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Research Article

Knowledge about Sexual and Reproductive Health among School Enrolled Adolescents in Tololar, Nicaragua, A Cross-Sectional Study

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Abstract

Background

Nicaragua has the highest prevalence of teenage pregnancies in Latin America. Knowledge regarding sexual and reproductive health plays an integral part in sexual behavior. The objective was to assess school going adolescents' knowledge about sexual and reproductive health and possible factors affecting it in the semi-rural community of Tololar, Nicaragua.

Methods

A cross-sectional study with a self-administered questionnaire on tablets was used for data collection. All 253 registered students at the school present at the time of fieldwork who gave written informed consent were deemed eligible for the study. A total of 225 participants in the ages of 11-19 years were included. Simple linear regression and multiple linear regression were performed analyzing the outcome knowledge. A p-value <0.05 was considered significant.

Results

The general knowledge about sexual and reproductive health was moderate; however, knowledge gaps were found such as prevailing myths and poor knowledge regarding human immunodeficiency

virus (hiv) transmission and contraceptive methods. Being female and single were significant negative determinants of knowledge (p-value < 0.01) and knowledge increased significantly with age (p-value < 0.05). School teachers, websites, social networks, and TV were the most frequently chosen sources of information on the topic.

Conclusions

Increased education on sexual and reproductive health with new interventions particularly for young females is recommended. Using IT-based materials as a complement may be an effective way to reach out to adolescents.

Keywords:
adolescent; Nicaragua; reproductive health; knowledge

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Introduction

Each year, about 16 million adolescent girls (15-19 years) of age give birth. For many young women, the pregnancy and childbirth are neither planned nor wanted. The complications of pregnancy and childbirth are the leading causes of death among young women in low- and middle-income countries [1]. Unsafe abortions remain as one of the most neglected problems within sexual and reproductive health worldwide [2]. In Latin America, the risks regarding teenage pregnancies can be evidenced in adolescents aged 15 years or younger having a higher risk for maternal death compared with women aged 20 to 24 years [3].

Nicaragua is a lower middle-income country where the Catholic Church wields a powerful influence on sexual and reproductive health and rights. Premarital sex is widely considered a sin, and there is a lack of formal sexual and reproductive education [4]. The country has one of the highest prevalences of teenage pregnancies in Latin America [5]. A recent demographic and health survey in Nicaragua has suggested that 65% of pregnancies among women aged 15-29 are unintended [6]. Early marriage, romanticism, machismo and religious prohibition of contraception have been suggested as contributors to the early start of childbearing [4] as well as gender differences in attitudes, social pressure and social approval for premarital sex where women are punished for premarital sex while men are encouraged [7]. Machismo is the creed of male sexual dominance, the female being subordinated [8]. In Nicaragua, women lack access to legal abortion services to terminate an unintended pregnancy [9] as the law of 2006 prohibits the termination of pregnancy also including incest, rape, and cases of danger to the life of the woman [10].

Sexual health knowledge is a prerequisite for good sexual health and constitutes an integral part in models of human behavior and decision-making, especially when it comes to the ability to take informed protective action [11]. It has been suggested that factors such as gender, age, religion, personal belief and attitude toward sources related to sex affect sexual knowledge. Regarding gender, research has shown both a higher knowledge among females and similar levels of knowledge among males and females [12] as well as young men may in some contexts have greater knowledge [13]. Age has shown a positive relationship to sexual knowledge, with older adolescents having more accurate knowledge [12], [14]. Education has further been highlighted as a vital protective factor for adolescents concerning sexual and reproductive health and rights [15].

In many low and middle-income countries sex education is not offered at schools or starts too late to be of help; also, some children do not attend school or leave school before being provided with the information [16]. There is strong evidence that curriculum-based sex education in school improves risk awareness, knowledge of risk reduction strategies and leads to higher intention to practice safer sex [17]. Some underline the responsibility of parents [11] although, in Nicaragua, half of the young people have reported to never communicate with parents on doubts or questions regarding sex [7].

The contexts have changed in low and middle-income countries, including improved school enrolment and technology transformations [18]. Almost all young people in Latin America have access to media [13]. Irrespective of adolescent's Internet source, it is sensible making sure they can evaluate the information's credibility and give them access to correct information [19] were one way for states and other agencies to provide information is through web-based learning sites [11].

