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Determinants of the unmet needs for information, education and communication on sexual health among single youths in Burundi

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Abstract

The prevalence of HIV/AIDS among young people aged 15-24 in urban areas is at least 12 times higher among girls than boys in Burundi, while it is twice as high in Rwanda. The gap between the two countries could be narrowed if Burundi's single young people were provided with sufficient information about their sexual health through appropriate channels. The aim of this study was to examine the social and individual "determinants" of unmet needs for sexual health information, education and communication (IEC) among unmarried young boys and girls aged 15-24 in Burundi, using data from the 2016 Demographic and Health Survey (DHS). Data were analyzed at the bivariate level using cross-tabulations and chi-squared tests, and at the multivariate level using binary logistic regression methods. According to the results of the study, the 'determinants' of the phenomenon studied are, for both sexes, the size of the household, the age of the youths, their level of education, their knowledge of where to take the HIV/AIDS test and their region of residence; only in the case of boys do we find, in addition, the age of the head of the household, his level of education and the adolescents' exposure to the media; similarly, only in the case of girls do we find their economic activity and their perception of HIV/AIDS. Multisectoral IEC actions on sexual health for young people should therefore be strengthened in Burundi. *(Afr J Reprod Health 2023; 27 [8]: 39-57).*

Keywords: HIV/AIDS knowledge, family environment, extra-family environment, media, individual, Burundi, Sub-Saharan Africa

Résumé

Au Burundi, en milieu urbain, la prévalence du VIH/SIDA est, chez les jeunes de 15-24 ans, au moins douze fois plus élevée chez les jeunes filles que chez les jeunes garçons, alors qu'au Rwanda elle est deux fois plus élevée. L'écart entre les deux pays serait réduit si les jeunes célibataires burundais recevaient suffisamment d'information sur leur santé sexuelle par des canaux appropriés. L'objectif de cette étude était de chercher au Burundi, chez les jeunes garçons et filles célibataires âgés de 15-24 ans, les « déterminants » sociaux et individuels des Besoins Non Satisfaits (BNS) en Information, Education et Communication (IEC) en santé sexuelle à partir des données de l'Enquête Démographique et de Santé (EDS) de 2016. Ces dernières ont été analysées, au niveau bivarié, en recourant aux tableaux croisés et tests de chi-deux, et, au niveau multivarié, en recourant aux méthodes de régression logistique binaire. A en croire les résultats de l'étude, dans les deux sexes, les « déterminants » du phénomène étudié sont la taille du ménage, l'âge du jeune, son niveau d'instruction, sa connaissance de l'endroit où faire le test de VIH/SIDA et sa région de résidence ; seulement, chez les garçons, on retrouve en plus l'âge du chef de ménage, son niveau d'instruction et l'exposition aux médias ; de même, seulement, chez les filles, on retrouve leur activité économique et leur perception du VIH/SIDA. Les actions multisectorielles d'IEC en santé sexuelle concernant les jeunes devraient alors être renforcées au Burundi. *(Afr J Reprod Health 2023; 27 [7]: 39-57).*

Mots-clés: Connaissance du VIH/SIDA, environnement familial, environnement extrafamilial, médias, individu, Burundi, Afrique subsaharienne

Introduction

Located in East Africa in the Great Lakes region, Burundi is a very under-urbanized country with an extremely young population. Indeed, data from the 2008 Burundi census show that the country's urbanization rate is 10.1% and that two-thirds of the total population (65.7%) is under 25 years of age, half of which is made up of young people between the ages of 10 and 24[1]. In Burundi, therefore, young people constitute an important sector of the population in which it is necessary to invest in order

to promote the country's development and reap the demographic dividend, as the emerging powers of Asia have done.

According to UNICEF, adolescence is a critical stage in life. Giving youths the tools they need to live better lives and involving them in community development initiatives is an investment in the strength of their society. It is therefore important to promote youths' sexual and reproductive health so that they can turn their potential into opportunities for social and economic development. Although youths' knowledge in this area largely determines their practices and the future trends of social development indicators, sexuality remains a taboo subject in Burundian society. Children reach adulthood without adequate information on sexual and reproductive health from their parents and/or trusted adults. This shortcoming is exacerbated by the fact that children are inundated with vague and contradictory (and mostly negative) messages about sexuality and gender, even in the school environment. This situation increases the risk of unwanted pregnancies and vulnerability to STIs/HIV/AIDS, and when youths are victims of violations of their sexual and reproductive rights, they either do not know that their rights have been violated or do not know where to seek assistance.

In Burundi, according to data from the 2016 Demographic and Health Survey (DHS), the prevalence of modern contraception among single girls is only 2.1% among 15-19 year olds and 4.1% among 20-24 year olds. Condom use at last intercourse in the 12 months prior to the survey is 26.5% and 44.5% for single girls and 42.8% and 59.8% for single boys. As a result, among young girls aged 15-19 and 20-24, fertility rates in Burundi are respectively 1.3 and 1.2 times higher than in neighboring Rwanda[2,3]. Similarly, in urban areas of Burundi, the prevalence of HIV/AIDS among youths aged 15-24 is at least 12 times higher among girls (1.2%) than boys (less than 0.1%), while in Rwanda it is twice as high[2,3].

Therefore, adolescents face many problems when trying to satisfy their sexual curiosity due to the lack of information and education on reproductive and sexual health. Such problems could be avoided if they were provided with information through appropriate channels. They should be adequately equipped with the knowledge, skills and values that will enable them to make wise choices about their sexual and social relationships in a world affected by HIV/AIDS. This would enable them to understand not only the risk of pregnancy and STIs/HIV/AIDS, but also the risk of sexual exploitation and abuse, and help them to recognize the problem when it arises, to protect themselves as much as possible, and to know where to seek help.

To address all these issues, the Government of Burundi and its partners have taken (and are taking) steps to improve youths' knowledge, attitudes and practices in the area of sexual and reproductive health. However, they are generally not informed by scientific research. For example, since the 2016 Demographic and Health Survey (DHS) data, no scientific research has been conducted in the country on adolescents' sexual and reproductive health that would allow the government and its partners to evaluate their actions at the national level and provide them with the up-to-date information needed to guide their actions effectively and profitably. Furthermore, in other contexts, most of previous studies on young people in the field of reproductive health have focused on their behavior, yet they are still in the socialization phase during which they need to be adequately informed and educated in this area.

What factors explain the unmet need for sexual and reproductive health information, education and communication (IEC) among unmarried adolescents in Burundi? This is the question that this study seeks to answer.

We did not find any approach in previous studies to explain the unmet needs for adolescents' IEC on sexual health, but some theories developed by sociologists and psychologists can be used to understand and explain this social phenomenon. These include socialization theory[4,5], child social development theory[6], cognitive social theory[7], and communication theory[8-10]. According to these theories, youths' unmet needs for IEC on sexual health depend not only on their social environment but also on their own characteristics.

In the first case, family factors[11-16], extra-familial factors[16,17] , and the media[16] are the most mentioned. It would be relevant to identify the most important of these factors and to show how they interact with individual characteristics on the phenomenon under study. All the above shows the relevance of the present study. Its objectives are to investigate the social and individual determinants of the unmet needs for adolescents' IEC on sexual

health, to elucidate the mechanisms of action of social factors, and characterize the adolescents most concerned by the phenomenon under study.

Methods

Data

The data used in our analysis come from the 2016 Burundi Demographic and Health Survey (BDHS). It was conducted nationally among households and is statistically representative of urban and rural areas, as well as the different regions of the country.

The total sample size for the BDHS is approximately 15977 households, 17269 women aged 15-49 and 7552 men aged 15-59. The data used in this study involve 5052 unmarried girls and 2535 unmarried boys aged 15-24, of whom 4942 and 2456 respectively responded to questions on their background characteristics, sexual behavior, and means of HIV/AIDS transmission and prevention.

