favorable	55.2	[48.4,61.7]		64.2	[58.1,69.9]	
Very favorable	38.8	[25.8,53.5]		52.7	[32.6,71.9]	
Have already done an HIV test			0.236			0.329
No	53.9	[48.2,59.5]		64.3	[59.0,69.2]	
Yes	49.9	[46.3,53.4]		67.8	[62.7,72.4]	
Agree that women can request the use of condom						
No	44.7	[38.1,51.5]		61.7	[51.1,71.3]	
Yes	52.6	[49.1,56.0]		67.2	[63.1,71.0]	
Relationship with the last partner			0.852			0.739
Boyfriend not living together	50.9	[48.0,53.9]		66.0	[62.1,69.7]	
Others	49.3	[32.5,66.2]		67.6	[58.4,75.6]	
Number of children			<0.001			<0.001
0	57.9	[54.3,61.4]		69.0	[65.1,72.6]	
1+	35.1	[29.5,41.2]		45.1	[34.5,56.2]	
E) OTHER						
Area of residence			0.030			<0.001
Rural	44.7	[40.2,49.3]		55.2	[48.5,61.8]	
Small town	54.4	[49.5,59.2]		69.3	[64.5,73.8]	
Large town	52.8	[46.4,59.2]		74.3	[67.0,80.5]	
Total	50.9	[47.9,53.9]		66.3	[62.6,69.8]	

At the extra-family level, the educational level of female youths is positively associated with condom use. The rate of condom use increases from 40.3% for those with no education or primary education level to 57.4% for those with a higher education level. With occupation, the proportion of condom use is higher among the female youths who worked in the sales sector (56%) or were not working (54%) than among those who worked in other professions (between 43-45%). Among the male youths, only those who worked in the agricultural sector (51%) differ from others (between 70-75%) by their low rate of condom use.

For both sexes, the percentage of condom use increases with the degree of media exposure. For example, it is higher than the national average among youths who are highly exposed to the media (58% among females and 74% among males) and lower among those not exposed to the media (38% and 49%, respectively).

At the individual level, among female youths, the proportion of condom use is lower for those who began sexual activity at age 15 or younger (39%) than at the other ages (48% at age 20 or more and 53% at age 15-19). Among male youths, in-depth knowledge of HIV/AIDS is positively associated with condom use (70% for those with in-depth knowledge versus 64% for those who do not have this knowledge). For both sexes, having at least one child is negatively associated with the condom use, with 35% and 45% for female and male youth respectively with at least one child versus 58% and 69% for female and male youth with no children.

Finally, the proportion of condom use is greater in large towns (53% among female and 74% among male youths) and small towns (54% and 69%) than in the rural areas (45% and 55%).

4.3 Results from multivariate analyses

In this section, we describe the factors associated with condom use (the “determinants”) (Table 4), the characteristics of the groups at risk (where the odds ratios of using condoms are lower than in the reference groups), those where the odds ratios are higher, and the mechanisms of action of social factors (Tables 5 and 6). Among the independent variables, only one, the household size, was eliminated to avoid the multicollinearity problem. The different VIF (variance inflation factors) showed that household size is strongly correlated with family composition.

4.3.1 “Determinants” of condom use

The full models (Table 4) show that, for both sexes, the “determinant” of condom use at the last sexual intercourse is the number of children ever born.

The gender differences in the determinants of condom use are important. The following are variables that acted as determinants among female youths only: ethnicity, youth’s occupation, and age at first intercourse. Among male youths, the variables that acted as determinants were the head of household’s education level and the household’s living standard.

Table 4 Logistic regression on condom use at the last sexual intercourse among single females and males age 15-24, 2018 CDHS