Aim

This study aimed to assess the knowledge of sexual and reproductive health among adolescents enrolled in school in the semi-rural community of Tololar outside León, Nicaragua. The following research questions guided the research:

Are there knowledge gaps in the studied population regarding sex and reproduction, contraception, human immunodeficiency virus (hiv) and other sexually transmitted infections (STIs)?

How do sex, age, religion, and socioeconomic status affect knowledge?

What sources of information are used on these issues in the studied population?

Method

Study Design

A cross-sectional study carried out in October 2016 investigated the knowledge regarding sexual and reproductive health among adolescents aged 11-19 years in the semi-rural community of Tololar, Nicaragua.

Setting

The semi-rural sector of Tololar is located 9 kilometers from León, Nicaragua's main university town. Tololar is believed to be a representative community for the western part of Nicaragua. The public secondary school in the area, which covers all adolescents in the sectors that belong to the Tololar community, was chosen as a setting to access the adolescents in the desired ages.

Participants

All registered students at the chosen school present at the time of fieldwork who gave written informed consent were deemed eligible for the study. Thus, 253 students were the total amount of registered students at the school and therefore the ones selected to participate. However, due to dropouts as well as absent students and one who chose not to participate in the study, we had a final amount of 225 participants who answered the questionnaire.

Data Collection

Data was collected using an instrument based on "Illustrative Questionnaire for Interview-Surveys with Young People," a core set of instruments endorsed by the World Health Organization [20]. This instrument is widely used in low- and middle-income countries and used in several studies where validity recently has been reported to be high (Cronbach's alpha coefficient 0.89) [21]. This instrument was translated into Spanish and modified in order to suit the chosen setting, aims, and target population. Initially, we conducted a one-day pilot with a smaller group of students in the city of León with positive results and made no significant changes. For the data collection, there was both a male and female instructor present at all times. They invited registered students to participate as well as answered questions. The participants answered the self-administered instrument in Spanish using tablets with the software EpiCollect [22]. The instructors were there to answer any questions regarding language.

Ethical Consideration

We conducted the study according to the Helsinki declaration [23]. Approval of the protocol was obtained from the institutional review board at UNAN-León, Nicaragua, with ethical approval number FWA00004523/IRB00003342, ACTA No. 95. We asked for written informed consent of each respondent before participation. Respondents were informed regarding voluntary participation, risks, benefits, and confidentiality. The School Council (the principal, vice principal, and parent's representatives) approved participation because many of the participants were minors.

Variables

One outcome variable was identified and defined as "Knowledge." This variable was an ordinal variable with a numeric value constructed from items of three instrument sections: sex and reproduction (four items), contraception (three items) and hiv/STIs (six items). The items were in total 13 (see Table 2). We calculated a knowledge score for each participant by assigning one point for each correct answer out of the 13 items. The items had the option of "Not sure" to eliminate guessing. This option, as well as an incorrect answer, gave zero points. Sex, age, economic standard, religion, civil status, and education were considered independent variables and were categorized as shown in Table 1. We considered sources of information separately.

Regarding the socioeconomic variable, poverty was measured using components of the Unsatisfied Basic Needs Index [24]. The components used in this study were the information on housing conditions such as the material of house walls and floor, and sanitary services such as access to water and latrine. When a component was classed as satisfactory, the participant received a score of one. The total sum varied between 0 and 4. With a score of 0-2, the participant was categorized as "Low-end," with a score of 3 as "Mid-end" and with a score of 4 as "High-end."

Sources of Information

For descriptive purposes, we also asked participants about from whom they had learned most regarding puberty, pregnancy, sex, STIs, and contraception. They had the opportunity to choose more than one option from a provided list of sources (School teacher, Mother, Father, Brother, Sister, Godparents, Religious services, Friends, Doctor/Health center, Others, Nobody) which also included one open-ended alternative (Other). We asked how often they spoke about the topics earlier mentioned with the person/persons that they chose as well as from whom they would have preferred to learn more.

