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ABSTRACT

The latent structure, reliability, and item discrimination of 33 items on a Centers for Disease Control (CDC) instrument representing knowledge, attitudes, and beliefs about the acquired immune deficiency syndrome (AIDS) were assessed. The study sample included 311 adolescents ranging from ages 12 to 19 years. Demographic characteristics of the sample were determined. Twenty-nine items were scored with a 3-point Likert-type format, and four items were scored with a 5-point format. An exploratory maximum likelihood factor analysis with an oblique rotation yielded an 8-factor solution. These factors, consisting of 26 items, were interpreted as: high-risk behaviors; drug use; school issues; infection transmission knowledge; infection prevention knowledge; sex practices; birth control prevention knowledge; and intrapersonal prevention knowledge. The primary factors were collapsed using a second order maximum likelihood factor analysis to yield four secondary factors for use as instrument scales: (1) drug use; (2) school issues; (3) transmission and infection knowledge; and (4) AIDS prevention knowledge. The items within each factor displayed too little homogeneity or were not present in sufficient quantity to form scales. The survey items have great potential as a standardized instrument, but extensive development work is needed before they can be used as such. Four data tables are included. (SLD)

The CDC AIDS Survey: A Psychometric Critique

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The CDC AIDS Survey: A Psychometric Critique

AIDS is a major national health problem. It is estimated that 1 - 1.5 million Americans may already be infected with HIV (MMWR, 1987). Since there is no known cure or vaccine for HIV the only way to prevent AIDS/HIV infection is to decrease those behaviors which are related to HIV transmission. Adolescents exhibit many behaviors that put them at risk of contracting and transmitting HIV. These behaviors include unprotected intercourse with multiple partners and experimentation with IV drugs. Although the prevalence of AIDS among adolescents is not high. the low level of incidence is misleading. Due to the long incubation period of HIV and to the large numbers of AIDS victims in their 20s, it is certain that many of today's AIDS victims became infected during their teen years. Therefore, teenagers represent an important target population for AIDS education efforts.

Background

In order to provide the best and most efficient educational programs for combating AIDS it is necessary to understand the knowledge, beliefs and attitudes which teenagers have toward AIDS. Although a number of research instruments have been used to survey adolescents with regard to high-risk behaviors. they do not provide information specific to risk of HIV infection. In order to have an instrument with which to compare knowledge, beliefs and behaviors related to AIDS among schools across the country, a set of items to measure HIV knowledge, beliefs and self-reported behaviors has been developed (DASH, 1987). Although a psychometric evaluation of the items has been reported, the specifics with regard to this analysis have not been released (Kann, Nelson, Jones & Kolbe, 1989). The psychometric information may have been considered unimportant because the items were not intended to be used for specific impact evaluation of school-based programs, but instead for more descriptive general impact of AIDS among adolescents.

A more thorough psychometric evaluation of these items is warranted for two reasons. The first is that the items will be used for measuring the impact of school-based programs and the second is that one of the purposes of the items is to compare responses across educational sites (Fetro, Volkan, Britton, & Felder, 1989). These types of analyses will undoubtable use inferential statistics thereby necessitating an understanding of the psychometric properties of the items.

The CDC has reported that a number of educational settings had problems using the items measuring self-reported behavior related to sex and drug usage (Kann et al., 1989). Although these items measure important variables they have been difficult to implement in educational settings and will not be assessed in this study. Nevertheless, these items should be treated to a similar psychometric evaluation in the future.

Results

Thirty three items representing AIDS knowledge attitudes and beliefs were assessed for latent structure, reliability, and item discrimination using a sample of 311 adolescents ranging from ages 12 to 19. Demographic characteristics of the sample are presented in Table 1. Twenty nine items were scored using a three-point Likert-type format with response options of yes, unsure, and no. Four items were scored using a five point format with response options of almost all, most, some, few, and almost none. An exploratory maximum likelihood factor analysis with an

oblique rotation yielded an eight factor solution as being the most interpretable. The eight factors were comprised of 26 items and were interpreted as perceived high-risk behaviors, drug use, school issues, infection transmission knowledge, infection prevention knowledge, sex practices, birth control prevention knowledge, and intrapersonal prevention knowledge. The eight factors explained 46.9% of the variance in the instrument. Factor loadings for each item are presented in Table 2.

In order to obtain instrument scales, the primary factors were collapsed using a second order maximum likelihood factor analysis with a oblique rotation (Nunnally, 1978). This yielded four secondary factors for use as instrument scales. These scales were interpreted as drug use, school issues, transmission/infection knowledge, and AIDS prevention knowledge. The secondary factor loadings are presented in Table 3. Each of the scales was assessed for reliability using Cronbach's alpha as a measure of internal consistency (Cunningham, 1986). Alpha coefficients for each of the four scales respectively were 0.81, 0.76, 0.61, and 0.52. The alpha for all items was 0.51, which gave little support to the use of a total instrument score.