Background characteristics	Single females		Single males	
	OR	95% CI	OR	95% CI
A) FAMILY ENVIRONMENT				
Family composition				
Nuclear (reference)	1.0		1.0	
Extended	0.8	0.5 - 1.2	1.0	0.5 - 1.8
Head with children	1.2	0.7 - 2.1	1.5	0.7 - 3.4
Head with children and others	1.2	0.7 - 2.0	0.9	0.4 - 2.1
Others	0.8	0.5 - 1.3	0.7	0.4 - 1.3
Sex of the household’s head				
Male (reference)	1.0		1.0	
Female	0.9	0.6 - 1.4	0.8	0.4 - 1.5
Education level of the household’s head				
No education (reference)	1.0		1.0	
Primary	1.2	0.8 - 2.1	1.9	1.0 - 3.8
Secondary	1.3	0.8 - 2.2	1.8	0.9 - 3.6
Higher	1.7	0.9 - 3.3	2.8*	1.1 - 7.2
Household Wealth Index				
Lowest	0.9	0.4 - 2.3	0.2*	0.1 - 0.9
Second	0.7	0.4 - 1.1	0.5	0.2 - 1.1
Middle	0.9	0.6 - 1.3	1.3	0.7 - 2.2
Fourth	1.1	0.7 - 1.6	1.1	0.6 - 1.8
Highest (reference)	1.0		1.0	
Ethnicity				
North (reference)	1.0		1.0	
Beti-Boulou	1.6	1.0 - 2.6	0.7	0.3 - 1.3
Bassa	1.3	0.6 - 2.8	1.0	0.4 - 2.6
Bamileke	2.1**	1.3 - 3.6	1.2	0.7 - 2.2
Mbo	2.9**	1.4 - 5.7	0.9	0.4 - 2.1
North-West/South-West	1.4	0.6 - 3.1	0.6	0.3 - 1.5
Others	1.1	0.6 - 1.9	1.2	0.6 - 2.5

Continued...

Table 4 Logistic regression on condom use at the last sexual intercourse among single females and males age 15-24, 2018 CDHS (*continued*)

Background characteristics	Single females		Single males	
	OR	95% CI	OR	95% CI
B) EXTRA-FAMILIAL ENVIRONMENT				
Religion				
Catholic (reference)	1.0		1.0	
Protestant	0.8	0.6 - 1.1	1.0	0.6 - 1.5
Muslim	1.4	0.8 - 2.7	1.2	0.6 - 2.1
Other Christians	0.8	0.5 - 1.3	1.0	0.5 - 2.0
Others	0.5	0.2 - 1.1	0.9	0.4 - 1.8
Youth's education level				
No education and primary (reference)	1.0		1.0	
First cycle of secondary	1.1	0.8 - 1.6	0.8	0.5 - 1.4
Second cycle of secondary	1.1	0.7 - 1.8	0.8	0.5 - 1.5
Higher	1.2	0.6 - 2.3	0.5	0.2 - 1.3
Youth's occupation				
Not working (reference)	1.0		1.0	
Modern and services	0.7*	0.4 - 1.0	1.7	0.8 - 3.5
Sales	1.3	0.9 - 2.0	1.0	0.5 - 1.8
Agriculture	1.0	0.7 - 1.5	0.7	0.4 - 1.3
Manual	0.6	0.4 - 1.1	1.0	0.6 - 1.7
C) MEDIA EXPOSURE				
Not exposed (reference)	1.0		1.0	
Low exposure	1.1	0.8 - 1.6	1.0	0.6 - 1.7
Moderately	1.1	0.7 - 1.7	1.5	0.8 - 2.6
Highly	1.6	0.9 - 2.9	1.4	0.6 - 3.2
D) INDIVIDUAL				
No. Sex. partners last 12 months				
One (reference)	1.0		1.0	
Two and more	1.1	0.8 - 1.7	0.9	0.6 - 1.3
Age at first sex				
<15 (reference)	1.0		1.0	
15-19	1.5*	1.0 - 2.2	0.8	0.5 - 1.5
20+	1.0	0.6 - 1.8	1.0	0.4 - 2.3
In-depth knowledge of AIDS				
No (reference)	1.0		1.0	
Yes	0.8	0.6 - 1.1	1.2	0.9 - 1.5
Perception of gender inequalities				
Not favorable (reference)	1.0		1.0	
Less favorable	1.2	0.9 - 1.7	1.1	0.7 - 1.5
Very favorable	0.6	0.3 - 1.2	0.6	0.2 - 1.7
Have already done an HIV test				
No (reference)	1.0		1.0	
Yes	0.8	0.6 - 1.1	0.9	0.6 - 1.4
Agree that women can request the use of condom				
No (reference)	1.0		1.0	
Yes	1.3	0.9 - 1.8	1.2	0.7 - 2.2
Relationship with the last partner				
Boy/Girlfriend not living together (reference)	1.0		1.0	
Others	0.7	0.4 - 1.4	1.2	0.7 - 1.9
Number of children				
0 (reference)	1.0		1.0	
1+	0.5***	0.3 - 0.7	0.4**	0.2 - 0.7
E) OTHER				
Area of residence				
Rural (reference)	1.0		1.0	
Small town	1.0	0.7 - 1.4	0.9	0.6 - 1.6
Large town	0.8	0.5 - 1.2	1.2	0.6 - 2.2
N	1,505		947	