Unmarried girls and boys are defined as those who, at the time of the survey, reported that they had never been married or were not currently living with a partner.

Ethical consideration

As the data used in this study are those from Demographic and Health Survey (DHS) carried out in Burundi in 2016, under the technical assistance of ICF International, we affirm that all the procedures contributing to the results of this research comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Declaration of Helsinki of 1975, as revised in 2008.

Variables

Dependent variable

The dependent variable of this study is the unmet needs for information, education, and communication (IEC) on sexual health. This is a dichotomous variable, with a value of 1 for youths with these needs and 0 otherwise. In the first category, we find youths who do not have a good knowledge of HIV/AIDS, and in the second category those who do. Youths who have a good knowledge of HIV/AIDS know that the regular use of condoms during sexual intercourse and limiting sexual intercourse to a faithful and uninfected partner reduces the risk of contracting the AIDS virus and that a healthy person can nevertheless have been infected with the AIDS virus, and reject the two most common local misconceptions regarding the transmission or prevention of AIDS (i.e. that AIDS can be transmitted by mosquito bites and by supernatural means).

Independent variables

Following the results of the review of previous studies, we consider here five groups of explanatory variables of unmet needs for IEC on sexual health: family factors, extra-family factors, media exposure, individual characteristics and other.

Family factors

This group includes family composition, household size, gender of the household head, age of the household head, educational level of the household head and economic status of the household.

- Family composition: children who grow up in families with two biological parents often reproduce positive models[12-15], since daily parent-child interactions in the family can provide valuable opportunities for children to learn, prepare and refine the abilities that allow them to develop social skills and, consequently, 'normal' social behavior. The variable 'family composition' classifies families into different family types. It is a qualitative variable with four categories: nuclear, extended, single-parent and other. In the milieu studied, a nuclear or elementary family is a family group consisting of parents and their children (one or more), usually living in the same dwelling. An extended family includes parents and their children and relatives such as grandparents, parents-in-law, aunts and uncles, cousins, etc.
- Household size: this is taken into account because, if it is large, other adults in addition to the parents may be involved in the sexuality education of children. It takes the values: 1-3; 4-5; 6-7; 8 or more.
- Gender of head of household: as several previous studies have shown that female heads of household invest more than men in their children, whether in terms of time, money, emotional support or education[18,19], this

variable has also been included in the set of independent variables. It is a dummy variable that distinguishes female-headed households from others.

- Age of the head of household: it reflects here the generation effect and takes the values: 15-29 years; 30-39 years; 40-49 years; and 50 years or more. Since the youngest heads of household live in a context where the issue of sex education faces fewer and fewer traditional obstacles, a context different from that of their elders or fathers, this variable could clearly be positively associated with the unmet needs for IEC on sexual health among single youths.
- The educational level of the head of the household and the economic status of the household: according to Rwenge *et al.*[21], these variables represent human and financial capital, respectively, which are essential for children's access to sexual health information. The first variable is a qualitative ordinal variable with three categories: no education, primary education, secondary education or higher. The second variable was created using the DHS wealth index construction method. It is also a qualitative ordinal variable with five approximately equal groups: highest, fourth, middle, second and lowest.

Extra-family factors

As children's socialization also takes place in school, peer groups and religious groups, school attendance, and adolescents' level of education, occupation, or religion were also included in the set of independent variables.

- School attendance and adolescents' level of education: not attending school and having a low level of education does not allow adolescents to have the skills to read brochures, newspapers, and magazines containing information on sexual health and to access information transmitted through other channels. Moreover, in the context studied, as sex education is increasingly practiced in schools, youths who do not attend school are more disadvantaged than others, as they have less theoretical or practical knowledge in the field of sexual health. The first is a dummy variable indicating whether the person was in school or not at the time of the 2016 BDHS. The second is a qualitative variable with four categories: no education, primary education, secondary education, or higher.
- Economic activity and religion of the adolescent: these two variables were also taken into account because the existence of social ties through peer groups and/or membership in religious groups can also support adolescents in improving their knowledge in the area of sexual health, especially in the milieu studied, where a comprehensive approach to educate and sensitize adolescents has been put in place, involving, among others, religious leaders of all denominations and peers. The first variable has the following categories: not working, agriculture, and others. The second has four categories: Catholic; Protestant; Muslim; and other.

Media exposure

As television, radio, and newspapers or magazines are part of the channels through which the Burundian government and its partners inform, educate, and sensitize youths in the area of sexual health, the degree of media exposure can also be associated with the studied phenomenon. As Rwenge *et al.*[20], we created it using the youths' frequency of watching TV, listening to the radio, and reading newspapers/magazines. It has here four categories: not exposed; low exposure; moderate exposure; and high exposure.

Individual characteristics

These are the age of the adolescents, the age of first sexual intercourse, the number of live births, the perception of HIV/AIDS, and the knowledge of a place where one can be tested for HIV/AIDS.

- Age of adolescents: according to Galland[21], children's independence from elders or parents increases as they move away from adolescence; this is accompanied by the taking of initiatives, some of which can be beneficial. The different categories of this variable are 15-16 years; 17-18 years; 19-20 years; 21-22 years; 23-24 years.
- Youths' age at first sexual intercourse: Youths' initiation into sexual activity may be followed by the emergence or growth of their interest in related health problems; however, in-depth knowledge of HIV/AIDS may also

motivate them to delay initiation into sexual activity. This means that the relationship between age at first sexual intercourse and the phenomenon under study may be symmetrical. This independent variable has three categories: didn't have sex for the first time; had sex for the first time before the age of 15; had sex for the first time at the age of 15 or over.

- The number of children born alive: a girl who has already started her reproductive life should be more likely to know about HIV/AIDS and other sexually transmitted diseases because she has visited health centers several times; where she has received sexual and reproductive health information during antenatal care, childbirth and/or postpartum care. In addition, the high social value of the child in the milieu studied may motivate the girl (or boy) who has become a mother (or father) to take an interest in health problems that may not allow her (him) to assume her (his) responsibilities well. The number of children born alive is a dummy variable, equal to '1' if the number of children of the respondent is zero and '2' if it is at least one.
- Perception of HIV/AIDS and knowledge of where to get an HIV/AIDS test: these are all dummy variables. The first equals '1' if the respondent considers HIV/AIDS to be a serious problem and '2' if not. The second equals '1' if the respondent knows where to get an HIV/AIDS test and '2' if not.

Other variables

These are the place of residence and region of residence. The first has two categories: urban and rural. The second has four categories: North, Centre-East, West, and South.

Statistical methods

Both descriptive and multivariate explanatory methods were used in this study. First, the sample of single youths was characterized using the frequency distributions of the independent variables considered. Then the percentages of single adolescents with unmet needs for IEC on sexual health were calculated overall and in different social strata using cross-tables and chi-squared tests.

At the explanatory multivariate level, the data were analyzed using a binary logistic regression model, since the dependent variable, the unmet need for IEC on sexual health, has two categories. Thus, the variable explained here is the probability that a youth has an unmet need for IEC at the time of the survey. What is modelled in logistic regression is the odds ratio (OR), which is the ratio of two probabilities: the probability of the event occurring (P) and the opposite (1-P). The odds ratios are interpreted in terms of the deviation from a reference modality.

To meet the objectives of the study, several logistic regression models were constructed. These are the full models, in which all the independent variables are included, and other models which are obtained by controlling each of the social characteristics by the individual ones. For more details on this methodology, see Rwenge *et al.*[20].

Sampling weights were used to correct for imperfections in the sample that could lead to biased estimates. Such imperfections include selection of units with unequal probabilities, non-coverage of the population and non-response. Analyses were performed using Stata 16 software. The probability thresholds were $p<0.001$, $p<0.01$ and $p<0.05$.