Item to total score correlation for each scale revealed a number of items which did not highly correlate to transmission/infection knowledge, AIDS prevention knowledge and total scale scores. These items were also shown to have small loadings in the primary factor analysis. The item total correlations are shown in Table 4.

Conclusion

Although the AIDS survey items were not originally intended as a standardized instrument, they have a great deal of potential as such. Nevertheless, the AIDS survey items do not make up a coherent research instrument even though the factor analyses indicate a very clear factor structure underlying the items. It appears that the items within each factor either display too little homogeneity, or are not present in sufficient quantity, to form scales. The drug use and school issues scales appear to have high reliability, but consist of only two items each. These alpha coefficients are probably due to the high degree of similarity among the items in each scale. The transmission/infection knowledge and AIDS prevention knowledge scales, derived from the second order factor analysis, achieved surprisingly low alpha coefficients given the number of items in each scale (10 items each) and their conceptual homogeneity. Clearly, the AIDS survey items need more extensive development work before they can be used as scales for conducting impact evaluation and cross-site comparisons. The instrument could be strengthened by the addition and/or deletion of items in each scale domain and further psychometric evaluation. Scales could be developed from either the primary or secondary factor structure.

The AIDS survey items should be refined and improved. Further work should also include an analysis of the behavior items and a standardized response format. The development of the psychometric properties of the AIDS survey items will lead to greater precision in assessing the impact of AIDS and AIDS education upon adolescents.

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TABLE 1

DEMOGRAPHIC INFORMATION

	FREQUENCY	PERCENT
GRADE		
7-8th Grade	21	6.8
9th Grade	101	32.5
10th Grade	59	19.0
11th Grade	66	21.2
12th Grade	61	19.6
Missing	3	1.0
SEX		
Male	160	51.4
Female	148	47.6
Missing	3	1.0
AGE		
12 or less	10	3.2
13-14	69	22.2
15-16	126	40.5
17-18	93	29.9
19 or older	10	3.2
Missing	3	1.0
ETHNIC BACKGROUND		
White	167	53.7
Black	16	5.1
Hispanic	105	33.8
Asian	11	3.5
Other	6	1.9
Missing	6	1.9

n=311

TABLE 2

PRIMARY FACTOR LOADING BY ITEM

	Perceived High-Risk Behaviors F1	Drug Use F2	School Issues F3	Infection Transmission Knowledge F4	Infection Prevention Knowledge F5	Sex Practices F6	Birth Control Knowledge F7	Intrapersonal Prevention Knowledge F8
Can a person get AIDS from sharing needles or syringes used to inject drugs?	983							
Can a person get AIDS from having sexual intercourse?	613							
Are gay men the only people who can get AIDS?	.520							
How many persons your age do you think are sharing needles or syringes used to inject drugs?		990						
How many persons your age do you think are injecting illegal drugs?		752						
Students with AIDS have a right to go to my school.			862					
It would not bother me to attend class with someone who has AIDS			799					
Can a person get AIDS from using public toilets?			310*	538				
Can a person get AIDS from kissing on the mouth?				487				
Can a person get AIDS from shaking hands with someone who has AIDS?				483				
Can a person get AIDS from having a blood test?				415				
Can a person get AIDS from being bitten by mosquitoes or other insects?				.355				
With regards to AIDS, are blood transfusions now generally safe?				345				31*
Can a person get AIDS from giving blood?				.331				
Can you keep from getting AIDS?					.556			
Can you protect yourself from becoming infected with the AIDS virus?					.555			
Students my age should be taught about AIDS.					489			

* Denotes cross-loadings

All loadings less than .30 are blank.

TABLE 2
(Continued)

PRIMARY FACTOR LOADING BY ITEM

	Perceived High-Risk Behaviors F1	Drug Use F2	School Issues F3	Infection Transmission Knowledge F4	Infection Prevention Knowledge F5	Sex Practices F6	Birth Control Knowledge F7	Intrapersonal Prevention Knowledge F8
Can people reduce their chances of becoming infected with the AIDS virus by using condoms (rubbers) during sexual intercourse?					.476			.327*
Can people reduce their chances of becoming infected with the AIDS virus by not having sexual intercourse (being abstinent)?					.414			
How many persons your age do you think are having sexual intercourse?						.581		
How many persons your age do you think are using condoms (rubbers) during sexual intercourse?						.548		
Can people reduce their chances of becoming infected with the AIDS virus by taking birth control pills?							.517	
Can people reduce their chances of becoming infected with the AIDS virus by urinating after sexual intercourse?							.377	
Can people reduce their chances of becoming infected with the AIDS virus by having sexual intercourse with only one person who is not infected with the AIDS virus?								.436
Can people reduce their chances of becoming infected with the AIDS virus by not having sexual intercourse with a person who used illegal drugs that can be injected?								.388
Can you tell if a person is infected with the AIDS virus by looking at them?								.364