* p<0.05; **p<0.01; ***p<0.001

4.3.2 Characteristics of the groups at risk

The results of the study reveal that, among male youths, individuals living in households whose heads attained higher education (OR=2.8) are more likely to use condoms than those living in households with heads without education. Young men living in households in the lowest wealth index quintile (OR=0.2) are less likely to use condoms than those living in households in the highest wealth index quintile. The results also reveal that, among female youths, individuals from the Bamileke (OR=2.1) or Mbo (OR=2.9) ethnic groups are more likely to use condoms than those from the northern ethnic groups. Finally, for young women, being employed in the modern or service sectors (OR=0.7) is negatively associated with condom use, compared to nonworking individuals.

The youths with at least one child are less likely to use condoms than those with no children (OR=0.5 among females and 0.4 among males). Among the females, individuals who had their first sexual intercourse at age 15-19 were more likely to use condoms (OR=1.5) than those who began sexual activity at a younger age. There was no significant difference in condom use between female youths who had their first sex at age 20 or more and those who entered in sexual activity at age 15 or younger.

4.3.3 Mechanisms of action of social factors

Among female youths, the results from logistic regression in which each type of social factor was controlled by individual factors (Table 5) are:

1. The effect of the household standard of living was nullified and that of ethnicity was attenuated when individual characteristics were included (see odds ratios for these variables in Models 1 and 2 in Table 5).
2. Further analyses showed that in-depth knowledge of HIV/AIDS attenuated the effect of ethnicity, and age of first intercourse and number of children born alive nullified that of the household standard of living (results not presented). This last individual factor nullified the effect of HIV test (results not presented).
3. The effect of youth's education level was nullified and that of the degree of media exposure was attenuated in the presence of individual characteristics (see odds ratios for youth's education in Models 3 and 4 in Table 5 and odds ratios for media exposure in Models 5 and 6 in Table 5). In-depth knowledge of HIV/AIDS and perception of gender inequalities nullified the effect of youth's education level, and this last individual factor and age at first intercourse attenuated that of the degree of media exposure (results not presented).

Among male youths, the results from the logistic regression models in which each type of social factor was controlled by individual factors (Table 6), and further analyses showed that the effect of household standard of living was attenuated (see Models 1 and 2 in Table 6) by the age of first intercourse and the effect of the degree of media exposure was attenuated (Models 5 and 6 in Table 6) by in-depth knowledge of HIV/AIDS, the perception of gender inequalities, and the number of children born alive (results not presented).

Table 5 Logistic regression models on condom use in which each type of social factor is controlled by individual factors (single females age 15-24, 2018 CDHS)