They were also similarly asked which type of media they usually use to learn about these topics from a multiple-choice list of options (Web sites, Social networks, TV, Radio, Books/journals/library, Films/videos, Others, None). We asked how often they used the media earlier selected as well as which was their preferred medium/media to learn more about the topics mentioned.

Statistical Methods

Statistical analysis was performed with the package R Commander [25] in the R program [26]. Descriptive analysis was performed on sociodemographic data where absolute and relative frequencies were calculated as well as mean age. Associations between sex and remaining covariates were analyzed with Pearson's chi-squared test for independence. Descriptive analysis was similarly performed on the partic-

Table 1. Sociodemographic characteristics of 11-19-year-old school going adolescents in Tololar, Nicaragua.

	Male (N=120)		Female (N=105)		p- value a	Total (N=225)	
	n	%	n	%		n	%
Age (years)							
11-13	27	22.5	28	26.7		55	24.4
14-16	63	52.5	65	61.9		128	56.9
17-19	30	25.0	12	11.4	0.033	42	18.7
Education							
Seventh grade	20	16.7	24	22.9		44	19.6
Eighth grade	35	29.2	24	22.9		59	26.2
Ninth grade	23	19.2	20	19.0		43	19.1
Tenth grade	25	20.8	17	16.2		42	18.7
Eleventh grade	17	14.2	20	19.0	0.492	37	16.4
Economical standard							
Low-end	16	13.3	23	21.9		39	17.3
Middle-end	36	30.0	28	26.7		64	28.4
High-end	68	56.7	54	51.4	0.229	122	54.2
Civil status							
In a relation	35	29.2	19	18.1		54	24
Single	85	70.8	86	81.9	0.052	171	76.0
Religion							
Catholic	50	41.7	45	42.9		95	42.2
Evangelical	30	25.0	34	32.4		64	28.4
Jehovah's witness	2	1.7	2	1.9		4	1.80
No religion	36	30	21	20		57	25.3
No answer	2	1.7	3	2.9	0.429	5	2.20

Absolute (n) and relative (%) frequencies.
[a] Associations between sex and remaining covariates. p-values based on Pearson's chi-squared test for independence.

ipants' responses to knowledge items, with associations calculated between the outcome "Knowledge" and sex. Descriptive analysis was also performed on sources of information with relative frequencies calculated. Bivariate analysis was conducted on the dependent variable with the independent variables, using simple linear regression. Variables with a p-value < 0.2 were considered for the multiple linear regression analysis. This cut-off was used in the bivariate analyses in order not to fail in identifying possible important covariates [27]. Multicollinearity was assessed through the use of variance-inflation

Table 2. Knowledge of sexual and reproductive health among 11-19-year-old school going adolescents in Tololar, Nicaragua.

	Correct knowledge						
	Male (N=120)		Female (N=105)		p-value a	Total (N=225)	
Statements	**n**	**%**	**n**	**%**		**n**	**%**
Sex and reproduction							
A woman can get pregnant the very first time a man and a woman have intercourse	98	81.7	72	68.6	0.023	170	75.6
A person does not stop growing after he/she has had sexual intercourse for the first time	71	59.2	57	54.3	0.461	128	56.9
Masturbation does not cause severe damage to health	35	29.2	21	20.0	0.113	56	24.9
A woman is most likely to get pregnant if she has sexual intercourse halfway between her periods	69	57.5	68	64.8	0.266	137	60.9
Contraception							
Condoms are an effective method of preventing pregnancy	92	76.7	65	61.9	0.016	157	69.8
The same condom cannot be used more than once	114	95.0	91	86.7	0.028	205	91.1
Condoms cannot slip off the man and disappear inside the woman's body	59	49.2	39	37.1	0.070	98	43.6
Sexually transmitted infections including hiv /aids							
A person can have a sexually transmitted infection without showing symptoms	72	60.5	57	55.3	0.387	129	58.1
Most people do not get cured of their hiv/aids	89	74.2	77	73.3	0.887	166	73.8
A person with hiv/aids does not always look emaciated or unhealthy in some way	28	23.3	25	23.8	0.933	53	23.6
People can take a simple test to find out whether they have hiv/aids	90	75.0	57	54.3	0.001	147	65.3
Signs and symptoms of a sexually transmitted infection in a woman or a man can be discharge from the penis/vagina, pain during urination and ulcers/sores in the genital area	91	75.8	61	58.1	0.005	152	67.6
Condoms are an effective way of protecting against sexually transmitted infections including hiv/aids	93	77.5	57	54.3	<0.001	150	66.7

Absolute (n) and relative (%) frequencies together with p-values.
[a] Associations between the outcome "Knowledge" and sex. p-values based on Pearson's chi-squared test for independence.

factors. A confidence interval of 95% was used and thus a p-value <0.05 was considered significant. Tables were stratified by sex.

