



Knowledge, misconceptions, self-efficacy and attitudes regarding HIV: Cross-cultural assessment and analysis in adolescents¹

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ABSTRACT. HIV infection is an important worldwide problem where the number of infected people is still increasing. Adolescents are highly vulnerable to HIV infection. Moreover, there is a need of improvements in HIV prevention, especially in low and middle income countries. The aim of this study was to assess the level of knowledge, misconceptions, susceptibility, attitudes and self-efficacy regarding HIV/AIDS in Spanish, Colombian and Panamanian adolescents. A total of 10,130 adolescents aged between 13 and 18 years participated in this study. It is an *ex post facto* study, which was conducted with cross-sectional surveys. A stratified random sampling procedure was used. Results showed main effects of country on the variables analyzed and differences according to sex and age in each country. Compared to Colombia and Spain, Panama needs stronger HIV prevention efforts, as it had the highest scores in HIV misconceptions and negative attitudes towards HIV and the lowest scores in HIV correct knowledge.

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RESUMEN. La infección por el VIH es una epidemia a nivel mundial donde el número de personas infectadas continúa aumentando, siendo los adolescentes un grupo altamente vulnerable. Además, existe una necesidad de mejoras en la prevención del VIH especialmente en países de ingresos bajos y medios. El objetivo de este estudio *ex post facto* es evaluar el nivel de conocimiento e ideas erróneas, la susceptibilidad, las actitudes y la autoeficacia en relación al VIH/sida en adolescentes colombianos, panameños y españoles, así como analizar el efecto del país de origen sobre estas variables. Participaron un total de 10.130 adolescentes de edades comprendidas entre los 13 y los 18 años de edad. Se trata de un estudio *ex post facto* mediante encuestas de tipo transversal. Se llevó a cabo un muestreo aleatorio estratificado. Los resultados pusieron de manifiesto que existían efectos principales del país en las variables evaluadas, así como diferencias en función del sexo y la edad en cada país. En comparación con Colombia y España, Panamá necesita de mayores esfuerzos dedicados a la prevención puesto que el menor nivel de conocimiento correcto, el mayor nivel de ideas erróneas y el mayor nivel de actitud negativa se presenta en los adolescentes de este país.

PALABRAS CLAVE. Actitudes. Autoeficacia. Conocimiento. VIH/sida. Estudio *ex post facto*.

Today, HIV infection is still a global epidemic and the number of people infected with the virus continues to increase. In 2008, according to the estimates of the Joint United Nations Programme on HIV/AIDS (UNAIDS, 2010b), about 33 million people lived with HIV worldwide and 2.7 million people got infected with the virus. Moreover, HIV particularly affects young people: in the world, a young person aged 15-24 years contracts HIV every 15 seconds (UNICEF, 2005) and 45% of new infections affect people in this age range (UNAIDS, 2010b).

Latin America is one of the regions most affected by HIV. In Colombia, for example, the incidence of HIV/AIDS is growing every year, and more females than males are infected with HIV/AIDS in the age range between 15 and 19 years (UNAIDS, 2010a) (for an analysis of the epidemiological status of HIV/AIDS in Latin America and other countries, see Bermúdez and Teva, 2004; Bermúdez and Teva-Álvarez, 2003; Buena-Casal, Bermúdez, Sánchez, and De los Santos-Roig, 2001). In addition, condom use in Colombia is considered low, which increases the probability of becoming infected with HIV and other sexually transmitted diseases (STDs) (UNAIDS, 2010a). In Panama, UNICEF has highlighted that children and adolescents are one of the most vulnerable groups to HIV (UNICEF, 2010). Overall, adolescents in Latin America are highly affected and represent about 40% of people living with HIV/AIDS in the region (UNICEF, 2005). In Western Europe, Spain is second only to Portugal in the number of cases of AIDS diagnosed (Bermúdez and Teva-Álvarez, 2003; EuroHIV, 2008).

