



# Validation of the AIDS Prevention Questionnaire: A Brief Self-Report Instrument to Assess Risk of HIV Infection and Guide Behavioral Change

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## Abstract

This paper describes the process of building and validating the AIDS Prevention Questionnaire (CPS), a brief HIV risk assessment measure. An initial 64-items bank was filled out by 466 young people (192 men and 274 women), aged between 17 and 26 years ( $M = 20.62$ ;  $SD = 2.15$ ). The exploratory factor analysis revealed five components: Knowledge about HIV, Condom Attitudes, Intentions of Condom Use, Safe sexual behavior and Stigma and discrimination towards people living with HIV. This structure was confirmed by confirmatory factor analysis. The internal consistency for the different components ranged from .67 to .74. Moreover, CPS has a classification system that allows determining the level of risk. These results support the AIDS Prevention Questionnaire as a valid and reliable measure to detect earlier the risk for HIV infection and to design adjusted preventive interventions.

**Keywords** HIV prevention · Sexual risk behavior · Level of risk · Psychometric properties · Preventive interventions

## Resumen

Este artículo describe el proceso de construcción y validación del Cuestionario para la Prevención del Sida (CPS), un instrumento breve de evaluación del riesgo de infección por VIH. Un banco inicial de 64 ítems fue cumplimentado por 466 jóvenes (192 hombres y 274 mujeres), con edades comprendidas entre 17 y 26 años ( $M = 20.62$ ;  $DT = 2.15$ ). El análisis factorial exploratorio reveló cinco componentes: información y conocimientos sobre VIH, autoeficacia percibida en el uso del preservativo, intención de uso del preservativo, uso autoinformado del preservativo y solidaridad y empatía hacia las personas que viven con VIH. Esta estructura fue ratificada mediante análisis factorial confirmatorio. La consistencia interna para los distintos componentes osciló entre .67 y .74. Además, el CPS presenta un sistema de clasificación que permite determinar el nivel de riesgo. Estos resultados indican que el Cuestionario para la Prevención del Sida es un instrumento válido y fiable para la detección temprana del nivel de riesgo para la infección por VIH y para el diseño de intervenciones preventivas personalizadas.

**Palabras clave** Prevención del VIH · Conducta sexual de riesgo · Nivel de riesgo · Propiedades psicométricas · Intervenciones preventivas

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## Introduction

HIV/AIDS remains one of the most serious global health problems. At this moment, global rate of new HIV diagnoses in Spain is 7.2 per 100,000 population [1]. The information system for new HIV diagnoses (SINIVIH) reported 3353 new HIV diagnoses last year, as well as 86.663 people living with HIV in Spain. New HIV diagnoses are mainly related to sexual transmission. In particular, transmission in men who have sex with men (MSM) was the most frequent route

of infection (53.1%), followed by heterosexual transmission, which represented 26.5%, and injecting drug users (IDU), who made up 3.6%. Men represented 83.9% of new HIV diagnoses in 2016 and the mean rates for men and women were 12.3 and 2.2 per 100,000 population. Young people under 30 years account for 25.8% of new infections. Furthermore, 46% showed signs of delayed diagnosis (with less than 350 CD-4 cells), even though HIV testing is available, confidential and free of charge for everybody [2].

Nowadays, surveillance on AIDS cases shows that epidemic is based primarily on risky sexual behaviors. Different behavioral change theories have developed a conceptual framework for HIV prevention. The Health Belief Model (HBM) [3], the Theory of Reasoned Action (TRA) [4] or Planned Behavior (TPB) [5], the Information-Motivation-Behavioral Skills Model (IMB) [6], and the Social Cognitive Theory (SCT) [7], have been the most relevant in this field of knowledge. Each of them has identified a number of constructs that would be predictors of sexual risk behavior [8].