Results

Description of Participants

The registered number of students at the school was a total of 253 adolescents aged 11-19 years. There was a school dropout rate of n = 24 (9.5%) and the majority of the students that had left school was females that had dropped out because of pregnancy in young age, according to the school principal. Three students were absent during the time of fieldwork and the remaining 226 students all, but one provided voluntary informed consent which left a final 225 participants.

Sociodemographic characteristics of the participants are depicted in Table 1. Of the 225 participants, about half were male, and the mean age was 14.9 years. When it comes to economic standard, half were considered to be high-end considering housing conditions and sanitary services. Regarding religious beliefs, four out of ten were Catholic and a quarter did not have a religion. Out of the participants having a preferred religion, 67 % considered religion to be essential in his or her life. The variable "Education" was excluded in the adjusted model due to collinearity with the variable "Age."

Knowledge of Sexual and Reproductive Health

The mean knowledge score regarding sexual and reproductive health among the participants was 7.7 out of the total sum of 13; thus we describe the overall knowledge as moderate. Scores ranged from 0 to 13 points. The descriptive statistics of knowledge among the studied population are shown in Table 2 and Table 3. Regarding sex and reproduction, one-fifth of women and one-third of men knew that masturbation does not cause severe damage to health. Over two-thirds were aware that condoms are an effective method of preventing pregnancy. That a person can have an STI asymptomatically was known by 58 % of the respondents and 68 % recognized possible signs and symptoms of an STI. Less than one-quarter of the participants was aware that a person with hiv and aids does not always appear emaciated or unhealthy. Regarding how to protect oneself from STIs, just over half of women and just over two-thirds of men were aware that condoms are an effective way of protection.

Regarding awareness of contraceptive methods, six of ten of the participants knew about injections. A third of the young men and a bit more of the young women knew that a woman could take a pill every

Table 3. Knowledge and beliefs regarding the transmission of hiv among 11-19-year-old school going adolescents in Tolo-lar, Nicaragua.

	Male (N=120)		Female (N=105)		Total (N=225)		p-value
	n	%	n	%	n	%	
Correct ways of transmission							
Used syringes	73	60.8	63	60.0	136	60.4	0.899
Sexual relations	21	17.5	26	24.8	47	20.9	0.193
During childbirth	6	5.0	4	3.8	10	4.4	0.754
Incorrect ways of transmission							
Mosquito bite	37	30.8	25	23.8	62	27.6	0.239
Sharing plates/glasses/cutlery	1	0.8	4	3.8	5	2.2	0.187
Kisses, hugs	2	1.7	2	1.9	4	1.8	0.999
Handshake	2	1.7	0	0.0	2	0.9	0.500

Absolute (n) and relative (%) frequencies. The first part of the table shows knowledge of the correct ways of hiv transmis-sion while the second part shows beliefs regarding incorrect ways of hiv transmission.

day as a contraceptive method. A third of the participants knew of the emergency pill and recognized an intrauterine device as a form of a contraceptive method.

As shown in Table 3, only 17 % of males and slightly under a quarter of females were aware that hiv could be transmitted sexually. Furthermore, only 4 % of the respondents knew that hiv could transmit during birth. As for the myths regarding hiv transmission, a third of the adolescents believed that it could transmit through a mosquito bite.

Of the studied population, almost all declared that they had had classes on the sexual and reproductive systems and moreover, 78 % of the respondents wanted more classes on these topics.