Results

Background characteristics of respondents

Table 1 shows the percentage distribution of single youths interviewed during the 2016 BDHS by background characteristics. Overall, 44% of male and female single youths have an unmet need for IEC on sexual health. Most of these youths live in nuclear households (44% of boys and 46% of girls) or in single-parent households (31% of boys and girls). Few live in extended households (18% and 19% respectively). More than 60% of single youths live in households with 6 members or more (62% of boys and 64% of girls). The number of single youths living in female-headed households is higher among females (32%) than among males (28%). Moreover, in the milieu studied, the households in which single youths live are mostly headed by people aged 40 or older (79% of boys and 83% of girls) and poorly educated (only 14-15% have secondary or higher education). At the time of the 2016 BDHS, the percentage of single youths attending school is higher for girls (57%) than for boys (49%). Similarly, the level of education varies by gender, with a higher proportion of the former than

Table 1: Percentage of single youths aged 15-24 at the time of 2016 BDHS by selected background characteristics

Background characteristics	Boys N	%	Girls N	%
Unmet Needs for IEC	2456	100	4942	100
No	1386	56.4	2760	55.8
Yes	1070	43.6	2182	44.2
Family environment				
Family composition	2535	100	5052	100
Nuclear	1103	43.5	2318	45.9
Extended	446	17.6	950	18.8
Single-parent	773	30.5	1544	30.6
Others	213	8.4	240	4.7
Household size	2535	100	5052	100
1-3	368	14.5	597	11.8
4-5	584	23	1220	24.2
6-7	756	29.8	1599	31.6
8 or more	827	32.6	1636	32.4
Gender of the household head	2535	100	5052	100
Male	1825	72	3440	68.1
Female	710	28	1612	31.9
Age of the household head	2535	100	5052	100
15-29	257	10.2	249	4.9
30-39	280	11	615	12.2
40-49	769	30.3	1486	29.4
50 or more	1228	48.5	2702	53.5
Education level of the household head	2528	100	5049	100
No education	1240	49.1	2653	52.5
Primary	912	36.1	1686	33.4
Secondary or higher	375	14.8	710	14.1
Household economic status or wealth index	2535	100	5052	100
Lowest	320	12.6	657	13.0
Second	429	16.9	894	17.7
Middle	465	18.3	1022	20.2
Fourth	586	23.1	1103	21.8
Highest	735	29	1376	27.3
Extra-family environment				
School attendance	2535	100	5052	100
No	1283	50.6	2181	43.2
Yes	1252	49.4	2871	56.8
Youth's education level	2535	100	5052	100
No level	139	5.5	375	7.4
Primary	1180	46.5	2015	39.9
Secondary and over	1216	48	2662	52.7
Youth's religion	2535	100	5052	100
Catholic	1556	61.4	2912	57.6
Protestant	732	28.9	1798	35.6
Muslim	108	4.3	148	2.9
Others	138	5.4	194	3.8
Youth's occupation	2535	100	5052	100
Not working	332	13.7	1641	32.5
Agriculture	1429	58.9	2609	51.6
Others	774	27.4	802	15.9
Media exposure				
Degree of media exposure	2535	100	5052	100
Not exposed	652	25.7	2166	42.9
Low exposure	1319	52	2268	44.9
Moderate exposure	492	19.4	559	11.1
High exposure	72	2.9	60	1.2
Individual characteristics				
Age	2535	100	5052	100
15-16	777	30.7	1667	33
17-18	641	25.3	1462	28.9
19-20	499	19.7	903	17.9
21-22	317	12.5	560	11.1
23-24	301	11.9	460	9.1
Age at first sex	2535	100	5052	100
Haven't had the first sex	1980	78.1	4381	86.7
< 15 years	224	8.8	117	2.3
15 years or more	331	13.1	554	11
Number of children	2535	100	5052	100
None	2517	99.3	4776	95.0
At least one child	18	0.7	276	5.0
Perception of HIV	2456	100	4643	100
Not a serious problem	1846	75.2	3294	71
A serious problem	610	24.8	1349	29
Knowledge of a place to get HIV test	2456	100	4643	100
No	538	21.9	890	19.2
Yes	1918	78.1	3753	80.8
Other				
Area of residence	2535	100	5052	100
Urban	385	15.2	834	16.5
Rural	2150	84.8	4218	83.5
Région of residence	2535	100	5052	100
North	673	26	1486	29.4
Center-East	556	22	1271	25.2
West	703	28	1217	24.1
South	603	24	1078	21.3

of the latter at the highest level of education (53% and 48% respectively). In the milieu studied, the majority of youths are Catholic (61% of boys and 58% of girls). The proportion of youths who are Protestant is higher among girls (36%) than among boys (29%). A small number of youths are Muslim (4% of boys and 3% of girls). Finally, in the milieu studied, 59% of the boys and 52% of girls work in agriculture, while 27% of the boys and 16% of the girls work in other sectors**.**

The proportion of youths with no or low media exposure is very high in the milieu studied,

Table 2: Proportion of single youths aged 15-24 having unmet needs for IEC on sexual health during the 2016 BDHS, by gender and selected background characteristics

Background characteristics	Boys				Girls			
	N	**%**	**95% IC**	χ^2 **p-value**	**N**	**%**	**95% IC**	χ^2 **p-value**
Family environment								
Family composition				0.428				0.005
Nuclear	1 029	45.0	[41.4;48.7]		2 119	48.0	[45.4;50.6]	
Extended	510	42.0	[37.0;47.1]		1 063	41.5	[37.7;45.4]	
Single-parent	775	43.9	[39.7;48.1]		1 491	45.3	[42.1;48.4]	
Others	222	38.4	[31.0;46.4]		269	37.2	[30.0;45.0]	
Household size				0.297				0.262
1-3	370	41.8	[35.8;48,0]		563	42.4	[37,8;47.1]	
4-5	569	40.2	[35.4;45.2]		1 173	46.1	[42,6;49.6]	
6-7	717	45.8	[41.3;50.3]		1 488	44.2	[41,0;47.4]	
8 or more	880	44.7	[41.1;48.4]		1 718	47.2	[44,3;50.1]	
Gender of the household head				0.719				0.635
Male	1 814	43.3	[40.5;46.1]		3 381	45.7	[43.6;47.8]	
Female	722	44.2	[39.9;48.7]		1 561	44.8	[41.6;48.1]	
Age of household head				0.338				0.008
15-29	241	37.4	[30.3;45.2]		277	37.0	[30.4;44.0]	
30-39	293	43.2	[36.9;49.6]		636	48.4	[43.2;53.6]	
40-49	781	44.8	[40.9;48.7]		1 443	48.3	[45.3;51.4]	
50 or more	1 221	44.2	[40.7;47.7]		2 586	44.0	[41.5;46.5]	
Education level of the household head				0.723				0.000
No level	1 168	43.6	[40.0;47.3]		2 388	48.4	[45.9;50.9]	
Primary	906	44.3	[40.6;48.0]		1 666	45.0	[41.8;48.1]	
Secondary or higher	454	41.2	[35.0;47.7]		886	35.7	[32.3;39.2]	
Household economic status or wealth index				0.001				0.000
Lowest	269	53.2	[46.4;60.0]		518	53.9	[48.2;59.5]	
Second	371	48.3	[42.5;54.1]		778	50.8	[46.9;54.6]	
Middle	439	45.1	[40.2;50.0]		924	46.6	[43.0;50.3]	
Fourth	535	39.6	[35.4;44.0]		1 053	43.4	[39.7;47.1]	
Highest	922	39.0	[34.5;43.6]		1 669	39.1	[35.8;42.4]	
Extra-family environment								
School attendance	2 536	43.6	[41.2;46.0]	0.003	4 942	45,4	[43,5;47,4]	0.272
No	1 235	46.9	[43.5;50.2]		2 167	46,4	[43,8;49,0]	
Yes	1 301	40.3	[37.2;43.4]		2 775	44,7	[42,2;47,1]	
Youth's education level				< 0.001				0.000
No level	125	54.3	[45.0;63.3]		328	63,4	[57,2;69,1]	
Primary	1 107	51.6	[47.9;55.2]		1 737	56,4	[53,4;59,2]	
Secondary and over	1 304	34.9	[31.9;38.0]		2 877	35,7	[33,5;37,9]	
Youth's religion				0.224				0.706
Catholic	1 525	45.0	[42.0;48.1]		2 837	44,6	[42,3;46,9]	
Protestant	739	42.1	[38.0;46.4]		1 734	46,5	[43,4;49,6]	
Muslim	143	33.3	[22.8;45.7]		184	47,1	[36,9;57,5]	
Others	129	43.1	[33.4;53.3]		187	46,8	[38,8;54,9]	
Youth's occupation				0.887				0.002
Not working	397	42.4	[37.0;47.9]		1 599	41,1	[38,3;43,9]	
Agriculture	1 313	43.9	[40.9;47.0]		2 502	46,9	[44,2;49,6]	
Others	826	43.4	[39.2;47.7]		841	49,5	[44,9;54,1]	
Media exposure								
Degree of media exposure				< 0.001				0.000
None	609	54.9	[50.0;59.7]		1 884	49.7	[46.6;52.7]	
Low	1 287	40.8	[37.8;43.8]		2 303	43.3	[40.7;45.9]	
Medium	546	37.8	[32.9;42.9]		678	40.7	[36.7;44.9]	
High	94	33.2	[22.3;46.2]		77	28.5	[16.7;44.3]	
Individual characteristics								
Age				< 0.001				0.000