*denotes cross-loadings

All loadings less than .30 are blank

TABLE 3

SECOND ORDER FACTOR ANALYSIS LOADINGS

	Drug Use	School Issues	Transmission /Infection Knowledge	AIDS Prevention Knowledge
Factor 2: Drug Use (2 items)	.994			
Factor 3: School Issues (2 items)		.990		
Factor 4: Transmission Knowledge (7 items)			.577	
Factor 8: Intrapersonal Prevention (3 items)			.369	
Factor 5: Prevention Knowledge (5 items)				.394
Factor 1: Perceived High-Risk Behaviors (3 items)				.341
Factor 7: Birth Control Knowledge (2 items)				.320
Factor 6: Sex Practices (2 items)*				

*Did not load at .30 or higher
All loadings less than .30 are blank.

TABLE 4

ITEM-TOTAL CORRELATIONS

DRUG USE	Item-Total Correlation
How many persons your age do you think are sharing needles or syringes used to inject drugs?	.681
How many persons your age do you think are injecting illegal drugs?	.681

ALPHA = .810

SCHOOL ISSUES	Item-Total Correlation
Students with AIDS have a right to go to my school	.624
It would not bother me to attend class with someone who has AIDS.	.624

ALPHA = .764

TRANSMISSION/INFECTION KNOWLEDGE	Item-Total Correlation
Can a person get AIDS from using public toilets?	.435
Can a person get AIDS from kissing on the mouth?	.295
Can a person get AIDS from shaking hands with someone who has AIDS?	.199
Can a person get AIDS from having a blood test?	.361
Can a person get AIDS from being bitten by mosquitoes or other insects?	.330
With regard to AIDS, are blood transfusions now generally safe?	.417
Can a person get AIDS from giving blood?	203
Can people reduce their chances of becoming infected with the AIDS virus by having sexual intercourse with only one person who is not infected with the AIDS virus?	.249
Can people reduce their chances of becoming infected with the AIDS virus by not having sexual intercourse with a person who used illegal drugs that can be injected.	.176
Can you tell if a person is infected with the AIDS virus by looking at the person?	.206

ALPHA = .614

AIDS PREVENTION KNOWLEDGE	Item-Total Correlation
Can a person get AIDS from sharing needles or syringes used to inject drugs?	.083
Can a person get AIDS from having sexual intercourse?	.110
Are gay men the only people who can get AIDS?	.170
Can you keep from getting AIDS?	.325

Can you protect yourself from becoming infected with the AIDS virus?	.408
Students my age should be taught about AIDS?	.455
Can people reduce their chances of becoming infected with the AIDS virus by using condoms (rubbers) during sexual intercourse?	.283
Can people reduce their chances of becoming infected with the AIDS virus by not having sexual intercourse (being abstinent)?	.244
Can people reduce their chances of becoming infected with the AIDS virus by taking birth control pills?	.234
Can people reduce their chances of becoming infected with the AIDS virus by urinating after sexual intercourse?	.167

ALPHA = .521

ALL ITEMS

	Item-Total Correlation
How many persons your age do you think are sharing needles or syringes used to inject drugs?	-.085
How many persons your age do you think are injecting illegal drugs?	-.046
Students with AIDS have a right to go to my school.	.341
It would not bother me to attend class with someone who has AIDS.	.219
Can a person get AIDS from using public toilets?	.383
Can a person get AIDS from kissing on the mouth?	.235
Can a person get AIDS from shaking hands with someone who has AIDS?	.181
Can a person get AIDS from having a blood test?	.280
Can a person get AIDS from being bitten by mosquitoes or other insects?	.190
With regard to AIDS, are blood transfusions now generally safe?	.379
Can a person get AIDS from giving blood?	.182
Can people reduce their chances of becoming infected with the AIDS virus by having sexual intercourse with only one person who is not infected with the AIDS virus?	.183
Can people reduce their chances of becoming infected with the AIDS virus by not having sexual intercourse with a person who used illegal drugs that can be injected.	.170
Can you tell if a person is infected with the AIDS virus by looking at the person?	.214
Can a person get AIDS from sharing needles or syringes used to inject drugs?	.167
Can a person get AIDS from having sexual intercourse?	.227
Are gay men the only people who can get AIDS?	.113
Can you keep from getting AIDS?	.179
Can you protect yourself from becoming infected with the AIDS virus?	.239
Students my age should be taught about AIDS?	.153
Can people reduce their chances of becoming infected with the AIDS virus by using condoms (rubbers) during sexual intercourse?	.139
Can people reduce their chances of becoming infected with the AIDS virus by not having sexual intercourse (being abstinent)?	.098
Can people reduce their chances of becoming infected with the AIDS virus by taking birth control pills?	.200
Can people reduce their chances of becoming infected with the AIDS virus by urinating after sexual intercourse?	.111

ALPHA = .523