Background characteristics	M1		M2		M3		M4		M5		M6	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
A) FAMILY ENVIRONMENT												
Family composition												
Nuclear (reference)	1.0		1.0									
Extended	0.7	0.5 - 1.2	0.8	0.5 - 1.2								
Head with children	1.2	0.7 - 2.1	1.3	0.7 - 2.2								
Head with children and others	1.0	0.6 - 1.7	1.2	0.7 - 2.1								
Others	0.9	0.6 - 1.4	0.8	0.5 - 1.3								
Sex of the household's head												
Male (reference)	1.0		1.0									
Female	0.9	0.6 - 1.2	0.9	0.6 - 1.3								
Education level of the household's head												
No education (reference)	1.0		1.0									
Primary	1.2	0.8 - 2.0	1.3	0.8 - 2.1								
Secondary	1.3	0.8 - 2.1	1.3	0.8 - 2.2								
Higher	1.6	0.9 - 3.0	1.8	0.9 - 3.3								
Household Wealth Index												
Lowest	0.6	0.3 - 1.5	0.8	0.3 - 1.9								
Second	0.5***	0.3 - 0.8	0.6	0.4 - 1.0								
Middle	0.7*	0.5 - 1.0	0.9	0.6 - 1.3								
Fourth	0.9	0.6 - 1.3	1.1	0.8 - 1.6								
Highest (reference)	1.0		1.0									
Ethnicity												
North (reference)	1.0		1.0									
Beti-Boulou	1.5	1.0 - 2.3	1.4	0.9 - 2.3								
Bassa	1.1	0.6 - 2.3	1.1	0.5 - 2.4								
Bamileke	2.3***	1.5 - 3.8	2.0**	1.2 - 3.3								
Mbo	2.7**	1.4 - 5.1	2.6**	1.3 - 5.0								
North-West/South-West	1.0	0.5 - 2.2	1.2	0.5 - 2.5								
Others	1.0	0.6 - 1.6	1.0	0.6 - 1.7								
B) EXTRA-FAMILIAL ENVIRONMENT												
Religion												
Catholic (reference)					1.0		1.0					
Protestant					0.8	0.6 - 1.1	0.9	0.6 - 1.2				
Muslim					1.6	0.9 - 2.8	1.5	0.8 - 2.7				
Other Christians					0.9	0.6 - 1.3	0.8	0.5 - 1.3				
Others					0.7	0.3 - 1.5	0.6	0.3 - 1.3				
Youth's education level												
No education and primary (reference)					1.0		1.0					
First cycle of secondary					1.3	0.9 - 1.8	1.3	0.9 - 1.9				
Second cycle of secondary					1.7*	1.1 - 2.5	1.5	1.0 - 2.3				
Higher					1.9*	1.1 - 3.2	1.8	1.0 - 3.3				
Youth's occupation												
Not working (reference)					1.0		1.0					
Modern and services					0.7*	0.5 - 1.0	0.7*	0.4 - 1.0				
Sales					1.2	0.8 - 1.7	1.2	0.8 - 1.8				
Agriculture					0.9	0.6 - 1.3	0.9	0.6 - 1.3				
Manual					0.7	0.4 - 1.2	0.7	0.4 - 1.1				
C) MEDIA EXPOSURE												
Not exposed (reference)									1.0		1.0	
Low exposure									1.7**	1.2 - 2.5	1.4	1.0 - 2.0
Moderately									1.8*	1.1 - 2.7	1.4	0.9 - 2.2
Highly									2.1**	1.2 - 3.6	1.9*	1.1 - 3.5
D) INDIVIDUAL												
No. Sex. partners last 12 months												
One (reference)			1.0				1.0				1.0	
Two and more			1.1	0.8 - 1.7			1.2	0.8 - 1.8			1.1	0.8 - 1.6
Age at first sex												
<15 (reference)			1.0				1.0				1.0	
15-19			1.5*	1.0 - 2.1			1.5*	1.0 - 2.2			1.5*	1.0 - 2.1
20+			1.0	0.6 - 1.8			1.1	0.6 - 1.9			1.1	0.6 - 1.8
In-depth knowledge of AIDS												
No (reference)			1.0				1.0				1.0	
Yes			0.9	0.7 - 1.1			0.8	0.6 - 1.1			0.9	0.7 - 1.1

Continued...

Table 5 Logistic regression models on condom use in which each type of social factor is controlled by individual factors (single females age 15-24, 2018 CDHS) (*continued*)

Background characteristics	M1		M2		M3		M4		M5		M6	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Perception of gender inequalities												
Not favorable (reference)			1.0				1.0				1.0	
Less favorable			1.2	0.9 - 1.6			1.2	0.8 - 1.6			1.2	0.8 - 1.6
Very favorable			0.6	0.3 - 1.2			0.6	0.3 - 1.1			0.6	0.3 - 1.1
Have already done an HIV test												
No (reference)			1.0				1.0				1.0	
Yes			0.8	0.6 - 1.1			0.9	0.6 - 1.2			0.9	0.7 - 1.2
Agree that women can request the use of condom												
No (reference)			1.0				1.0				1.0	
Yes			1.3	0.9 - 1.8			1.3	0.9 - 1.8			1.3	1.0 - 1.8
Relationship with the last partner												
Boy/Girlfriend not living together (reference)			1.0				1.0				1.0	
Others			0.7	0.3 - 1.3			0.9	0.5 - 1.6			0.9	0.4 - 1.7
Number of children												
0 (reference)			1.0				1.0				1.0	
1+			0.5***	0.3 - 0.7			0.5***	0.3 - 0.6			0.4***	0.3 - 0.6
E) OTHER												
Area of residence												
Rural (reference)	1.0		1.0		1.0		1.0		1.0		1.0	
Small town	1.1	0.8 - 1.5	1.0	0.7 - 1.5	1.2	0.9 - 1.7	1.2	0.9 - 1.6	1.3	1.0 - 1.7	1.2	0.9 - 1.6
Large town	0.8	0.5 - 1.1	0.8	0.5 - 1.2	1.1	0.8 - 1.7	1.1	0.8 - 1.5	1.1	0.8 - 1.6	1.1	0.7 - 1.5
N	1,571		1,505		1,605		1,536		1,605		1,536	

