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CLINICAL & BASIC RESEARCH

# Predictors of Human Immunodeficiency Virus Knowledge among Jordanian Youths

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# قياس الوعي بفيروس نقص المناعة المكتسب بين الشباب الأردني

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**الملخص: الهدف:** فهم العوامل المصاحبة لمستوى الوعي بفيروس نقص المناعة المكتسبة الحصول على مثل هذه البيانات مهم جدا من أجل وضع برامج وقائية للشباب. تناقش هذه الدراسة العوامل المحدده لمدى وعي الشباب الأردني بفيروس نقص المناعة المكتسبة. **الطريقة:** هذه دراسة مقطعيه على شريحة واسعة ضمت 8,129 شابا وشابة تراوحت أعمارهم بين 14 و25 سنة أختيروا عشوائيا من مدارس مختلفة من جميع المحافظات الأردنية الإثنى عشر. مثلت الإناث المشتركات 50% ومعدل أعمارهم 17 سنة. وقام المشاركون بتعبئة الاستبانة ذاتيا والتي اشتملت على الخصائص الاجتماعية والديموغرافية، والمعرفة العامة بفيروس نقص المناعة المكتسبة، ومدى الوعي بين الجنسين، والتعرض للمخاطر أو الميل للمجازفة. **النتائج:** في اختبار يضم 13 سؤالا لقياس مدى المعرفة بفيروس نقص المناعة المكتسبة، كان معدل ما أجاب عنه المشاركون بصورة صحيحة 7 أسئلة (أي 7.21، وبـ 2.63 انحراف معياري). سجلت الإناث في المناطق الريفية مستوى متدن من المعرفة بالفيروس، بينما سجل طلاب الكليات والجامعات مستويات أعلى. كما يختلف الوعي بالفيروس باختلاف مصادر المعلومات، فقد كانت المعلومات المتلقاة من الرفاق أكثر دقة، بينما سجلت المعلومات المتلقاة من الوالدين والمراكز الصحية درجة أقل. وسجل الشباب المؤمنون بالمساواة بين الجنسين درجات وعي أكبر بالفيروس، وكانت درجة الوعي أقل عند الشباب الذين يوافقون على تعاطي المخدرات. **الخلاصه:** ركزت البرامج التثقيفية المتعلقة بالفيروس في الأردن على الشباب والإناث في المناطق الريفية. كما أثبتت المؤسسات التعليمية أنها فاعلة في توفير المعلومات الدقيقة للطلاب، بينما يجب ضم أولياء الأمور وخبراء الصحة في البرامج التوعوية من أجل تجنب المفاهيم الخاطئة ورفع مستوى الوعي بفيروس نقص المناعة المكتسبة بين الشباب الأردني.

**مفتاح الكلمات:** المعرفة بفيروس نقص المناعة المكتسب؛ الشباب؛ الأردن؛ الشرق الأوسط.

**ABSTRACT:** ***Objectives:*** Understanding factors associated with the level of human immunodeficiency virus (HIV) knowledge acquisition is crucial to inform preventative programmes for young people. This study examines predictors of HIV knowledge among Jordanian youths. ***Methods:*** A cross-sectional survey was conducted among 8,129 youths aged between 14 and 25 years randomly selected from schools representing each of the 12 governorates of Jordan. A total of 50% of respondents were female and, on average, 17 years old. Participants completed a self-administered questionnaire covering sociodemographic characteristics, HIV knowledge, gender awareness, exposure to and favourable attitudes toward risky behaviours. ***Results:*** On a 13-item HIV knowledge test, participants answered an average of 7 questions correctly (mean = 7.21; standard deviation = 2.63). Female respondents from rural areas demonstrated significantly lower levels of HIV knowledge, while college and university students demonstrated higher levels. HIV knowledge differed significantly by sources of information, with peer-acquired information associated with more accuracy, while HIV information from parents or health centres was associated with a lower score. Youths with more egalitarian gender views also demonstrated higher knowledge levels, whereas youths approving of drug use showed lower levels of HIV knowledge. ***Conclusion:*** HIV education programmes in Jordan should focus on females and youths living in rural areas. Educational institutions have been shown to be effective in providing accurate information to students, while parents and health professionals should also be included in HIV prevention programmes in order to reduce misconceptions and raise the level of HIV knowledge among Jordanian youths.