Main Results

Bivariate analysis on the dependent variable "Knowledge" showed that young men in the studied population had a significantly higher knowledge than young women, p-value < 0.001 (see Table 4). Knowledge was augmented significantly with age, p-value < 0.001. The bivariate analysis furthermore showed that the adolescents who were currently in a relationship of any kind had greater knowledge scores than the participants who were not, p-value < 0.001. Multiple linear regression was employed in order to investigate these associations further while controlling for effects of confounding factors. Findings showed that being female was a significant negative determinant of knowledge regarding sexual and reproductive health compared to being male, p-value < 0.01. In the adjusted model, knowledge significantly increased with age, p-value < 0.05, and being in a relationship was furthermore a determinant of higher knowledge, p-value < 0.01.

As depicted in Table 5, a schoolteacher was the most frequent source of information among the adolescents regarding puberty, sex, pregnancy, STIs and contraception. Mothers were the persons from whom most of the adolescents would have preferred to learn more about these topics. Regarding media, young women chose social networks more frequently while the source of information most commonly opted for among young men was websites. The preferred medium among all age groups and both sexes was social networks.

Discussion

Key Results

This study showed that the general knowledge of sexual and reproductive health among adolescents in the studied population was moderate. Significant knowledge gaps were found, particularly regarding the transmission of hiv. Young men had significantly higher knowledge regarding sexual and reproductive health compared to young women. Knowledge on this topic increased significantly with age. To be in a relationship was found as a significant positive determinant of sexual and reproductive knowledge.

Implications and Limitations

We found more profound knowledge gaps among young Nicaraguans than those found in previous studies [11], [16] which may be explained by the additional inclusion in this study of the youngest span of adolescents since we found a positive relationship between age and sexual knowledge. The importance of their knowledge on these issues has previously been stated [2], [16]. The low knowledge regarding routes of hiv transmission is a worrying new finding regarding the spread of the virus. With Nicaragua's high level of teenage pregnancies in mind, it is troubling that 95% of adolescents were unaware that hiv could transmit during childbirth.

The present study found young men to have greater sexual knowledge than young women, an issue where previous research is divided. The same findings earlier described, where greater exposure for men to media and education, as well as to learning through greater access to public spaces, have been mentioned as possible explanations. Social barriers could also explain the dissimilarities, such as a lower acceptance of women demonstrating their knowledge of condoms and sexual matters in some societies [16]. For the context under study, the ideology of machismo could comprise a part of this social barrier. Women are expected to act sexually naive, while men are rewarded for being sexually experienced.

Table 4. Association between knowledge and selected independent variables, for 11-19-year olds in Tololar, Nicaragua.

	Unadjusted		Adjusted a	
Independent variable	**β**	**p-value**	**β**	**p-value**
Sex				
Male	Reference		Reference	
Female	-1.227	< 0.001	-1.000	< 0.01
Age				
Ages 11-19	0.366	< 0.001	0.259	< 0.05
Education				
Seventh grade	Reference		-	-
Eighth grade	-1.066	< 0.05	-	-
Ninth grade	-0.355	0.503	-	-
Tenth grade	0.392	0.462	-	-
Eleventh grade	1.921	< 0.001	-	-
Economical standard				
Low-end	Reference		-	-
Middle-end	-0.068	0.899	-	-
High-end	-0.343	0.481	-	-
Religion				
Catholic	Reference		-	-
Evangelical	0.249	0.561	-	-
Jehovah's witness	-1.111	0.411	-	-
No religion	0.495	0.265	-	-
No answer	-0.811	0.504	-	-
Civil status				
In a relationship	Reference		Reference	
Single	-1.620	< 0.001	-1.216	< 0.01

Simple (unadjusted) and multiple (adjusted) linear regression analyses on the outcome variable "Knowledge" with selected independent variables, for 11-19-year-old school going adolescents in Tololar, Nicaragua. Results presented with estimates (β) and p-values.
[a] Adjusted for sex, age, and civil status.

In this study, civil status was found to be a predictor for a higher knowledge of sexual and reproductive health, which is consistent with previous evidence [17]. Since premarital sex is widely considered sinful in Nicaragua [7], it may be less taboo to learn on the subject if being in a relationship.

Table 5. Sources of information regarding sexual and reproductive health among 11-19-year olds in Tololar, Nicaragua.