* p≤0.05; **p≤0.01; ***p≤0.001

Table 6 Logistic regression models on condom use in which each type of social factor is controlled by individual factors (single males, age 15-24, 2018 CDHS)

Background characteristics	M1		M2		M3		M4		M5		M6	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
A) FAMILY ENVIRONMENT												
Family composition												
Nuclear (reference)	1.0		1.0									
Extended	1.0	0.6 - 1.7	1.0	0.5 - 1.7								
Head with children	1.5	0.7 - 3.1	1.5	0.7 - 3.5								
Head with children and others	1.0	0.5 - 2.2	0.9	0.4 - 2.1								
Others	0.7	0.4 - 1.3	0.7	0.4 - 1.2								
Sex of the household's head												
Male (reference)	1.0		1.0									
Female	0.8	0.5 - 1.5	0.8	0.4 - 1.5								
Education level of the household's head												
No education (reference)	1.0		1.0									
Primary	1.6	0.9 - 3.1	1.8	1.0 - 3.5								
Secondary	1.6	0.8 - 3.1	1.7	0.9 - 3.4								
Higher	2.2	0.9 - 5.0	2.2	0.9 - 5.3								
Household Wealth Index												
Lowest	0.2***	0.1 - 0.5	0.2**	0.1 - 0.6								
Second	0.4*	0.2 - 0.9	0.4*	0.2 - 0.9								
Middle	1.2	0.7 - 1.9	1.2	0.7 - 2.1								
Fourth	1.0	0.7 - 1.7	1.1	0.7 - 1.7								
Highest (reference)	1.0		1.0									
Ethnicity												
North (reference)	1.0		1.0									
Beti-Boulou	0.7	0.4 - 1.2	0.6	0.3 - 1.2								
Bassa	0.7	0.3 - 1.7	0.9	0.4 - 2.4								
Bamileke	1.2	0.7 - 1.9	1.1	0.6 - 2.0								
Mbo	0.7	0.4 - 1.5	0.8	0.4 - 1.9								
North-West/South-West	0.6	0.3 - 1.2	0.6	0.3 - 1.4								
Others	1.1	0.6 - 2.1	1.0	0.5 - 2.1								
B) EXTRA-FAMILIAL ENVIRONMENT												
Religion												
Catholic (reference)					1.0		1.0					
Protestant					0.9	0.6 - 1.3	0.8	0.5 - 1.3				
Muslim					1.0	0.6 - 1.7	1.1	0.6 - 1.9				
Other Christians					0.9	0.5 - 1.7	0.9	0.5 - 1.7				
Others					1.1	0.5 - 2.4	1.1	0.5 - 2.5				
Youth's education level												
No education and primary (reference)					1.0		1.0					
First cycle of secondary					1.2	0.7 - 1.9	1.1	0.7 - 1.7				
Second cycle of secondary					1.3	0.8 - 2.1	1.2	0.7 - 2.0				
Higher					1.2	0.6 - 2.3	0.9	0.5 - 1.7				
Youth's occupation												
Not working (reference)					1.0		1.0					
Modern and services					1.3	0.6 - 2.6	1.5	0.7 - 3.2				
Sales					1.1	0.6 - 1.9	1.1	0.6 - 2.1				
Agriculture					0.6	0.4 - 1.0	0.6	0.4 - 1.1				
Manual					1.1	0.6 - 1.8	1.1	0.6 - 1.9				
C) MEDIA EXPOSURE												
Not exposed (reference)									1.0		1.0	
Low exposure									1.6*	1.0 - 2.6	1.4	0.9 - 2.3
Moderately									2.0**	1.2 - 3.3	1.9*	1.1 - 3.2
Highly									2.2*	1.1 - 4.4	2.1	0.9 - 4.5
D) INDIVIDUAL												
No. Sex. partners last 12 months												
One (reference)			1.0				1.0				1.0	
Two and more			0.9	0.6 - 1.4			0.9	0.6 - 1.4			0.9	0.6 - 1.4
Age at first sex												
<15 (reference)			1.0				1.0				1.0	
15-19			0.9	0.5 - 1.5			0.9	0.5 - 1.4			0.9	0.5 - 1.5
20+			0.9	0.4 - 2.2			0.9	0.4 - 2.0			0.8	0.4 - 1.9

Continued...