15-16	723	53.3	[49.0;57.6]		1 548	55.6	[52.5;58.6]	
17-18	651	45.1	[40.5;49.8]		1 415	46.8	[43.8;49.9]	
19-20	519	37.5	[32.7;42.6]		904	38.7	[35.4;42.2]	
21-22	324	35.3	[29.6;41.5]		602	35.1	[30.7;39.9]	
23-24	319	34.9	[29.0;41.2]		473	32.8	[28.1;37.9]	
Age at first sex				0.004				0.008
Haven't had the first sex	1 994	44.2	[41.5;46.9]		4 276	46.2	[44.2;48.3]	
< 15 years	213	50.5	[43.1;57.8]		123	48.8	[38.3;59.4]	
15 years or more	329	35.1	[29.5;41.2]		543	38.3	[33.7;43.2]	
Number of children	NA	NA	NA	NA				0.027
None					4674	45.8	[43.9.;47.8]	
At least one child					268	38.4	[32.0;45.1]	
Perception of HIV				0,006				0.000
Not a serious problem	1 902	41.8	[39.2;44.5]		3 565	41.6	[39.5;43.8]	
A serious problem	634	48.7	[44.3;53.2]		1 377	54.6	[51.5;57.7]	
Knowledge of a place to get HIV test				< 0,001				0.000
No	536	59.2	[54.6;63.6]		937	63.7	[59.7;67.4]	
Yes	2 000	39.2	[36.6;41.8]		4 005	41.1	[39.0;43.2]	
Other								
Area of residence	2 536	43,6	[41.2;46.0]	0,005	4 942	45.4	[43.5;47.4]	0.000
Urban	652	35,9	[30.5;41.7]		1 301	36.5	[32,7;40.4]	
Rural	1 884	45,0	[42.4;47.6]		3 641	47.2	[45,1;49.4]	
Région of residence				0,375				0.352
North	699	43,1	[38.3;48.0]		1 336	47.5	[43.8;51.3]	
Center-East	606	40,1	[35.5;44.9]		1 291	43.1	[39.7;46.6]	
West	660	45,0	[40.8;49.2]		1 092	46.3	[42.2;50.5]	
South	571	46,0	[41.1;51.0]		1 223	44.0	[39.7;48.4]	

but more so among female than male youths (88% and 78% respectively). The majority of single youths aged 15-24 said they had not yet had their first sexual intercourse (78% of boys and 87% of girls). However, among those who said they had, the percentage of those who had experimented with sex for the first time before the age of 15 is higher among males (40%) than females (17%). Premarital fertility is very low in the milieu studied, with only 0.7% of single boys and 5% of single girls saying they had already had their first child. At the time of the survey, the percentage of youths who perceived HIV/AIDS as a serious problem was very low in the milieu studied (25% of boys and 29% of girls). Finally, most single youths know at least one place where they can be tested for HIV/AIDS in the milieu studied (78% of boys and 81% of girls).

Bivariate associations of each independent variable with unmet need for IEC

Table 2 shows the association between each independent variable and the Unmet Needs for IEC on sexual health among single Burundian youths.

For both sexes, at the social level, only the household wealth index, the adolescent's educational level, and the level of media exposure are significantly associated with the Unmet Needs for IEC on sexual health. For both sexes, at the individual level, the youth's age, age at first sex, awareness of HIV/AIDS and knowledge of a place to get an HIV test are also significantly associated with the unmet need for IEC on sexual health. The family composition of the household, the age of the head of the household, the educational level of the head of the household, the occupation of the adolescent and the number of children are only associated with the unmet need for IEC on sexual health among female youths and with school attendance among male youths.

For both sexes, the rate of unmet need for IEC on sexual health is negatively associated with the household wealth index. It is significantly lower than the national average (44% of boys and 45% of girls) among single youths living in households in the third (40% and 43%) or fourth (39% of boys and girls) wealth quintile. For both sexes, this rate is also negatively associated with age, education level, and media exposure.

For both sexes, this rate is higher among single youths living in households in the third wealth index quintile (40% and 43% respectively) or in the fourth (39% of both boys and girls). For both sexes, this rate is also negatively associated

with age, educational attainment, and level of media exposure.

For both sexes, late onset of sexual activity (at age 15 or older: 35% of boys and 38% of girls; under 15: 51% and 49% respectively) and knowing where to get an HIV/AIDS test (39% versus 59% of boys and 41% versus 64% of girls) are other factors negatively associated with unmet need for IEC on sexual health. Similarly, for both sexes, viewing HIV/AIDS as a normal health problem is negatively associated with the dependent variable (42% versus 49% of boys and 42% versus 55% of girls). For both sexes, single adolescents living in cities are less concerned about unmet needs for IEC on sexual health than those living in rural areas (36% versus 45% of boys and 37% versus 47% of girls).

Among girls only, living with parents is positively associated with an unmet need for IEC on sexual health (48% in nuclear, 42% in extended, and 45% in single-parent households compared to 37% in other household types).

The age of the household head is also positively related to the dependent variable. On the other hand, the educational level of the household head is negatively associated with the same variable. It should also be noted that those who work in the agricultural sector (47%) or in other sectors (50%) are more concerned about the unmet need for IEC on sexual health than those who do not work (41%). Finally, among girls, having already had a child is negatively associated with unmet need for IEC on sexual health (38% versus 46%). For boys only, attending school is negatively associated with the dependent variable (40% versus 47%).

Results of the multivariate analyses

This section presents the "determinants" of the phenomenon under study, i.e. the factors that are associated with it, other things being equal, as well as the mechanisms of action of some of them. In the latter case, we will focus on mediating relationships.

"Determinants" of unmet need for IEC on sexual health

The models including all independent variables (Table 3) show that, for both sexes, the "determinants" of the unmet need for IEC on sexual health are the size of the household, the age of the adolescent, his or her level of education, his or her knowledge of a place to get an HIV test and the region of residence. Among boys only, the variables that act as determinants are the age of the head of the household, the educational level of the head of the household, and media exposure. Among girls only, the variables that act as determinants are the occupation of the adolescent, the perception of HIV, and the region of residence.