Variable	Most frequently chosen source (%)	Second most frequently chosen source (%)	Preferred source (%)
Sex			
Male	School teacher (80.0)	Other/others (37.5)	School teacher (45.0)
Female	School teacher (93.3)	Mother (54.3)	Mother (67.6)
Age			
11-13	School teacher (80.0)	Mother (50.9)	Mother (50.9)
14-16	School teacher (89.8)	Mother (39.1)	Mother (57.8)
17-19	School teacher (83.3)	Other/others (50.0)	Mother (52.4)
All genders and ages	School teacher (86.2)	Mother (42.2)	Mother (55.1)
Sex			
Male	Websites (41.7)	TV (35.8)	Social networks (41.7)
Female	Social networks (39.0)	TV (35.2)	Social networks (39.0) Books/Journals/Library (39.0)
Age			
11-13	TV (32.7) Books/Journals/Library (32.7)	Social networks (30.9)	Social networks (49.1)
14-16	TV (38.3)	Social networks (36.7)	Social networks (36.7)
17-19	Websites (50.0)	Social networks (38.1)	Websites (40.5) Social networks (40.5)
All genders and ages	Websites (35.6) Social networks (35.6) TV (35.6)	Books/Journals/Library (33.3)	Social networks (40.4)

Descriptive statistics presented in relative (%) frequencies of 11-19-year-old school going adolescents' sources of information regarding sexual and reproductive health in Tololar, Nicaragua.

The sources of information most frequently opted for were websites, social networks, and TV. These types of media may prove an effective way of reaching out to adolescents with information on sexual and reproductive health, especially since adolescents may face obstacles in accessing sexual and reproductive health care. Those not having access to these types of media shall however not be forgotten.

This study identified school teachers to be the persons most frequently selected as a source which was consistent with previous findings [14]. This finding may suggest that sex education and contact with teachers was common in this setting or that it was less acceptable or more sensitive to talk about this subject when not in the context of formal sex education.

Reporting bias due to the use of a self-reporting survey is one limitation. Social desirability bias might also have affected the answers; the social barriers regarding knowledge [16] may, in this case, have played a part, with for example women perceiving it less acceptable to demonstrate their knowledge. The use of tablets as a means of data collection represents both strengths and limitations to the study, with the use of new technology being considered an extra motivation and a definite strategy to increase participation as well as a user-friendly tool, while it may also have led to a dependence on skills of

this technology. Another limitation was the use of a cross-sectional study design; thus only associations and no causal relationships could be stated. Regarding the variables, the design of the socioeconomic variable was a limitation since the required full information for the Unsatisfied Basic Needs index was missing, which implied that economic standard might not have been adequately measured. The investigation of knowledge of contraceptive methods used in this study ("have heard of" the different methods) is a measure of general awareness and cannot guarantee a correct knowledge of the method. This study focused on knowledge as one possible way of improving sexual and reproductive health among adolescents. There are however a wide variety of factors except for the knowledge that may play a part and could be investigated, such as social and cultural influences on sexual behavior.

Generalizability

The data can be considered representative for Tololar, and at best for semi-rural areas in western Nicaragua; however, it cannot be generalized to all Nicaraguan adolescents. It is notable that this study only measured knowledge among adolescents enrolled in school and moreover that the rate of adolescents dropping out of school was considerable, of which the majority was females due to pregnancy which in itself is an important finding.

Conclusions

This study identified that being female was negatively associated with sexual and reproductive health knowledge, as was also being single or of younger age. These findings may be one part of the complicated explanation of Nicaragua's high rate of teenage pregnancies. These groups may be targets of extra interventions. We identified several knowledge gaps that educators and health care personnel may attend.

A grand majority of the adolescents had the will and interest to learn. According to the preferences of the adolescents in this study, websites and social networks may prove an effective way of reaching out to adolescents with information on sexual and reproductive health.

List of Abbreviations

STIs - sexually transmitted infections

hiv – human immunodeficiency virus

UNAN-León – Universidad Nacional Autónoma Nicaragua, León

Availability of Data and Materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Author's Contribution

All authors approved the final manuscript. ASB executed the study and wrote the first draft of the manuscript. All authors aided in editing the manuscript. PEC also aided in the design of the statistical analyses, while CK and WJUG aided in the conceptualization and implementation of the study.

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Competing Interests

The authors have declared that no competing interests exist.

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