***Keywords:*** HIV knowledge; Youth; Jordan; Middle East.

**Advances in Knowledge**

- *Limited research on human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) has been conducted among young people in Jordan.*
- *The findings of this study have significant implications for the practice and support of HIV education programmes for youth.*
- *Adolescents need to be aware of HIV and methods that contribute to its prevention. Teachers and lecturers can play a significant role in educating young people about risky sexual behaviours.*

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**Application to Patient Care**

- *The knowledge obtained from this study can help adolescents to initiate a healthy lifestyle, thus preventing HIV.*
- *HIV knowledge among adolescents will help them to behave more responsibly in society.*

The United Nations defines youth as persons between the ages of 15 and 24 years old. Individuals under the age of 25 continue to account for more than half of new human immunodeficiency virus (HIV) cases around the world.[1] The median age of the population in Jordan is 22 years, and about three-quarters of Jordan's 6 million people are under the age of 25.[2] Countries with a large proportion of youth tend to have a high prevalence of HIV.[3,4]

By the end of 2009, Jordan had 850 officially registered HIV cases, indicating a prevalence rate of less than 0.01%.[5,6] Other countries with traditional Muslim cultures, such as Algeria, Tunisia and Iran, previously had low rates of HIV but are currently experiencing an alarming increase in rates of HIV infection.[7] Globalisation, changes in sociocultural norms, poverty, and high levels of migration in Jordan may increase youths' exposure to high-risk behaviours, including unprotected sex.

There has been limited research on HIV knowledge among youth in Jordan. A descriptive study conducted among 1,013 university students in Jordan further demonstrated a 'knowledge-deficit' and the presence of misconceptions with regards to HIV among Jordanian youths.[8] Recent literature suggests that Jordanian youths, like other Arab youths, experience challenges in receiving accurate information about HIV/AIDS.[9] The healthcare system does not offer HIV education programmes specifically targeting youth, and social norms do not encourage public discussions about sex.[10] In families, parents avoid talking with their adolescents about sexuality; educational programmes about puberty and sexuality are nearly absent from school curricula.[9,11] When a curriculum does contain information related to reproductive health in high school, teachers often avoid it.[9,11] Cultural taboos as well as traditional norms prevent health educators from informing young people publicly about condom use, or providing educational materials such as pamphlets or brochures.[12]

Thus, the purpose of this study was to examine predictors of HIV knowledge among youths in Jordan. More specifically, the study aimed to identify levels of HIV knowledge among youths in Jordan; examine gender differences in the level of HIV knowledge among Jordanian youth, and examine which demographic, socioeconomic, and cultural factors predict HIV knowledge among youths in Jordan.

## Methods

The study used data from a cross-sectional survey conducted among 8,129 youths between the ages of 14 and 25 years. Respondents from all schools and educational institutions representing each of the 12 governorates were randomly selected to participate in the survey. A total of 50% of the respondents were female and, on average, respondents were 17 years old. Participants completed a self-administered questionnaire that collected information about sociodemographic characteristics, HIV knowledge, gender awareness, exposure to risky behaviours and favourable attitudes toward risky behaviours.

Students were recruited for the study from all public, private, military, and United Nations Relief and Works Agencies (UNRWA) schools in Jordan, including institutions of higher education (universities, community colleges) and vocational training centres (VTCs).

The sampling process passed through several multistage levels. First, the sample size was set at 6,000 students in order to have sufficient numbers to meet statistical requirements. Second, a list of all schools and institutions of higher education was compiled. Third, samples of schools (male and female) were randomly selected from each district. Fourth, all classes in the selected schools (grades 9 to 12) were taken as a unit for data collection. Data were collected during class periods.

Sampling was conducted in several stages as a sample of each type of institution was selected and students were selected according to their college affiliation. It was decided that the selection should cover Jordan's three geographic regions—north, central, and south. The total sample size was 8,129, which exceeded the number originally decided upon

because the class was the unit of data collection; all students in the selected classes were interviewed.

The questionnaire used was designed in Arabic to fulfill the multiple purposes of the research project. Before embarking on the actual study, the questionnaire was piloted on several hundred students to check for any discrepancies, ambiguity, or sensitivity of questions or statements and was then revised based on the findings of this pilot test.