In these decades, multiple scales and questionnaires have been published in different countries that evaluate the main components of these models (see Table 1): *beliefs and attitudes* (for example: Multidimensional Condom Attitudes Scale [9]; HIV-Antibody Testing Attitude Scale [10]; HIV/AIDS Attitudes Scale [11]; HIV/AIDS Stigma Scale [12]; Condom Use Expectancy Scale [13]; Condom Barriers and Motivations Scale [14], HIV Attitudes Scale [15]), *knowledge and information* (for example: HIV Knowledge Questionnaire [16]; HIV and other STI Knowledge Scale [17]), *self-efficacy* (for example: Condom Use Self-Efficacy Scale [18]; Specific Condom Use Self-efficacy [19]; Modified Condom Outcome Expectancy Scale [20]; Condom Use Self-efficacy Measure [21]), *perception of risk* (for example: Fear of AIDS Instrument [22]; Risk-Taking Questionnaire [23]; Perceived Risk of HIV Scale [24]; Multicomponent AIDS Phobia Scale [25], Worry about Sexual Outcomes [26]); or *behavior and behavioral intention* (for example: The Safe Sex Behavior Questionnaire [27]; Condom Influence Strategy Questionnaire [28]; HIV Risk Behavior Questionnaire [29]; HIV-Risk Index [30]).

Others questionnaires have been based on some models: HBM (AIDS Health Belief Scale) [31], IMB (ES 5 Questionnaire) [32] or TPB (Sexual Risk Behavior Scale [33]). The others measure a series of constructs related to different theoretical approaches [34–41]. All of them have adequate psychometric properties, are usually written in English, the number of items range from 30 to 170 and include three to seven components.

There are some unidimensional scales mentioned above in the Spanish context [15, 17, 25, 26]. The adaptation of the HIV/AIDS-164 Scale [37] by Bermúdez et al. [42], is composed of factual knowledge, misconceptions, attitudes, perceived susceptibility, and self-efficacy. The HIV-Risk Index

by Ballester-Arnal et al. [30] estimates HIV risk exposure among young people through a global score based on direct and indirect indicators.

After reviewing literature (see Table 1), we have not found a brief multidimensional assessment measure in which all theoretical perspectives are integrated, broader vision of risk behavior for HIV infection is provided (knowledge, attitudes towards HIV and safe sex, self-efficacy, behavioral intention, preventive behavior and stigma towards people living with HIV), and health care professionals were supported to make a more extensive use, for example to make decisions about specific interventions actions. The AIDS Prevention Questionnaire (CPS) has two purposes: firstly, the diagnosis of risk profile for HIV infection, and secondly, the design, planning and evaluation of the effectiveness of preventive interventions to change sexual risk behavior. CPS integrates quantitative and qualitative assessment methods. In the present study, the construction and validation of a descriptive and explanatory measure of risk behavior for HIV/AIDS addressed to adolescents and young Hispanics is presented.

## Method

### Participants

Four hundred and sixty-six Spanish young people were assessed (58.8% were women and 41.2% were men) in different activities organized by SALUSEX. The age ranged between 17 and 26 years ( $M_{age} = 20.62$ ;  $SD = 2.15$ ). Most of them self-identified as heterosexual (females: 93%; males: 88%) and some of them as homosexual (females: 2%; males: 9%) or bisexual (females: 5%; males: 3%). Regarding country of origin, 98% were Spanish and 2% were from other countries. Concerning sexual experience, 89.9% of participants reported mutual masturbation, followed by vaginal sex (88.8%), oral sex (87.1%) and anal sex (30.5%).

### Measures

AIDS Prevention Questionnaire (Cuestionario de Prevención del Sida or CPS) is a self-administered measure that includes 44 different response format questions: 14 dichotomous items, 2 multiple choice items, 24 Likert-type items and 4 continuous 0–100 items. The questionnaire considers HIV/AIDS prevention as a multidimensional perspective and uses the sociocognitive models of health behavior as theoretical reference. The main components are information and knowledge about HIV (12 items), attitudes and perceived self-efficacy (14 items), behavioral intention condom use (6 items), self-reported use of condom and HIV antibody