Among boys, those living in households with 4-5 members are less likely to have unmet needs for IEC on sexual health than those living in households with at least 8 members (OR = 0.7). For girls, the same is observed when comparing children living in households with 6-7 members with those living in households with at least 8 members (OR = 0.8). For both sexes, children aged 17 years or older are less affected by unmet need for sexual health IEC than those aged 15-16 years (for boys: OR=0.9 at 17-18 and 0.7 at 19-20, 21-22 or 23-24; for girls: OR=0.8 at 17-18, 0.7 at 19-20 and 0.6 at 21-22 or 23-24).

Furthermore, for both sexes, children with no education and those with primary education are more likely to be affected by the same phenomenon than those with secondary education or more (for boys: ORs are 2.0 and 1.6 respectively; for girls: ORs are 2.8 and 1.8 respectively). For both sexes, there is a positive relationship between not knowing where to get an HIV test and unmet need for sexual health IEC (OR=1.6 for boys and 1.9 for girls).

Finally, for both sexes, compared to adolescents living in the West region, those living in the North and Centre-East regions are less likely to be affected by the Unmet Needs for IEC on sexual health (for boys: 0.8 and 0.6, respectively; for girls: 0.8 and 0.7, respectively). Only among girls does the OR of unmet need for IEC on sexual health in the Western region differ from that in the Southern region (OR = 0.7).

Only among boys is the OR of unmet need for IEC lower in households where the head is aged 30-39 or 40-49 than in households where the head is aged 50-59. Contrary to expectation, we observed among them that adolescents living in households whose heads have a secondary or higher education are more likely to be affected by unmet needs for IEC than those living in households whose heads have no education (OR = 1.7). Furthermore, among them, adolescents with no media exposure are more likely to be affected by the same phenomenon than those with low media exposure (OR = 1.5). Only

Table 3: Results from logistic regression models on unmet needs for IEC on sexual health among boys and girls aged 15-24 (2016 BDHS)

Background characteristics	Boys		Girls	
	OR	**95% IC**	**OR**	
Family environment				
Family composition				
Nuclear	1		1	
Extended	0.93	[0.66;1.30]	0.89	[0.70;1.10]
Single-parent	0.93	[0.57;1.52]	0.91	[0.65;1.26]
Others	0.99	[0.58;1.68]	0.91	[0.59;1.40]
Household size				
1-3	0.81	[0.54;1.22]	0.85	[0.64;1.12]
4-5	0.73**	[0.54;0.97]	0.96	[0.79;1.16]
6-7	0.97	[0.74;1.26]	0.83**	[0.69;0.99]
8 or more	1		1	
Gender of the household head				
Male	1		1	
Female	1.17	[0.73;1.87]	1.07	[0.78;1.47]
Age of the household head				
15-29	0.71	[0.42;1.20]	0.95	[0.65;1.38]
30-39	0.74*	[0.52;1.04]	1.14	[0.87;1.49]
40-49	0.82*	[0.66;1.04]	1.09	[0.93;1.29]
50 or more	1		1	
Education level of the household head				
No level	1		1	
Primary	1.24	[0.96;1.60]	0.97	[0.82;1.14]
Secondary or higher	1.67**	[1.11;2.51]	0.84	[0.64;1.10]
Household economic status or wealth index				
Lowest	1.39	[0.89;2.18]	1.13	[0.81;1.58]
Second	1.35	[0.89;2.04]	1.11	[0.82;1.49]
Middle	1.17	(0.79;1.72]	1.07	[0.81;1.41]
Fourth	0.93	[0.66;1.32]	0.95	[0.73;1.24]
Highest	1		1	
Extra-family environment				
School attendance				
No	1		1	
Yes	0.93	[0.83-1.06]	0.95	[0.90;1.02]
Youth's education level				
No level	1.96***	[1.26-3.06]	2.81***	[2.11;3.76]
Primary	1.58***	[1.23-2.02]	1.78***	[1.53;2.07]
Secondary and over	1		1	
Youth's religion				
Catholic	1		1	
Protestant	0.85	[0.68-1.07]	1.02	[0.88;1.17]
Muslim	0.71	[0.41-1.24]	1.26	[0.77;2.06]
Others	0.81	[0.53-1.25]	0.89	[0.63;1.25]
Youth's occupation				
Agriculture	1		1	
Not working	1.12	[0.83-1.51]	1.02	[0.85;1.23]
Others	1.15	[0.91-1.45]	1.33**	[1.07;1.65]
Media exposure				
Degree of media exposure				
None	1		1	
Low	1.45***	[1.13-1.85]	0.99	[0.84;1.17]
Medium	1.02	[0.79-1.32]	1.18	[0.95;1.47]
High	0.94	[0.52-1.70]	0.88	[0.43;1.82]
Individual characteristics				
Age				
15-16	1		1	
17-18	0.88	[0.69-1.14]	0.84*	[0.71;1.01]

19-20	0.69**	[0.52-0.91]	0.67***	[0.55;0.82]
21-22	0.66**	[0.46-0.94]	0.63***	[0.49;0.81]
23-24	0.66**	[0.46-0.95]	0.59***	[0.45;0.78]
Age at first sex				
Haven't had the first sex	1		1	
< 15 years	1.17	[0.85-1.62]	1.12	[0.71;1.78]
15 years or more	0.79	[0.58-1.07]	0. 98	[0.74;1.29]
Number of children	NA	NA		
None			1	
At least one child			0.96	[0.66;1.38]
Perception of HIV				
Not a serious problem	1		1	
A serious problem	1.12	[0,91-1,37]	1.26***	[1.09;1.47]
Knowledge of a place to get HIV test				
No	1.62***	[1.28-2.05]	1.89***	[1.55;2.31]
Yes	1		1	
Other characteristics				
Area of residence				
Urban	0.77	[0.53-1.12]	0.67 ***	[0.51;0.87]
Rural	1		1	
Region of residence				
North	1		1	
Center-East	0.77*	[0.59-1.02]	0.75 **	[0.60;0.94]
West	0.62***	[0.46-0.83]	0.67***	[0.53;0.84]
South	0.99	[0.73-1.33]	0.71***	[0.56;0.90]
Constant	0.66	[0.31-1.41]	0.89	[0.53;1.47]
Fisher's F	4.39***		9.08***	
LROC	0,78		0,84	
N	2528		4940	

***p≤0,001 ; ** p≤ 0,05 ; * p ≤0,1

among girls, adolescents working in sectors other than agriculture are most concerned about the unmet need for IEC on sexual health (OR = 1.3). Furthermore, among them, adolescents who perceive HIV/AIDS as a serious problem are more likely than others to be affected by the Unmet Needs for IEC on sexual health (OR=1.3). Finally, among them, adolescents living in urban areas are less likely than those living in rural areas to be affected by the same phenomenon (OR=0.7).

Mechanisms of action of social factors

For both sexes, Tables 4 and 5 show that the presence of individual characteristics reduced the explanatory power of the household wealth index. Among girls, they nullified the difference between youths living in households in the second wealth index quintile and those living in households in the fourth wealth index quintile. It attenuated the difference between youths living in households in the first wealth index and those in the highest wealth index (Models 1 and 2 of Table 5). Among boys, the presence of individual characteristics played only the first role, when comparing youths living in households in the middle or third wealth index and those in the reference category (Models 1 and 2 of Table 4).