Table 6 Logistic regression models on condom use in which each type of social factor is controlled by individual factors (single males, age 15-24, 2018 CDHS) (*continued*)

Background characteristics	M1		M2		M3		M4		M5		M6	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
In-depth knowledge of AIDS												
No (reference)			1.0				1.0				1.0	
Yes			1.1	0.8 - 1.5			1.2	0.9 - 1.6			1.2	0.9 - 1.5
Perception of gender inequalities												
Not favorable (reference)			1.0				1.0				1.0	
Less favorable			1.0	0.7 - 1.5			0.9	0.6 - 1.2			0.9	0.6 - 1.3
Very favorable			0.6	0.2 - 1.7			0.6	0.2 - 1.7			0.6	0.2 - 1.7
Have already done an HIV test												
No (reference)			1.0				1.0				1.0	
Yes			0.9	0.7 - 1.4			1.0	0.7 - 1.4			0.9	0.6 - 1.3
Agree that women can request the use of condom												
No (reference)			1.0				1.0				1.0	
Yes			1.2	0.6 - 2.1			1.3	0.8 - 2.3			1.1	0.7 - 1.7
Relationship with the last partner												
Boy/Girlfriend not living together (reference)			1.0				1.0				1.0	
Others			1.2	0.7 - 2.0			1.1	0.7 - 1.7			1.1	0.7 - 1.7
Number of children												
0 (reference)			1.0				1.0				1.0	
1+			0.4**	0.2 - 0.7			0.3***	0.2 - 0.6			0.4***	0.2 - 0.6
E) OTHER												
Area of residence												
Rural (reference)	1.0		1.0		1.0		1.0		1.0		1.0	
Small town	1.1	0.7 - 1.7	1.0	0.6 - 1.7	1.4*	1.0 - 2.1	1.3	0.9 - 2.1	1.6*	1.1 - 2.3	1.5	0.9 - 2.3
Large town	1.3	0.8 - 2.2	1.3	0.7 - 2.3	1.7*	1.0 - 2.8	1.8*	1.0 - 3.1	1.9**	1.2 - 3.1	1.9*	1.1 - 3.3
N	1,008		947		1,031		969		1,031		969	

* p≤0.05; **p≤0.01; ***p≤0.001

5 DISCUSSION

One of the important results from the descriptive analyses is that the proportion of young adults who used condoms at their last sexual intercourse was 51% among the females and 66% among the males. In 2011, these proportions were respectively 60% and 72%. These findings highlight a relaxation of HIV/AIDS preventive practices among youths in Cameroon. This has been observed in other developing countries and explained in Cameroon by Billong et al. (2020) by the fact that expenditures related to the fight against HIV/AIDS are generally oriented towards antiretroviral treatment. In 2017, for example, the prevention of this pandemic for out-of-school youth accounted for only 1.9% of expenditures, and the communication for social and behavioral change in the general population accounted for 14.5% (Billong et al. 2020). Thus, HIV/AIDS programs for young adults received the lowest prevention funding, and this could have caused the problem of condom shortage. There was an annual growth of 24% in the number of condoms distributed in 2010-2014 in Cameroon, and then an annual decrease of 10%. As suggested by MINSANTE (2016), this problem could be explained by funding constraints.

The results from multivariate analyses demonstrate the relevance of the systemic explanatory approach to condom use among youths in Cameroon because we highlighted the “determinants” of this behavior at the family, extra-family, and individual levels of independent variables. The degree of media exposure did not affect the use of condoms among single youths.

The results of the study highlight the role of household human and financial capital in improving male youths’ sexual behaviors. The positive influence of the household head’s educational level occurred only at its highest level, and this result can be understood if we take into account the sexual education of children in the family setting. This requires parents to be well informed about youths’ sexual and reproductive health (Breunar et al. 2016; Pop and Rusu 2015). At a higher level of education, parents develop the capacity to communicate more easily with their sons about sexual and reproductive health matters. Another explanation is that educated parents invest more than others in the quality of their children, and may be more motivated to communicate with their children about subjects related to the prevention of pregnancies and STI / HIV / AIDS. This could be an important area for future research.