**Table 1** Summary of tools for assessing main components of HIV prevention

Name	Year	Authors	Location	Population	No. of items	Subscales	Alpha de Cronbach
Condom Use Self-Efficacy Scale [18]	1991	L. J. Brafford and K. H. Beck	USA	803 college students	28-items	1: Personal experience with condoms, 2: Embarrassment at purchase, 3: Alcohol use, 4: Not wanting to offend with the implication of uncleanness, 5: Reduction in excitement, 6: Loss of spontaneity, 7: Breaking the mood, 8: Not being prepared, 9: Unsure of partner's feeling about condoms, 10: Embarrassment, 11: Communication with partner, 12: Embarrassment about talking about condoms, 13: Afraid of partner's refusal of condom use, 14: Ability to maintain an erection, and 15: Fear of reputation	.91
The Safe Sex Behavior Questionnaire [27]	1992	C. DiIorio, M. Parsons, S. Lehr, D. Adame and J. Carlone	USA	531 college freshmen	27-items	1: Sexual behaviors, 2: Condom usage, 3: High risk sexual behaviors, 4: Sexual communication and negotiation	.52–.85 (individual subscales)
Multidimensional Condom Attitudes Scale [9]	1994	M. Helweg-Larsen and B. E. Collins	USA	239 undergraduate students Age ranged from 15 to 35 years	25-items	1: Reliability and Effectiveness, 2: Pleasure, 3: Identity Stigma, 4: Embarrassment About Negotiation and Use, 5: Embarrassment About Purchase	.62–.94 (individual subscales)
HIV-Antibody Testing Attitude Scale [10]	1999	C. B. Boshamer and K. E. Bruce	USA	156 heterosexual students Age ranged from 17 to 37 years	32-item	1: Friends concerns about HIV antibody testing, 2: Family concerns about HIV antibody testing, 3: Concern about public opinion of HIV antibody testing, 4: Concerns about confidentiality of HIV antibody testing	.88

**Table 1** (continued)

Name	Year	Authors	Location	Population	No. of items	Subscales	Alpha de Cronbach
Fear-of-AIDS Instrument [22]	1999	R. A. Bell, F. Molitor and N. M. Flynn	USA	608 men and women at the AIDS Foundation's anonymous HIV test site	40-items	1: Infection Fear, 2: Partner Betrayal, 3: Economic Consequences, 4: Society's Response, 5: Testing Concerns, 6: Casual Contact, 7: Medical Procedures, 8: Safe Sex Communication Apprehension	.87–.97 (individual subscales)
Risk-Taking Questionnaire [23]	2000	E. Gullone, S. Moore, S. Moss and C. Boyd	Australia	570 and 925 adolescents Age ranged from 11 to 18 years	22-items	1: Thrill-seeking behaviors, 2: Rebellious behaviors, 3: Reckless behaviors (having unprotected sex included), 4: Antisocial behaviors	.66–.80 (individual subscales)
Specific Condom Use Self-efficacy Scales [19]	2001	J. Baele, E. Dusseldorp and S. Maes	Belgium	424 male and female sexually experienced and inexperienced adolescents Average age of 17 years	37-items	1: Technical skills, 2: Image confidence, 3: Emotion control, 4: Purchase, 5: Assertiveness, 6: Sexual control	.65–.84 (individual subscales)
Brief HIV Knowledge Questionnaire [16]	2002	M. P. Carey and K. E. E. Schroder	USA	1019 low-income men and women Average age of 33.99 years	18-items	Unidimensional	0.75–0.89 (across samples)
Condom Influence Strategy Questionnaire [28]	2002	S. M. Noar, P. J. Morokoff and L. L. Harlow	USA	625 college students Age ranged from 18 to 22 years	36-items	1: Withholding sex, 2: Direct request, 3: Seduction, 4: Relationship conceptualizing, 5: Risk (STD) information, 6: Deception	.83–.93 (individual subscales)
Modified Condom Outcome Expectancy Scale [20]	2003	S. G. Sherman, D. A. Celenzano, J. W. McGrath, S. E. Chard, R. R. Gangakhedkar, N. Joglekar, R. Malhotra-Kohli, M. Kamya and A. Fullen	USA	100 HIV-negative sexual partners of HIV-infected individuals	9-items	Two-factors analogous to two of the five factors in the original COES (partner reaction and positive self-evaluation)	.80
HIV Risk Behavior Questionnaire [29]	2005	J. Whyte	USA	304 African American women Average age of 23.8 years	25-items	1: Barrier/fluid avoidance modalities, 2: Survival sex, 3: Sexual communications, 4: Factors that increase sexual risk	.82

Table 1 (continued)