Among girls only, the presence of individual characteristics reduced the explanatory power of the head of household's age and that of the head of household's education level. In particular, the presence of individual characteristics nullified the difference between youths living in households whose heads aged 40-49 and those living in households whose heads aged 50-59 and attenuated the difference between youths living in households whose heads aged 30-39 and those in the reference category (Models 1 and 2 in Table 5). It only played the second role when comparing youths living in households whose heads have secondary or higher education level and those living in households whose heads have no educational level (Models 1 and 2 of Table 5). Concerning extra-family characteristics, among boys, the presence of individual characteristics did not play any role (Models 3 and 4 of Table 4). On the other hand, among girls, it reduced the explanatory power of youths' occupation by attenuating the difference between youths who work in agriculture sector and those who work in other sectors of activities

Table 4: Results from logistic regression models in which each type of social factor is controlled by individual characteristics (single boys aged 15-24, 2016 BDHS)

Background characteristics	M1		M2		M3		M4		M5		M6	
		95% IC	**OR**	**95% IC**	**OR**	**95% IC**	**OR**	**95% IC**	**OR**	**95% IC**	**OR**	**95% IC**
Family environment												
Family composition												
Nuclear	1		1									
Extended	1.00	[0.74;1.35]	1.02	[0.74;1.39]								
Single-parent	0.91	[0.57;1.45]	0.98	[0.61;1.58]								
Others	0.89	[0.53;1.47]	1.01	[0.60;1.72]								
Household size												
1-3	0.85	[0.59;1,24]	0.84	[0.56;1.24]								
4-5	0.76**	(0.58;1,00]	0.75**	[0.57;0.99]								
6-7	0.98	[0.76;1,26]	0.97	[0.74;1.26]								
8 or more	1		1									
Gender of the household head												
Male	1		1									
Female	1.2	[0.76;1.89]	1.15	[0.73;1.81]								
Age of the household head												
15-29	0.76	[0.45;1.27]	0.8	[0.47;1.34]								
30-39	0.95	[0.69;1.32]	0.8	[0.57;1.13]								
40-49	0.96	[0.77;1.19]	0.84	[0.67;1.04]								
50 or more	1		1									
Education level of the household head												
No level	1		1									
Primary	1.21	[0.95;1.54]	1.19	[0.93;1.54]								
Secondary or higher	0.71**	[0.55;0.93]	0.80*	(0.62;1.04]								
Household economic status or wealth index												
Lowest	2.07***	[1.37;3.13]	1.81***	[1.19;2.75]								
Second	1.64**	[1.12;2.38]	1.58**	[1.07;2.32]								
Middle	1.31	[0.91;1.88]	1.28	[0.88;1.85]								
Fourth	0.98	[0.70;1.38]	0.96	[0.68;1.37]								
Highest	1		1									
Extra-family environment												
School attendance												
No					1		1					
Yes					1.04	[0.93;1.17]	0.93	[0.82;1.05]				

Youth's education level												
No level					1		1					
Primary					0.86	[0.58;1.29]	0.81	[0.55;1.18]				
Secondary and over					0.40***	[0.26;0.63]	0.51***	[0.33;0.79]				
Youth's religion												
Catholic					1		1					
Protestant					0.86	[0.69;1.07]	0.84	[0.67;1.04]				
Muslim					0.69	[0.39;1.24]	0.69	[0.40;1.21]				
Others					0.8	[0.51;1.24]	0.8	[0.51;1.24]				
Youth's occupation												
Agriculture					1		1					
Not working					1.15	[0.86;1.54]	1.11	[0.83;1.49]				
Others					1.1	[0.88;1.37]	1.11	[0.88;1.39]				
Media exposure												
None									1		1	
Low									1.76***	[1.40;2.22]	1.57***	[1.24;2.00]
Medium									0.9	[0.70;1.15]	0.94	[0.72;1.22]
High									0.74	[0.43;1.28]	0.81	[0.45;1.45]
Individual characteristics												
Age												
15-16			1				1				1	
17-18			0,82	[0.64;1.05]			0.85	[0.66;1.09]			0.86	[0.68;1.10]
19-20			0,64***	[0.48;0.84]			0.66***	[0.49;0.88]			0.66***	[0.50;0.88]
21-22			0,60***	[0.43;0.84]			0.63***	[0.45;0.88]			0.65**	[0.47;0.90]
23-24			0.63***	[0.44;0.89]			0.63**	[0.44;0.90]			0.67**	[0.47;0.93]
Age at first sex												
Haven't had the first sex			1				1				1	
< 15 years			1.26	[0.92;1.74]			1.17	[0.85;1.60]			1.28	[0.93;1.76]
15 years or more			0.91	[0.68;1.23]			0.81	[0.60;1.10]			0.9	[0.67;1.21]
Perception of HIV												
Not a serious problem			1				1				1	
A serious problem			1.15	[0.94;1.42]			1.12	[0.92;1.38]			1.15	[0.94;1.41]
Knowledge of a place to get HIV test												
Yes			1.87***	[1.49;2.36]			1.66***	[1.31;2.10]			1.81***	[1.44;2.29]
No			1				1				1	
Other characteristics												
Area of residence												
Urban	0.70**	[0.50;0.99]	0.75*	[0.54;1.05]	0.69**	[0.51 – 0.94]	0.76*	[0.56;1.03]	0.75**	[0.56;1.00]	0.8	[0.60;1.06]

Rural	1		1		1		1		1		1	
Region of residence												
West	1		1		1		1		1		1	
North	0.73**	[0.55;0.95]	0.8	[0.61;1.05]	0.76*	[0.58;1.00]	0.79	[0.60;1.05]	0.84	[0.64;1.11]	0.88	[0.67;1.15]
Center-East	0.65***	[0.49;0.86]	0.68***	[0.51;0.91]	0.66***	[0.50;0.88]	0.66***	[0.49;0.88]	0.72**	[0.54; 0.94]	0.72**	[0.55;0.96]
South	0.98	[0.74;1.31]	0.97	[0.73;1.29]	0.93	[0.69;1.24]	0.92	[0.69;1.22]	1.01	[0.76;1.33]	0.96	[0.73;1.27]
Constant	0.66	[0.35;1.23]	0.76	[0.39;1.49]	1.59**	[1.06;2.40]	1.81**	[1.13;2.89]	0,81*	[0.65;1.01]	0.85	**[0.64;1.12]**
Fisher's F	2.65***		4.85***		5.86***		6.18***		6.26***		7.71***	
N	2528		2528		2536		2536		2536		2536	

***p≤0,001; ** p≤ 0,05; * p ≤0,1

Table 5: Results from logistic regression models in which each type of social factor is controlled by individual characteristics (single girls aged 15-24, 2016 BDHS)

Background characteristics	**M1**	**95% IC**	**M2** **OR**	**95% IC**	**M3** **OR**	**95% IC**	**M4** **OR**	**95% IC**	**M5** **OR**	**95% IC**	**M6** **OR**	**95% IC**
Family environment												
Family composition												
Nuclear	1		1									
Extended	0.90	[0.73;1.12]	0.92	[0.75;1.14]								
Single-parent	0.81	[0.59;1.11]	0.87	[0.63;1.21]								
Others	0.73	[0.48;1.12]	0.82	[0.54;1.25]								
Household size												
1-3	0.82	[0.63;1.07]	0.88	[0.67;1.16]								
4-5	0.95	[0.79;1.14]	0.98	[0.81;1.19]								
6-7	0.84*	[0.71;1.01]	0.85*	[0.71;1.02]								
8 or more	1		1									
Gender of the household head												
Male	1		1									
Female	1.10	[0.81;1.50]	1.1	[0.81;1.51]								
Age of the household head												
15-29	1.14	[0.80;1.64]	1.03	[0.71;1.48]								
30-39	1.55***	[1.20;2.00]	1.27*	[0.98;1.65]								
40-49	1.23***	[1.05;1.44]	1.11	[0.95;1.30]								
50 or more	1		1									
Education level of the household head												
No level	1		1									
Primary	0.89	[0.76;1.04]	0.92	[0.79;1.08]								