It is a fact that unprotected sex is one of the main routes of transmission of HIV and the age of first sexual experience is getting lower (see, for example, Teva, Bermúdez,

and Buéla-Casal, 2009a). Consequently, knowledge about prevention of these diseases is essential to reduce the risks associated with sexual activity (Anwar, Sulaiman, Ahmadi, and Khan, 2010). Moreover, effective strategies of behavioural change in individuals who engage in sexual activity are needed. Explanatory models of risky sexual behaviour include multiple psychosocial variables. A few examples of factors that are considered in such models are knowledge and misconceptions about HIV/AIDS, attitudes towards HIV/AIDS, self-perceived risk of HIV infection and self-efficacy in preventing the infection. Results obtained using the theory of planned behaviour to study intention to use a condom have shown that such intention is related to attitudes towards condoms and self-efficacy of condom use (Schaalma *et al.*, 2009). Other recent studies have also supported the validity of the theory of planned action in predicting intention to use a condom and condom use behaviour in adolescents. According to such studies, HIV knowledge is an important variable that is related to intention to use a condom (Bryan, Kagee, and Broaddus, 2006), to consistent condom use and to older age at first sexual relationship (Berten and Van Rossem, 2009). Applying other theories such as the information-motivation-behavioural skills model, researchers have concluded that variables pertaining to information and motivation components have a direct effect on condom use and that such use is mediated by self-efficacy (Bermúdez, Herencia-Leiva, and Uribe Rodríguez, 2009). Although the level of HIV knowledge in itself is not enough for individuals to implement preventive behaviors (Bermúdez, Teva, and Buéla-Casal, 2005; Díaz-Loving, 2001), it is important to assess this knowledge and identify misconceptions, since risky behaviours can be reduced by increasing correct knowledge of HIV infection and decreasing misconceptions about it at the same time (DiClemente, Crosby, and Wingood, 2002). However, according to some studies, adolescents do not take into account their own knowledge of HIV in their sexual relations because their perceived risk of infection is low (Hoppe *et al.*, 2004).

Susceptibility is understood as individuals' perception about whether they are at risk of contracting a given disease (Cabrera, Tascón, and Tucumi, 2001). Adolescents do not perceive that they are at risk of HIV infection (Merchan-Hamann, Ekstrand, Hudes, and Hearst, 2002; Navarro and Vargas Morath, 2004; Vinh, Raguin, Thebaud, Semaille, and Tri, 2003). This low perception of risk may lead to late diagnosis of people infected with HIV (UNAIDS, 2010b). This increases the chances that such people will continue to transmit the virus. If adolescents do not perceive infection with STDs and HIV as a threat and consider their own infection risk as low, this underestimation probably leads them to not take appropriate measures to prevent infection from such diseases (DiClemente *et al.*, 2002). Just like knowledge, perceived susceptibility is a necessary but not sufficient condition for people to adopt protective health behaviors (Kershaw *et al.*, 2005).

There are other factors apart from the level of knowledge of prevention of STDs and HIV. For example, adolescents' lack of confidence in their skills to have sex using contraception can hamper the adoption of preventive behaviors. Therefore, higher self-efficacy of condom use should lead to an increase in condom use (DiClemente *et al.*, 2002). Sexual self-efficacy, that is, an individual's confidence in his/her own ability to perform safe sexual practices, or, more broadly, an individual's confidence in his/her

ability to perform a healthy activity in spite of interpersonal or situational pressures against it (Bachanas *et al.*, 2002; Bandura, 1986; Gulleto, Wright, Booth, Feldman, and Stewart, 2009), has been related to a greater probability of condom use in adolescents. Yet, some studies have not found much support to the hypothesis that knowledge of HIV/AIDS and self-efficacy moderate the relationships between risk factors (*e.g.*, depression, behavioral problems and drug use) and risky sexual behavior in adolescents (Bachanas *et al.*, 2002).

Attitudes are another important variable included in explanatory models of risky behavior. They are defined as the learned tendency to respond in the same way to an object or situation (Fishbein and Ajzen, 1975). Negative attitudes towards condom use have been identified as a risk factor for HIV infection (Leikckness *et al.*, 2005). Such attitudes can be used to determine whether there is intention to use a condom or not (Bermúdez, Sánchez, and Buela-Casal, 2000). Conversely, positive attitudes towards condom use have been associated to consistent condom use (Stulhofer, Graham, Bozicevic, Kufirin, and Ajdukovic, 2007).