Name	Year	Authors	Location	Population	No. of items	Subscales	Alpha de Cronbach
HIV/AIDS Attitudes [11]	2007	N. Silva, P. Henrique, C. Henrique and N. M. Silva	Brazil	549 high and elementary school level students Age ranged from 13 to 51 years	47-item	1: Technical/Scientific Information Perception General Factor, 2: Technical / Scientific Information Perception Factor versus Sexuality and Prejudice, 3: Technical/Scientific Information Perception Factor in Drug Abuse	.859
Worry about sexual outcomes [26]	2009	J. M. Sales, J. Spitalnick, R. R. Milhausen, G. M. Wingood, R. J. DiClemente, L. F. Salazar and R. A. Crosby	USA	522 African-American female adolescents Age ranged from 14 to 18 years	10-items	1: STI/HIV worry, 2: pregnancy worry	.87
Perceived Risk of HIV Scale [24]	2012	L. E. Napper, D. G. Fisher and G. L. Reynolds	USA	785 clients of HIV testing and prevention services Age ranged from 18 to 79 years	8-items	Unidimensional	.88
Multicomponent AIDS Phobia Scale [25]	2013	J. P. Espada, M. T. González, M. Orgilés and A. Morales	Spain	832 secondary students Age ranged from 14 to 18 years	20-items	Two-factor	.77
HIV Attitudes Scale [15]	2013	J. P. Espada, R. Ballester, T. B. Huedo-Medina, R. Secades-Vill, M. Orgilés and M. Martínez-Lorca	Spain	1216 high school students Age ranged from 15 to 17 years	12-items	1: Attitudes toward safe sex when there are obstacles; 2: Attitudes toward HIV testing; 3: Attitudes toward condom use; 4: Attitudes toward people living with HIV/AIDS	.77
HIV/AIDS Stigma Scale [12]	2014	E. A. Smith, J. A. Miller, V. Newsome, Y. A. Sofolahan and C. O. Airhihenbuwa	USA	1195 South Africans Average age of 35.8 years	12-items	1: Government Support, 2: Shame and Rejection, 3: Individual Support	.67 to .80 (individual subscales)
HIV and other STI Knowledge Scale [17]	2014	J. P. Espada, A. Guillén-Riquelme, A. Morales, M. Orgilés and J. C. Sierra	Spain	1570 adolescents Age ranged from 13 to 17 years	24-items	1: General knowledge about HIV, 2: Condom as a protective method, 3: Routes of HIV transmission, 4: Prevention of HIV, and 5: Other sexually transmitted infections	0.65–0.85 (individual subscales)
Condom Use Expectancy Scale [13]	2015	L.A. Nydegger, S.L. Ames and A. W. Stacy	USA	440 people in drug programs	18-items	1: Positive outcomes, 2: Negative Outcomes, 3: Safe sex outcomes	.73–.93 (individual subscales)

**Table 1** (continued)

Name	Year	Authors	Location	Population	No. of items	Subscales	Alpha de Cronbach
Condom Use Self-efficacy Measure [21]	2016	B. E. McCabe, N. Schaefer, K. Gattamorta, N. Villegas, R. Cianelli, V. B. Mitrani and N. Peragallo	USA	320 Hispanic women	15-items	Unidimensional	.92
HIV-Risk Index [30]	2016	R. Ballester-Arnal, M. D. Gil-Llario, J. Castro-Calvo and C. Giménez-García	Spain	9861 young people Age ranged from 18 to 30 years	9-items	1: Direct sexual risk indicators, 2: Indirect sexual risk indicators	.79
Condom Barriers and Motivations Scale	2017	S. A. Golub and K. E. Gamarel	USA	473 men who reported not taking PrEP and 301 men elected to begin PrEP Average age of 32.99 and 33.91 years	16-items	1: Pleasure reduction barriers, 2: Perceived partner pressure barriers, 3: Risk reduction motivations, 4: Intimacy interference barriers	.74–.83 (individual subscales)

testing (7 items), and solidarity and empathy towards people living with HIV (5 items).