Secondary or higher	0.71**	[0.55;0.93]	0.80 *	[0.62;1.04]								
Household economic status or wealth index												
Lowest	1.60***	[1.16;2.21]	1.37*	[1.00;1.88]								
Second	1.35**	[1.03;1.79]	1.24	[0.94;1.65]								
Middle	1.16	[0.90;1.50]	1.12	[0.86;1.46]								
Fourth	0.99	[0.77;1.28]	1	[0.75;1.25]								
Highest	1		1									
Extra-family environment												
School attendance												
No					1		1					
Yes					0.96	[0.90;1.02]	0.95	[0.89;1.02]				
Youth's education level												
No level					3.18***	[2.39;4.24]	2.81***	[2.12;3.74]				
Primary					2.33***	[2.02;2.69]	1.80***	[1.55;2.09]				
Secondary and over									1		1	
Youth's religion												
Catholic					1		1					
Protestant					1.06	[0.92;1.22]	1.02	[0.88;1.18]				
Muslim					1.38	[0.83;2,30]	1.31	[0.81;2.13]				
Others					0.92	[0.66;1.30]	0.88	[0.62;1.23]				
Youths'occupation												
Agriculture					1		1					
Not working					1.10	[0.93;1.32]	1.01	[0.84;1.21]				
Others					1.38***	[1.11;1.70]	1.29**	[1.05;1.60]				
Media exposure												
None									1		1	
Low									1.26***	[1.08;1.47]	1.14	[0.97;1.33]
Medium									1.02	[0.82;1.26]	1.09	[0.88;1.35]
High									0.64	[0.31;1.29]	0.77	[0.37;1.60]
Individual characteristics												
Age												
15-16			1				1				1	
17-18			0.80**	[0.67;0.95]			0.84*	[0.71;1.01]			0.79***	[0.66;0.94]
19-20			0.62***	[0.51;0.76]			0.66***	[0.55;0.80]			0.61***	[0.50;0.73]
21-22			0.57***	[0.45;0.72]			0.62***	[0.48;0.79]			0.55***	[0.43;0.70]
23-24			0.54***	[0.42;0.71]			0.58***	[0.44;0.76]			0.52***	[0.40;0.68]

Age at first sex												
Haven't had the first sex			1				1				1	
< 15 years			1.30	[0.83;2.04]			1.11	[0.70;1.74]			1.26	[0.81;1.96]
15 years or more			1.04	[0.79;1.36]			0.95	[0.72;1.25]			0.99	[0.75;1.30]
Number of children born alive												
None			1				1				1	
At least one			1.03	[0.72;1.47]			0.98	[0.68;1.41]			1.08	[0.76;1.55]
Perception of HIV												
Not a serious problem			1				1				1	
A serious problem			1.41***	[1.22;1.64]			1.27***	[1.10;1.48]			1.44***	[1.25;1.67]
Knowledge of a place to get HIV test												
No			2.08***	[1.71;2.52]			1.90***	[1.56;2.31]			2.10***	[1.72;2.55]
Yes			1				1				1	
Other characteristics												
Place of residence												
Urban	0.71**	[0.55;0.93]	0.72**	[0.56;0.93]	0.58***	[0.47;0.71]	0.62***	[0.51;0.76]	0.60***	[0.48 – 0.75]	0.62***	[0.51;0.77]
Rural	1		1		1		1		1		1	
Region of residence												
West	1		1		1		1		1			
North	0.76**	[0.61;0.95]	0.77**	[0.62;0.97]	0.78**	[0.62;0.98]	0.78**	[0.62;0.98]	0.85	[0.68 – 1.06]	0.83	[0.67;1.04]
Center-East	0.65***	[0.53;0.81]	0.70***	[0.56;0.87]	0.67***	[0.53;0.84]	0.69***	[0.55;0.86]	0.72***	[0.58 – 0.89]	0.75**	[0.60;0.93]
South	0.76**	[0.60;0.96]	0.72***	[0.57;0.92]	0.74**	[0.58;0.95]	0.70***	[0.55;0.90]	0.76**	[0.59 – 0.97]	0.71***	[0.56;0.91]
Constant	1.01	[0.66;1.54]	1.04	[0.66;1.62]	0.72***	[0.56;0.91]	0.89	[0.67;1.18]	1.00	[0.82 – 1.22]	1.06	[0.85;1.34]
Fisher's F	5.12***		9.95***		19.17***		16.36***		8.28***		16.19***	
N	4940		4940		4942		4942		4942		4942	

***p≤0,001 ; ** p≤ 0,05 ; * p ≤0,1

Models 3 and 4 of Table 5). Concerning media exposure, among boys, the presence of individual characteristics did not play any role (Models 5 and 6 in Table 4). On the other hand, among girls, it nullified the explanatory power of the first factor by completely canceling the difference between youths who are not at all exposed to the media and those who are weakly exposed to the media (Models 5 and 6 of Table 5).

Discussion

The study results showed that in 2016, 43.5% of single boys and 45.9% of single girls in Burundi were affected by unmet need for IEC on sexual health. According to ISTEEBU *et al*.[22], these proportions were 52.3% and 55.5% respectively in 2010. This represents a decrease of about 12% and 22% respectively (p-value=0.001 for both sexes). These results show that the actions of the Burundian government and its partners have improved knowledge and attitudes towards sexual health among young people in Burundi. However, young people benefited differently from these interventions depending on their family, extra-family and individual characteristics. In fact, the study results showed that the ORs of having unmet needs for IEC on sexual health varied according to the modalities of the independent variables considered at these three levels.

For both sexes, the study results partially support the idea that large household size is negatively associated with unmet needs for IEC on sexual health. This means that the presence of adults other than parents in large households contributes to the sexual education of young people. However, the positive effect of this factor may disappear when the ratio of children to adults is high. In fact, the ORs of having unmet needs for IEC on sexual health were not higher in very small households than in those with at least 8 members; only young people living in households with 4-5 or 6-7 members were less likely to have unmet needs for sexual health IEC than those living in households with at least 8 members. This finding is innovative because previous studies evaluating the effect of family environment indicators on adolescents' sexual health knowledge and attitudes did not include household size among the independent variables. For both sexes, at the multivariate level, among the extra-familial characteristics, only the young people's level of education was associated with the phenomenon under study. Its negative relationship with the latter is due to the fact that education is one of the most important means of acquiring knowledge and skills and, in Burundi, the school is one of the social actors used by the government and its partners in sexual education interventions.

The results of the study confirm those of Lloyd[17] and Yode[23] and show that the social theories of Castra[5] and Benson *et al*.[6], which explain the phenomenon studied, are relevant for both sexes in the Burundian context. However, for both sexes, theories that recognize the role of young people's experiences in improving their knowledge and attitudes are also relevant, as most of their individual characteristics, namely age, knowledge of a place to get an HIV test and/or perception of HIV as a serious problem, were among the determinants of their unmet needs for IEC on sexual health. Indeed, the first factor was negatively associated with the dependent variable because, according to Galland[21], young people's independence from elders or parents gradually increases as they leave adolescence. The association between the second factor and the dependent variable is due to the fact that in HIV screening sites, children can voluntarily receive information on sexual health from social actors other than parents and educators (such as health care providers). With regard to the last factor, for girls, its positive association with the phenomenon under study is justified by the fact that ignorance about HIV/AIDS does not allow them to consider it as a normal health problem. For them, therefore, the two variables are linked in both directions.

As household heads aged 30-39 or 40-49 consider sexuality to be less and less taboo among boys, the study results showed that the ORs of having unmet needs for IEC are less important in households headed by individuals in these age groups than in those headed by individuals aged 50-59. The fact that a non-significant relationship was observed for girls between the age of the household head and the phenomenon studied means that they are less affected by the above-mentioned change than boys: in fact, in Burundi, social norms regarding premarital sex remain stricter for the former than for the latter. The positive relationship observed among boys between the educational level

of the household head and the unmet need for IEC on sexual health can be explained mainly by the relationship between the high educational level of the household head and the pursuit of activities in the modern sector of the economy. The latter significantly reduces the time parents spend with their children in the family environment. This finding contradicts that of Yode[23].