In spite of the broad research on the variables mentioned and their relationship with risky sexual behaviour, no studies are known to have assessed such variables in numerous and representative samples of Spanish and Latin American adolescents in a cross-cultural analysis. As shown above, HIV rates are considerably high in certain countries of Latin America (Colombia and Panama) and Western Europe (Spain) and adolescents are highly vulnerable to HIV infection. It is therefore highly important to assess the level of knowledge and misconceptions about HIV/AIDS, susceptibility to HIV, attitudes towards HIV and self-efficacy in adolescents in these countries. Considering all the above, the present study had the following objectives:

- Assess the level of knowledge and misconceptions about HIV, as well as susceptibility to HIV, attitudes towards HIV and self-efficacy in HIV prevention in adolescents from Colombia, Panama and Spain according to sex and age.
- Assess the effect of country of origin on correct knowledge and misconceptions about HIV/AIDS and susceptibility to HIV, attitudes towards HIV and self-efficacy in HIV prevention in adolescents from Colombia, Panama and Spain.

Method

Participants

A total of 10,130 adolescents aged between 13 and 18 years participated in the study. The sample was composed of 4,460 Spanish adolescents (mean age = 15.6 years; *SD* = 1.2), 3,658 Colombian adolescents (mean age = 15.1 years; *SD* = 1.4) and 2,012 Panamanian adolescents (mean age = 15.3 years; *SD* = 1.5). Percentages of participants pertaining to sex and age are shown in Table 1.

TABLE 1. Percentage of participants from each country (Spain, Colombia and Panama) according to sex and age.

<i>Variables</i>	<i>Spain (n = 4,460)</i> <i>n (%)</i>	<i>Colombia (n = 3,658)</i> <i>n (%)</i>	<i>Panama (n = 2,012)</i> <i>n (%)</i>	<i>Total (N = 10,130)</i> <i>n (%)</i>
Sex				
Male	2.108 (47.3)	1.823 (49.9)	904 (45.8)	4.835 (47.9)
Female	2.350 (52.7)	1.830 (50.1)	1070 (54.2)	5.250 (52.1)
Age				
13-15 years	2.076 (46.5)	2.143 (58.6)	1.072 (55.1)	5.291 (52.6)
16-18 years	2.384 (53.5)	1.515 (41.4)	875 (44.9)	4.774 (47.4)

Instruments

The variables, namely knowledge and misconceptions about HIV/AIDS, susceptibility to HIV, attitudes towards HIV and self-efficacy in HIV prevention, were assessed with the following instrument.

- Short version of the HIV/AIDS questionnaire (Bermúdez, Sánchez, and Buela-Casal, 2003). It is the short version, adapted to Spanish, of the items originally developed by Paniagua *et al.* (1994). The Spanish version has 66 items, arranged into five subscales: *Knowledge of facts related to HIV/AIDS* (20 items) (Cronbach's alpha = .73), with scores ranging from 0 to 20; *Misconceptions* (20 items) (Cronbach's alpha = .83), with scores ranging from 0 to 20; *Negative attitudes towards HIV/AIDS* (12 items) (Cronbach's alpha = .79), with scores ranging from 0 to 12; *Susceptibility to HIV/AIDS* (5 items) (Cronbach's alpha = .53), with scores ranging from 0 to 5; and *Self-efficacy in the prevention of HIV infection* (9 items) (Cronbach's alpha = .76), with scores ranging from 0 to 9. All the items of the scale had two response options: *true* and *false*.

Design

According to the classification proposed by Montero and León (2007), the study used an *ex post facto* design, with cross-sectional surveys.