Description of the CPS domains:

1. Knowledge about HIV (K-HIV). A series of statements about the level of perceived information (items 1, 2 and 10), real knowledge about routes of transmission and risky practices (items 7 and 8), types of information sources (item 3), preventive measures (item 9), HIV antibody testing (items 11 and 12), and the impact of disease in people living with HIV (items 4, 5 and 6).
2. Self-efficacy and attitudes (SEA). A series of statements that describe ability and skills to use condoms such as buying, putting or refusing unsafe sexual intercourse (item 13, 18, 20 and 21), and feelings related to sexual communication (item 14, 15 and 16), influence of drugs and sexual excitation on the use of condoms (item 17 and 19). Moreover, some items ask about perceived probability and fear of disease and perceived severity (item 22, 23 and 24), subjective norm (item 26) and trust on condoms (item 25) are included.
3. Condom use intention (CUSEI). A series of statements that measure behavioral intention of condom use in different sexual practices (item 27, 28 and 29), types of partner (item 30 and 31) and risk scenarios (item 32).
4. Safe sexual behavior (SAS-B). A series of self-reported statements about frequency of condom use in different sexual practices (item 33, 34 and 35), types of partner (item 36 and 37) and risk scenarios (item 38). Moreover, 1-item related to get HIV antibody testing (item 39) is included.
5. Stigma and discrimination towards people living with HIV (SD-HIV). A series of statements that measure solidary behavior towards known and unknown people living with HIV (item 42, 43 and 44). Moreover, items related to empathy and social perception of HIV-positive people (item 40 and 41) are included.

**Procedure**

In order to design the assessment tool, a group of experts in health psychology generated a set of statements that represented the main keys of the theoretical models of HIV prevention. Two experts extensively reviewed a bank of 64 items. The quality criteria were syntactic correction, semantic comprehension and adequacy of statements to the construct. The experts evaluated each item scoring from 0 to 5. Questions that had formulation problems were deleted, some statements were rewritten using alternative expressions, and items with similar content were grouped. The corrected version of the instrument was administered to a pilot group. The final version was composed of 44 items.

Participants were collected during the World AIDS Day. The research unit carries out informative and formative activities on the 1st December each year. They were aimed to raise awareness, disseminate knowledge and offer volunteer programs to the young people. Specifically, diptychs on participation about HIV research projects were offered to interested people during 2016. In the first phase, these young people were contacted by the mean of communication preferred to provide them information about the study and confirm their participation (2 months). In the second phase, groups of 6–7 participants filled questionnaires in a paper-and-pencil format, in the laboratories of the university research unit (4 months). The approximate time to complete them was 10 min. The guidelines of the Spanish data protection law and the Declaration of Helsinki were applied.

## Analysis of Data

Participants were randomly divided into two sub-samples to explore and confirm the factorial structure. Sample 1 had 231 people (40.26% were male and 59.74% were female) aged 17 to 26 years ( $M = 20.48$ ;  $SD = 2.17$ ). They were included in the Exploratory Factor Analysis (EFA). Sample 2 was consisted of 235 people (42.16% were males and 56.84% were females) aged 17 and 26 years ( $M = 19.82$ ,  $SD = 2.13$ ). They were included in the Confirmatory Factor Analysis (CFA). No statistically significant gender and aged differences were found.

Psychometric properties of the questionnaire were evaluated by the Kaiser–Meyer–Olkin test (KMO) and Bartlett’s test of sphericity, Unweighted least squares (ULS) method and an oblique rotation (direct Oblimin) were used for EFA, structural equation modeling were required for CFA, the Cronbach’s  $\alpha$  was used as a reliability index, and the relationship among components was calculated by the Pearson’s correlation coefficient. The fit indices used were Satorra–Bentler scaled Chi square ( $\chi^2_{S-B}/df$ ), Normed Fit Index (NFI), Non-normed Fit Index (NNFI), Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA). IBM SPSS Statistics 20.0 and EQS 6.1 programs were used for the statistical analysis.

## Results

### Structure

The questionnaire has five dimensions previously commented that assess the main components of HIV prevention. As seen in Table 2, each factor has a certain number of items and a minimum–maximum range of scores. The Cronbach’s alpha internal consistency reliability was adequate (between .67 and .74).

**Table 2** Questionnaire components, number of statements, score range and Cronbach’s alpha

Component	Item	Minimum and maximum values	$\alpha$
K-HIV	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	0–24	.67
SEA	13, 14, 15, 16, 17, 18, 19, 20, 21	9–54	.70
CUSEI	27, 28, 29, 30, 31, 32	0–18	.74
SAS-B	33, 34, 35, 36, 37, 38	0–18	.67
SD-HIV	40, 41, 42, 43, 44	0–206	.69