In the case of boys, the findings also highlight the relevance of communication theory. Indeed, it was only among them that young people not exposed to the media were most concerned about the unmet need for IEC on sexual health. Finally, although the exercise of activities in the modern or informal sector allows adolescents to interact with friends and other people, among girls, where this factor was one of the determinants of the phenomenon studied, a positive relationship was observed between the two. A relevant hypothesis to explain this result could also be that of premarital sexual norms among girls. This means that girls are denied the opportunity to acquire knowledge about sexual health through the free reading of newspapers and magazines with articles on sexual issues, the free listening to the radio, the free watching of TV programmes on sexual issues, or the free communication with friends and others outside the family about sexual issues.

Other interesting results came from models in which the effects of social factors were controlled for by those of individual characteristics. The fact that the latter nullified or attenuated the effects of the former on unmet needs for IEC on sexual health supports the idea that social factors act directly or indirectly through individual factors on the phenomenon studied. This means that the positive effects of adolescents' socialization on sexuality are manifested when it improves their individual characteristics.

Limitations of the study

Although the results of the study are interesting, they are limited for two main reasons. First, the cross-sectional nature of the DHS data makes it impossible to establish causal relationships between the characteristics considered and the unmet need for IEC among young single people: data were needed to establish the temporal priority of the independent variables. Secondly, the effects of interactions between independent variables were not tested. For example, in theory, family composition and household size should interact on the dependent variable. Indeed, a negative association between household size and children's knowledge of sexual and reproductive health could be observed in nuclear households and disappear in extended households, given the role that people as well informed as parents can play in their health education.

Conclusions and implications for research and practice

The results of this study demonstrate the relevance of the multisectoral approach to HIV/AIDS prevention among young people used in Burundi and other African countries. They also suggest that the government and its partners in Burundi should strengthen not only their IEC on sexual health activities for adolescents through the media, but also their activities aimed at removing socio-cultural barriers to girls' access to information on sexuality.

The limitations of the study highlight the importance of studies based on biographical data to identify causal relationships between specific characteristics of young people and unmet need for IEC on sexual health.

Contribution of Authors

Both authors identified the problem and the appropriate method. AB (a young researcher) conducted the literature review, highlighted the different explanatory approaches and obtained information on the study population. In addition, AB processed and analyzed the 2016 BDHS data and wrote the introduction and all other sections of the article under the supervision of RMJR (senior lecturer at IFORD). Finally, RMJR was also responsible for proofreading, editing and formatting the entire article according to AJRH standards.

References

1. BCR (Bureau Central du Recensement) (2011). *Recensement Général de la Population et de l'Habitat di Burundi 2008 : Synthèse des Résultats Définitifs*. Ministère de l'Intérieur et UNFPA, Bujumbura, avril 2011, 24p.
2. MPBGP (Ministère à la Présidence chargé de la Bonne Gouvernance et du Plan), MSPLS, ISTEEBU et ICF International, 2017. Rapport de la Troisième Enquête Démographique et de Santé. Bujumbura, Burundi: ISTEEBU, MSPLS et ICF, 2017.

3. NISR (National Institute of Statistics Rwanda), MOH (Ministry of Health) et ICF International, 2014. Rwanda Demographic and Health Survey 2014-15. Rockville, Maryland, USA: NISR, MOH et ICF International.
4. Rocher G. 1968. *L'action sociale*, Montréal, édit. H.M.H., Coll. Points, 1968.
5. Castra M. 2013. "Socialisation", Sociologie [En ligne], Les 100 mots de la sociologie, mis en ligne le 1er août 2013, consulté le 3 juillet 2020.
6. Benson P, Scales PC, Hamilton SF et Arturo S. 2007. Positive youth development: theory, research and application. Volume 1. Theoritical Model of Human Development. Handbook of Child Psychology.
7. Bandura A., 1986. Social Foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice-Hall, Inc.
8. Bettman JR.1979. An Information Processing Theory of Consumer Choice. Reading MA: Addison-Wesley.
9. McGuire W. J., 1984. Public communication as a strategy for inducing health-promoting behavioral change. Preventive Medicine, 13, 299-313.
10. Rogers EM. 1983. Diffusion of innovations. New York: Free Press.
11. Kumi-Kyereme A, Awusabo-Asare K, Biddlecom A et Tanle A. (2007). Influence of social connectedness, communication and monitoring on adolescent sexual activity in Ghana. African Journal of Reproductive Health, 11, 133 - 147.
12. Rwenge M, 2000. "Sexual Risk Behaviors Among Young People in Bamenda, Cameroon". *International Family Planning Perspectives*, vol. 26, number 3, September 2000, p.118-123 & 130.
13. Meda Pop V et Rusu AS. 2015. "The Role of Parents in Shaping and Improving the Sexual Health of children – Lines of Developing Parents Sexuality Education Programmes". Procedia – Sexual and Behavioral Sciences 209 (2015): 395-401.
14. Fontes MB, Crivelaro RC, Scartezini AM, Lima DD, Garcia A and Fujioka 2017. "Facteurs déterminants des connaissances, des attitudes et des pratiques en MST/SIDA et hépatites virales parmi les jeunes âgés de 18 à 29 ans au Brésil". Thèmes libres, Ciencia & Saude Coletiva, 22(4) : 1343-1352.
15. Megan E. S., Leslie G. S., Tara E. et Gibbons F. X, 2020. "Family Context and Adolescent Risky Sexual Behaviour: an Examination of the Influence of Family Structure, Family Transitions and Parenting." *Journal of Youth and Adolescence* 49, 1179-1194.
16. Rwenge Mburano, Jean-Robert, Franklin Bouba Djourdebbe and Emmanuel Ekambi Ekambi. 2020. Social and Individual Factors Associated with Condom Use among Single Youths: An Analysis of the 2018 Cameroon Demographic and Health Survey. DHS Working Paper No. 170. Rockville, Maryland, USA : ICF.
17. Lloyd C. 2010. "Role of schools in promoting sexual and reproductive health among adolescents in developing countries", Malarcher S. (ed.): Social determinants of sexual and reproductive health: informing future research and programme implementation, IWHO, p. 113-132.
18. Clavenot D and Pilon M. 1996. "Femmes et scolarisation des enfants". In : *Femmes et Gestion des Ressources*. Paris : CEPED, 24p.
19. Pilon M., 1996. "Genre et Scolarisation des enfants en Afrique subsaharienne". *Locoh T. (ed.), Labourie-Racapé A. (ed.), Tichit C. (ed.) Genre et Développement: des pistes à suivre*. Paris : CEPED, 1996, pp. 25-34. (Documents et Manuels du CEPED; 5).
20. Rwenge J, Djourdebbe F and Ekambi E. (2022). Social and individual factors associated with condom use among single adolescents: An analysis of the 2018 Cameroon Demographic and Health Survey. Journal of Biosocial Science, 54(2), 295-321. doi:10.1017/S0021932021000055
21. Galland O. 2001. "Adolescence, post-adolescence et jeunesse: retour sur quelques interprétations". In *Revue Française de Socologie*, vol. 4, n°4, pp. 611-640.
22. ISTEEBU (Institut de Statistiques et d'Études Économiques du Burundi), MSPLS (Ministère de la Santé Publique et de la Lutte contre le Sida) et ICF International, 2012. Enquête Démographique et de Santé Burundi 2010. Bujumbura, Burundi: ISTEEBU, MSPLS et ICF International.
23. Yode M., 2010. Relation entre environnement familial et le comportement sexuel des adolescents au Burkina Faso. Thèse de doctorat en démographie, Département de Démographie, Faculté des Arts et des Sciences, Université de Montréal, 2010, 231p.