Procedure

Sample size was fixed to obtain a maximum error of 1.5% and a confidence interval (CI) of 95.5% in the Spanish group, a maximum error of 1.8% (95.5% CI) in the Colombian group and a maximum error of 2.2% (95.5% CI) in the Panamanian group. A stratified random sampling procedure was used. The schools where adolescents were assessed were randomly selected from the lists of schools of each country. After selecting the schools, their headmasters or heads of studies were contacted. Data were collected by researchers trained to apply the questionnaires. Researchers' training consisted on becoming familiar with the questionnaires and making an application practice. In each school, classes were selected randomly whenever possible. When random selection of classes was not feasible, classes were chosen depending on their availability. Students completed the questionnaire in the classrooms during school hours. They were all given the same instructions and information about the study. Informed consent was obtained from the headmasters or teachers of the schools. Students were informed that their

participation was voluntary, and confidentiality and anonymity were guaranteed. No students refused to participate. The study was approved by the ethics committees of the Universidad Javeriana de Cali (Colombia), the Universidad Nacional Autónoma de Chiriquí (Panama) and the Universidad de Granada (Spain). Norms proposed by Ramos-Álvarez, Moreno-Fernández, Valdés-Conroy and Catena (2008) were considered to write the present paper.

Statistical analyses

The *t* Student test and a multivariate analysis of variance (MANOVA) were used. The *t* Student test was used to analyze the differences in the variables assessed – knowledge and misconceptions, negative attitudes, susceptibility and self-efficacy regarding HIV – according to sex and age group (13-15 years; 16-18 years). The MANOVA was performed to analyze the main and interaction effects of country of origin (Spain; Colombia; Panama), sex and age on the variables assessed. The MANOVA was chosen to minimize Type I errors. Statistical analyses were performed with the SPSS statistical package Version 15.0, with a level of significance of $p < .05$.

Results

Table 2 shows the means and standard deviations of the sample of Spanish adolescents in the variables knowledge and misconceptions, negative attitudes, susceptibility and self-efficacy. Significant differences according to sex and age were found in all variables except self-efficacy, which showed no significant differences between males and females. Table 3 shows the means and standard deviations of the Colombian sample and Table 4 shows those of the Panamanian sample.

TABLE 2. Means and standard deviations (*SD*) of knowledge, misconceptions, negative attitudes, susceptibility and self-efficacy in Spanish adolescents according to sex and age.

Characteristics	Knowledge			Misconceptions			Negative attitudes			Susceptibility			Self-efficacy		
	Mean	SD	<i>p</i>	Mean	SD	<i>p</i>	Mean	SD	<i>p</i>	Mean	SD	<i>p</i>	Mean	SD	<i>p</i>
Sex			.00			.00			.00			.00			ns
Male	15.78	2.94		2.21	2.45		1.81	2.34		3.87	1.13		6.50	2.15	
Female	15.19	2.97		1.65	2.02		1.01	1.57		4.12	1.00		6.59	2.20	
Age			.00			.00			.00			.00			.00
13-15 years	14.92	3.00		2.17	2.37		1.62	2.15		3.88	1.12		6.19	2.26	
16-18 years	15.94	2.85		1.70	2.11		1.18	1.86		4.10	1.02		6.85	2.05	
Total	15.47	2.97		1.92	2.25		1.39	2.01		4.00	1.07		6.55	2.18	

Note. ns: not significant.

TABLE 3. Means and standard deviations (*SD*) of knowledge, misconceptions, negative attitudes, susceptibility and self-efficacy in Colombian adolescents according to sex and age.

Characteristics	Knowledge			Misconceptions			Negative attitudes			Susceptibility			Self-efficacy		
	Mean	SD	<i>p</i>	Mean	SD	<i>p</i>	Mean	SD	<i>p</i>	Mean	SD	<i>p</i>	Mean	SD	<i>p</i>
Sex			.02			.00			.00			.00			.00
Male	15.83	2.87		2.00	2.29		2.27	1.77		2.24	1.00		3.64	1.13	
Female	15.60	2.92		1.55	1.94		1.71	1.46		2.40	0.96		3.52	1.18	
Age			.00			.01			.00			ns			.00
13-15 years	15.52	2.95		1.86	2.17		2.09	1.70		2.32	0.97		3.51	1.16	
16-18 years	16.00	2.79		1.66	2.07		1.84	1.55		2.31	1.00		3.68	1.14	
Total	15.72	2.90		1.78	2.13		1.99	1.65		2.32	0.98		3.58	1.15	

Note. ns: not significant

TABLE 4. Means and standard deviations (*SD*) of knowledge, misconceptions, negative attitudes, susceptibility and self-efficacy in Panamanian adolescents according to sex and age.