### Knowledge About HIV (K-HIV)

Results of the Kaiser–Meyer–Olkin ( $KMO = .702$ ) measure of sampling adequacy and Bartlett’s test of sphericity ( $\chi^2_{66} = 577.672$ ,  $p < .001$ ) were appropriate for factor analysis. Consequently, an exploratory factor analysis by weighted least squares and direct Oblimin rotation was conducted. Four sub-factors were extracted explaining 52.91% of the total variance:

- K-HIV 1, called “Level of perceived HIV-information”, was made up of 3 items (item 1, 2 and 3) that measured the belief about the own level of information. It explains 21.78% of variance.
- K-HIV 2, named “Myths about HIV/AIDS”, was made up of 3 items (item 4, 5 and 6) that asked misconceptions about HIV infection and people living with HIV. It explains 10.52% of variance.
- K-HIV 3, called “Level of HIV-information”, was made up of 3 items (item 7, 8 and 9) that evaluated the knowledge about routes of HIV transmission. It explains 10.87% of variance.
- K-HIV 4, named “HIV antibody testing knowledge”, was made up of 3 items (item 10, 11 and 12) that examined the information about diagnosis of HIV. It explains 9.74% of variance.

Confirmatory factor analysis was conducted. The indexes related to the model seemed to be a good fit to the data:  $\chi^2_{S-B}/df = 1.213$ ,  $NNFI = .963$ ,  $CFI = .973$ ;  $RMSEA = .022$ . In this factor, the Cronbach’s alpha obtained was .673.

### Self-Efficacy and Attitudes (SEA)

Results of the Kaiser–Meyer–Olkin ( $KMO = .679$ ) measure of sampling adequacy and Bartlett’s test of sphericity ( $\chi^2_{66} = 604.364$ ,  $p < .001$ ) were appropriate for factor analysis. Consequently, an exploratory factor analysis with weighted least squares and direct oblimin rotation was conducted. Three sub-factors were extracted explaining 55.79% of the total variance:

- SEA 1, called “Comfort in condom use”, was made up of 5 items (item 13, 14, 17, 18 and 19) that assessed the

level of safety and feeling of comfort with the condom. It explains 28.33% of variance.

- SEA 2, named “Condom use negotiation”, was made up of 2 items (item 15 and 16) that evaluated the fear of partner rejection after requesting the use of condom. It explains 11.63% of variance.
- SEA 3, called “knowledge about how to use condoms”, was made up of 2 items (item 20 and 21) that examined the knowledge of how to put on a condom correctly. It explains 15.80% of the variance.

Confirmatory factor analysis was conducted. The indexes related to the model seemed to be a good fit to the data:  $\chi^2_{S-B}/df = 1.532$ , NNFI = .958, CFI = .972, RMSEA = .035. The Cronbach’s alpha obtained in this factor was .699.

### Condom Use Intentions (CUSEI)

Results of the Kaiser–Meyer–Olkin (KMO = .742) measure of sampling adequacy and Bartlett’s test of sphericity ( $\chi^2_{66} = 189.997$ ,  $p < .001$ ) were appropriate for factor analysis. Consequently, an exploratory factor analysis with weighted least squares and direct oblimin rotation was conducted. Two sub-factors were extracted explaining 62.93% of the total variance:

- CUSEI 1, named “Behavioral intention to condom use in different sexual practices”, was made up of 4 items (item 27, 28, 29 and 30) that assessed the motivation to use a condom in romantic relationships. It explains 43.99% of variance.
- CUSEI 2, called “Behavioral intention to condom use with casual partner and drugs consumption”, was made up of two items (item 31 and 32) that evaluated the motivation to use a condom in occasional relationships. It explains 18.94% of variance.

Confirmatory factor analysis was conducted. The indexes related to the model seemed to be a good fit to the data:  $\chi^2_{S-B}/df = 1.525$ , NNFI = .934, CFI = .956, RMSEA = .061. In this factor, the Cronbach’s alpha obtained was .739.

### Safe Sexual Behavior (SAS-B)

Results of the Kaiser–Meyer–Olkin (KMO = .633) measure of sampling adequacy and Bartlett’s test of sphericity ( $\chi^2_{66} = 152.388$ ,  $p < .001$ ) were appropriate for factor analysis. Consequently, an exploratory factor analysis with weighted least squares and direct oblimin rotation was conducted. Three sub-factors were extracted explaining 74.91% of the total variance:

- SAS-B 1, called “Vaginal intercourse”, was made up of 2 items (item 33 and 36) that assessed the use of condom in vaginal sexual practices. It explains 39.13% of variance.