The positive association observed among male youths between household living standard and condom use reflects the fact that parental financial support plays an important role in improving preventive practices. Those who lived in households with a wealth index quintile higher than the second quintile are less likely to be vulnerable to economic pressures that could expose them to high-risk behaviors, and are also more likely to have access to good health-care services that encourage healthy lifestyle practices.

As the household head’s education level and the household living standard were associated with condom use in the multivariate logistic regression models only among male youths, and the same was observed among female youths in the case of ethnicity, youth’s occupation, and age at first intercourse, effective intervention for promoting condom use should be differently packaged for female and male youths.

The fact that, among female youths, individuals from Bamileke and Mbo ethnic groups were more likely to use condoms than others suggests that interventions should be less reinforced in West and Littoral regions, where Bamileke and Mbo live, than in the North, East, and other regions. This result concurs with findings published in 2004 by Rwenge. No previous study has evaluated the effect of youths’ economic

activity on condom use. In the Cameroonian context, the result obtained does not confirm the hypothesis concerning the relation between youth's economic activity and condom use. Contrary to expectations, young females who worked in the modern/service sector or were manual workers were less likely to use condoms than those who were not working. The age gap between partners may explain this relationship, and may be higher among female youths who worked in the modern/service sector or were manual workers than those who were not working. Indeed, as among the latter, most of the individuals are enrolled in school, and most of them recruit their partners among individuals of the same age group. This highlights the importance of the problem of unbalanced power relationship: most female youths who worked in modern/service sector or were manual workers had sexual intercourse with older men, and therefore their ability or capacity to influence the behavior of their partners is low.

Furthermore, among female youths, the positive relationship between age at first sexual intercourse and condom use corroborates observations made in other contexts, notably in Mali (Boileau 2006) and in Burkina Faso (Yode and LeGrand 2012). This suggests that delaying the onset of sexual activity could be a safer way to protect sexual and reproductive health. In the case of the number of children ever born, its negative association with condom use observed among female and male youths is an expression of trust between partners, and intimacy that would be stronger within relationships solidified by the birth of at least one child than within other relationships.

Other important results were highlighted with the logistic regression models in which each type of social factor was controlled by the individual factors. These models showed that the influence of some social factors was attenuated or nullified in the presence of individual factors, and that social factors have significant direct and indirect effects on youths' condom use. For example, among female youths, in-depth knowledge of HIV/AIDS explains some of the influence of ethnicity, and delaying first sexual intercourse and not having children to raise fully explain that of household standard of living. In other words, among female youths, individuals living in households in the second wealth index quintile and those living in households in the middle wealth index quintile were less likely to use condoms than those living in households in the highest wealth index quintile because a good proportion of the former started sexual activity at a younger age (33% and 22% versus 6%) and had at least one child (41% and 40% versus 21%). Furthermore, among them, delaying first sexual intercourse and a negative perception of gender inequalities may explain the influence of media exposure. Among young males, this last individual factor, as well as in-depth knowledge of HIV/AIDS and not having children to raise, played the same role in the case of media exposure. Thus, positive changes in youths' family, extra-family, and media environments should lead to the improvement of their sexual behaviors if they play the same role in the case of their knowledge, attitudes, perceptions, and practices about STDs/HIV/AIDS.

Our study results have one important limitation. The cross-sectional nature of DHS data does not allow for establishing temporal priority of independent variables and for evaluation of causal implications. Thus, the results are simple associations among variables. Because the study highlighted that social factors are associated with youths' condom use via their individual characteristics, longitudinal or biographical studies of youths' sexual behaviors are needed to show how changes over time in the youths' social environment (familial environment, extra-familial environment, and media) affect behavioral changes through perceptions and attitudes, and are either directly or indirectly related to HIV/AIDS prevention.

6 CONCLUSION AND RECOMMENDATIONS

The “determinants” of single youths’ condom use were found at the family, extra-family, and individual levels of independent variables. The degree of media exposure was not associated with condom use among either male or female youths. These findings support Cameroon’s multisectoral approach to HIV/AIDS prevention among youths, and emphasize the importance of involving parents, teachers, and youths.

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