Characteristics	Knowledge			Misconceptions			Negative attitudes			Susceptibility			Self-efficacy		
	Mean	SD	<i>p</i>	Mean	SD	<i>p</i>	Mean	SD	<i>p</i>	Mean	SD	<i>p</i>	Mean	SD	<i>p</i>
Sex			.00			.00			.00			.02			.00
Male	15.40	2.84		4.26	3.55		3.74	2.92		3.14	1.54		6.33	2.25	
Female	14.81	3.04		3.41	3.20		2.85	2.66		3.30	1.47		5.55	2.45	
Age			.00			.02			.01			.00			.00
13-15 years	14.69	3.05		3.98	3.47		3.40	2.83		2.97	1.55		5.65	2.45	
16-18 years	15.54	2.80		3.58	3.35		3.07	2.78		3.55	1.39		6.24	2.28	
Total	15.06	2.97		3.85	3.44		3.28	2.83		3.21	1.52		5.89	2.41	

Table 5 shows the summary of the MANOVA. As can be observed in the table, the size of the effects found shows that the magnitude of the differences of the main effects of sex and age was zero. The same applies to the interaction between country, sex and age. However, the magnitudes of the main effects of country of origin were small in the case of misconceptions ($\eta = .10$) and negative attitudes ($\eta = .10$) but moderate in the variables susceptibility ($\eta = .32$) and self-efficacy ($\eta = .34$) (Cohen, 1992).

TABLE 5. Summary of the MANOVA. Main and interaction effects of sex, age and country on knowledge, misconceptions, negative attitudes, susceptibility and self-efficacy.

Variables	Sex		Age		Country		Country*Sex		Country*Age	
	F (1, 9241)	η^2	F (1, 9241)	η^2	F (2, 9241)	η^2	F (2, 9241)	η^2	F (2, 9241)	η^2
Correct knowledge	52.60*	.01	113.78*	.01	24.97*	.01	5.35*	.00	7.97*	.00
Misconceptions	112.49*	.01	38.66*	.00	388.67*	.10	2.41	.00	2.46	.00
Negative attitude	257.89*	.03	40.88*	.00	467.20*	.10	4.46*	.00	3.31*	.00
Susceptibility	39.66*	.00	75.66*	.01	2130.05*	.32	3.99*	.00	22.99*	.01
Self-efficacy	40.69*	.00	108.95*	.01	2365.38*	.34	29.93*	.01	16.99*	.00

* $p < .05$

Discussion

As a general conclusion, the results obtained show significant differences in knowledge, misconceptions, negative attitudes, susceptibility and self-efficacy according to sex and age in each country. They also show an effect of country of origin. In fact, several studies performed in Latin America have shown the existence of differences according to sex and age in the variables analyzed (see, for example, Caballero-Hoyos and Villaseñor-Sierra, 2003; Dávila, Tagliaferro, Bullones, and Daza, 2008; Uribe, Valderrama, Sanabria, Orcasita, and Vergara, 2009; Uribe, Vergara, and Barona, 2009; Vinaccia *et al.*, 2007).

Overall, although there is high knowledge about how HIV is transmitted, there are still misconceptions that lead young people to adopt risky behaviours or not to seek medical assistance (Dávila *et al.*, 2008; Joseph, Mumford, Younis, and Langford, 2009). Studies performed in Spain with small samples (84 adolescents) concluded that there is insufficient knowledge about pregnancy prevention and STDs and that sex education activities for young people are needed (Barella Balboa, Mesa Gallardo, and Cobena Manzorro, 2002). Therefore, programs should continue to provide correct knowledge about HIV/AIDS and eliminate any misconceptions on the subject (Bhattacharya, Cleland, and Holland, 2000).