- SAS-B 2, named “Anal and oral intercourse”, was made up of 2 items (item 34 and 35) that evaluated the use of condom in oral and anal sexual practices. It explains 18.74% of variance.
- SAS-B 3, called “Occasional intercourse”, was made up of 2 items (item 37 and 38) that examined the use of condom with sporadic partners and under alcohol and drugs effects. It explains 17.03% of variance.

Confirmatory factor analysis was conducted. The indexes related to the model seemed to be a good fit to the data:  $\chi^2_{S-B}/df = 1.577$ , NNFI = .939, CFI = .975, RMSEA = .068. The Cronbach’s alpha obtained in this factor was .674.

### Stigma and Discrimination Towards People Living with HIV (SD-HIV)

Results of the Kaiser–Meyer–Olkin (KMO = .675) measure of sampling adequacy and Bartlett’s test of sphericity ( $\chi^2_{66} = 287.081$ ,  $p < .001$ ) were appropriate for factor analysis. Consequently, an exploratory factor analysis with weighted least squares and direct Oblimin rotation was conducted. Two sub-factors were extracted explaining 64.28% of the total variance:

- SD-HIV 1, called “Empathy”, was made up of two items (item 40 and 41) that assessed the capacity to understand how people live with HIV, that is, the social perception about the feeling that HIV positive people are experiencing. It explains 36.15% of variance.
- SD-HIV 2, named “Solidarity”, was made up of 3 items (item 42, 43 and 44) that evaluated the predisposition to help a friend living with HIV. It explains 28.13% of variance.

Confirmatory factor analysis was conducted. The indexes related to the model seemed to be a good fit to the data:  $\chi^2_{S-B}/df = 1.877$ , NNFI = .952, CFI = .965, RMSEA = .076. The Cronbach’s alpha obtained in this factor was .689.

Finally, it should be highlighted that the statistical analysis of items 22, 23, 24, 25, 26 and 39 have not allowed to include them in these previous dimensions. However, they are maintained because their content are relevant for a comprehensive assessment of the preventive aspects of HIV and evaluate main aspects of the theoretical models of HIV prevention. They will be have a qualitative analysis and interpretation.

### Normative Data and Correlations

Significant statistical differences by gender are found in SD-HIV ( $p = .008$ ) and CUSEI ( $p = .021$ ). Females obtained



**Table 3** Descriptive statistics and gender differences (*t* test)

Component	M (SD)			t
	Total sample (n = 466)	Male (n = 192)	Female (n = 274)	
K-HIV	17.85 (3.12)	18.09 (2.95)	17.67 (3.24)	1.352
SEA	45.01 (5.71)	44.71 (5.73)	45.23 (5.69)	-.935
CUSEI	12.81 (3.71)	12.25 (3.43)	13.74 (3.99)	-2.342*
SAS-B	9.44 (3.40)	9.16 (3.53)	9.78 (3.24)	-1.010
SD-HIV	176.76 (27.45)	172.50 (30.34)	179.64 (24.96)	-2.647**

\**p* < .05; \*\**p* < .01

**Table 4** Pearson’s correlation coefficient between questionnaire components

	K-HIV	SEA	CUSEI	SAS-B	SD-HIV
K-HIV	–	.220***	-.023	.119	-.005
SEA		–	.034	.282**	.122*
CUSEI			–	.499***	.011
SAS-B				–	-.017
SD-HIV					–

\**p* < .05; \*\**p* < .01; \*\*\**p* < .001

higher scores than males in stigma and discrimination towards people living with HIV and condom use intentions (see Table 3).

Moreover, all components were related to each other with values ranging from .122 to .499. As Table 4 shows, there are positive correlations between condom attitudes and knowledge about HIV (*p* = .001), safe sexual behavior (*p* = .002), and stigma and discrimination towards people living with HIV (*p* = .016). Moreover, condom use intentions and safe sexual behavior showed positive correlations (*p* = .001).

**Classification of the Scores**

A classification system that allows applying a descriptive label to each dimension is showed. The mean T-score range on all scales is from 41 to 59 points. Low scores are within one or two standard deviations of the mean. They indicate deficits in any component; therefore, there is a risk for sexual health. Very low scores are within two or more standard deviations of the mean. They indicate significant problems in any component, thus, an increment of the risk to HIV infection (see Table 5).

**Table 5** Profiling scores

K-HIV	SEA	CUSEI	SAS-B	SD-HIV	T scores	
> 23	> 52	> 17	> 17	> 205	< 70	Very high
20–22	51		13–16	–	60–69	High
14–19	40–50	10–16	7–12	150–204	41–59	Average range
11–13	34–39	7–9	3–6	122–149	31–40	Low
< 10	< 33	< 5	< 2	< 121	< 30	Very low

**Discussion**

This study evaluated the psychometric properties of a brief AIDS Prevention Questionnaire in a sample of Spanish youth. AIDS is a challenge for public health, especially in groups such as MSM or heterosexuals [1, 2]. Correctly and consistent condom use in sexual relationships is the only effective procedure for HIV prevention, other sexually transmitted infections and unwanted pregnancies. The behavior changes models have explained the sexual risk behavior through psychosocial determinants [3–7]. It is necessary to design brief and easy-apply assessment measures to score broadly the risk factors for HIV infection in the clinical, educational and health settings. Most of the assessment measures reviewed are in English language. There is only one other multi-component questionnaire adapted to the Spanish context, the HIV/AIDS Scale 164 by Paniagua. But it has 164 items or 65 in the brief version, and it does not include a behavioral component [37, 42]. The other scales found measure a single component of HIV prevention, for example: HIV knowledge [16], AIDS phobia [25] or HIV risk perception [26].

Our results support a questionnaire that includes five factors with adequate internal consistency (between .67 and .74). The first factor is called Knowledge about HIV (K-HIV), it has 12 items referred to knowledge about the HIV transmission routes and the HIV-antibody testing, the perceived information or the misconceptions about the disease. This factor explains 51.91% of variance and has a reliability of .67. The second factor is named Condom Attitudes (CATT), it has nine items related to the perceived competence, feeling of comfort and security with the condom (for example: buy it, put it on, talk about it, etc.) and fear of rejection for proposing its use to a partner. In this

line, Weeks and cols. in 1995, identified the multidimensionality of self-efficacy (use and rejection) [43]. This factor explains 55.79% of variance and it has a reliability of .70. The third factor is called Condom Use Intention (CUSEI), it has 6 items and is the motivational component of the behavior. After statistical analysis, behavioral intention for condom use with steady partner or in casual relationships have appeared to be as two components separately, maybe because different contextual factors are influencing in each scenario. This factor explains 62.93% of variance and has a reliability of 0.74. Similarly, the fourth factor named Safe sexual behavior (SAS-B) is grouped according to the frequency of condom use. Perhaps this structure relates to the lesser or greater perceived ability to discuss condom use with a partner. It has 6 items, explains 74.91% of variance and has a reliability of 0.67. The last factor, called Stigma and discrimination towards people living with HIV (SD-HIV), has five items that are subdivided into the attitudinal sphere (empathy) and the behavioral sphere (willingness to help a person with HIV). This factor explains 64.28% of variance and has a reliability of .69.

These factors explain a high percentage of total variance and they are conceptually related to each other. Behavioral intention predicts behavior according to the Theory of Planned Behavior, it is associated to condom use in studies such as those of Jemmott et al. [33] or Asare [44]. Appropriate knowledge about HIV prevention is the main variable to analyze the risk and feel competent to use the condom in sexual interactions [45]. Moreover, feeling competent to use condoms also facilitates its use directly [46, 47].

These findings have limitations that must be addressed in the future studies. First, the questionnaire does not include a factor with the assessment of an attitudinal component. Therefore, it is recommended to use the qualitative part of the questionnaire that asked about perceived susceptibility, perceived severity, perceived fear, or subjective norm, by which professionals may assess the cognitive-affective characteristics of the sexual risk behavior. Secondly, it would be necessary to analyze the test–retest reliability and discriminant validity.

However, this research offers a brief and valid evaluation measure that can be adapted to the needs of health professionals: to identify groups at risk for HIV infection, to design prevention programs or psychological intervention aimed at deficient areas, and to evaluate the effectiveness of treatments applied, identifying what components have changed and what ones have been resistant to change.

### Compliance with Ethical Standards

**Conflict of interest** The authors declare no competing interests.

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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