The present study found medium-high susceptibility levels in the three countries, as Kershaw *et al.* (2005) did in their study from adolescents. However, other studies had shown low susceptibility levels (Gerrard, Gibbons, and Bushman, 1996). Like other authors (Yoo, Lee, Kwon, Chung, and Kim, 2005), the present study found greater knowledge among males than females in the three countries analyzed. Yet, in contrast with the results of earlier studies, the present study found higher levels of misconceptions among males.

It is very interesting to see how differences in knowledge, misconceptions, negative attitudes, susceptibility and self-efficacy according to sex were maintained, with males showing higher knowledge and misconceptions and more negative attitudes. In Colombian and Panamanian males, self-efficacy was also higher in males than in females. Females showed greater susceptibility than males in the three countries. Therefore, differences in the variables analyzed according to sex showed a similar pattern in the three countries. The content of STD/HIV prevention programs and the characteristics of the adolescents who receive them may be the underlying causes of the differences found according to sex. It is also important to consider gender roles and social norms, which are different for males and females, given that these aspects hinder safe sexual practices (Carrera-Fernández, Lameiras-Fernández, Núñez-Mangana, and Rodríguez-Castro, 2007). Moreover, these variables may mediate the effect of prevention programs and the extent to which adolescents become involved in such programs and assimilate the information they provide. Besides, male and female adolescents are known to engage in different sexual behaviours, which should be considered in prevention programs. It is also necessary to eliminate gender stereotypes and promote a sexuality that fosters equality between people regardless of their sex (Failde Garrido, Lameiras Fernández, and Bimbela Pedrola, 2008). In the present study, Spanish males and females showed the highest levels of knowledge, susceptibility and self-efficacy, and the lowest levels of misconceptions and negative attitudes. Such results may be due to the fact that, in Spain, youth receive more

sex education than youth in Latin America, where sex education is not included in many educational systems (Givaudam and Pick, 2005).

In regards to age differences were the same across countries. In the three countries, the youngest adolescents showed the highest level of misconceptions and negative attitudes. Considering the results obtained, the youngest adolescents are more likely to have a higher risk. It has been stressed that prevention programs should adapt to age groups and start early (Callejas Pérez *et al.*, 2005), from the age of thirteen or even earlier, given that the age of first sexual contact is around 14 years in Panama and Colombia (Bermúdez, Ramiro *et al.*, 2009; Uribe-Rodríguez, Bermúdez, and Buela-Casal, 2007) and around 15 in Spain (Teva, Bermúdez, and Buela-Casal, 2009b). This would guarantee that adolescents have greater knowledge and skills from the start of their sexual relations. Panama seems to have taken this into account, since it has given priority to HIV prevention action in international cooperation.

As regards the influence of country of origin, overall, our findings reveal the following needs: greater prevention efforts should be made in Panama, compared to Colombia and Spain, as its adolescents show the highest level of misconceptions and negative attitudes. It would also be useful to try to eliminate the misconceptions that persist and improve knowledge in the three countries analyzed. STDs/HIV prevention and sex education programs should include sections on communication with one's partner and friends about the risk of contracting HIV/AIDS and the appropriateness of condom use (Sayles *et al.*, 2006). Such contents would be particularly useful to increase self-efficacy in females, who are more vulnerable because of gender inequalities, among other reasons (Pulerwitz, Amaro, DeJong, Gortmaker, and Rudd, 2002). It could be also useful to promote the use of female condom in women (Lameiras-Fernández *et al.*, 2010) since it would help them to protect themselves from HIV infection. In addition, and in agreement with Piña López (2004), the programs mentioned above should not only provide information or promote safe behaviours; the design of such programs should take into account the context of such behaviours, the availability of the necessary skills to have protected sex and the reasons or motivations to do so. It has also been suggested that prevention programs should also consider cultural differences between countries and be targeted and adapted both to native adolescents of the country in question and to the immigrant population (Bermúdez, Castro, Madrid, and Buela-Casal, 2010; Castro and Bermúdez, 2011).

Finally, the present study is relevant and useful for researchers and professionals involved in the design of HIV prevention programs. To the authors' knowledge, it is the first study comparing representative samples of adolescents from Spain, Colombia and Panama in terms of knowledge, misconceptions, negative attitudes, susceptibility and self-efficacy regarding HIV/AIDS.

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