The test of HIV knowledge included 13 questions that assessed students' knowledge of HIV infection and HIV transmission modes (e.g. *Is there any effective cure for acquired immune deficiency syndrome (AIDS)? Can HIV be transmitted by touching an infected person? Can HIV be transmitted by having sex with a person infected with HIV?*). Correct answers were coded as 1 while incorrect and 'don't know' answers were coded as 0. A composite score was computed by summing up all correctly answered items. The HIV knowledge score ranged from 0 to 13, with a higher score indicating a higher level of HIV knowledge.

A steering committee was formed to oversee and facilitate the research project. It was comprised of physicians, educators, psychologists, a sociologist, pharmacists, a lawyer, a retired police general who had been head of the anti-drug department, statisticians, and United Nations Fund for Population Activities (UNFPA) representatives and technical experts. The study was approved by this steering committee as well as research committees in the Jordanian ministries of higher education and of education. The study purpose was explained to the students and written informed consent was obtained from consenting students. No financial incentives were provided to students who participated in the study.

A number of variables were used to measure important predictors of HIV knowledge. Respondents were asked to name the main sources of information on HIV and other sexually transmitted infections (STIs). Respondents could choose more than one source of information from the following list: parent/s, sibling/s, other relative/s, friends, teachers, educational materials (books, magazines, the Internet), healthcare centres, and mass media (TV or radio). Additionally, respondents were asked whether they had ever attended a lecture on HIV/AIDS, feared getting infected with HIV/AIDS, or felt embarrassed to see a doctor if they experienced pain in the reproductive area.

A permissive attitude toward drug use is an important predictor of risky behaviour among youth. A gauge of this attitude is commonly used in situations where it is difficult to assess risk-taking behaviour. The Attitudes toward Drug Use Scale included 18 questions (e.g. *Use of small amounts of drugs will cause no harm; Smoking is a gateway to drugs; Use of drugs brings pleasure and happiness; Drinking alcohol leads to using drugs; Drugs are no more dangerous than smoking*). Respondents used a 5-point Likert scale to express their options about each statement (from 1 = strongly disagree to 5 = strongly agree). Items disapproving of drug use were reverse coded *(I avoid the company of drug users; Drugs destroy human life; Experimenting with drugs even once is dangerous*). Higher than average scores on the scale indicate attitudes justifying or in favour of/approving drug use.

Another attitudinal scale measured youths' attitudes toward gender roles. A gender awareness scale assessed the respondents' views on gender roles and gender equality in public and private lives and asked students to rate statements such as the acceptability of working in a job headed by a woman; a son sharing in household chores and childcare; offering males and females equal opportunities in education and employment, and women taking leadership positions in the public sector. Each of the 6 statements were rated on a 4-point scale with possible responses being agree, hesitant, neutral, or disagree. An average composite score indicated a greater level of gender awareness and more supportive attitudes toward gender equality.

Sociodemographic variables included the respondents' ages, genders, places of residence (urban, rural, the Badia region (i.e. desert), or refugee camps), geographic regions (north, central, or south), paternal and maternal levels of educational attainment, number of siblings, and number of rooms in the household.

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS), Version 18 (IBM, Inc., Chicago, Illinois, USA). First, descriptive statistics and gender differences for key sociodemographic and explanatory variables were examined. Second, using a multiple linear regression approach, the factors associated with the higher levels of HIV knowledge were examined. About 13% of the data were missing for paternal and

**Table 1:** Socio-demographic characteristics of the sample

| Variable | Total (N = 8,129) | Male (n = 4,064) | Female (n = 4,065) | *P* value, $\chi^2$, t-test |
|---|---|---|---|---|
| | | Frequency (%) | | |
| **Level of education** | | | | *P* <0.01 |
| Basic | 1,720 (21.2) | 814 (20.0) | 906 (22.3) | |
| Secondary | 4,521 (55.6) | 2,321 (57.1) | 2,200 (54.1) | |
| Vocational | 342 (4.2) | 257 (6.3) | 85 (2.1) | |
| Community College | 399 (4.9) | 109 (2.7) | 290 (7.1) | |
| University | 1,147 (14.1) | 563 (13.9) | 584 (14.4) | |
| **Residence** | | | | *P* <0.01 |
| City | 5,632 (69.3) | 2,830 (69.6) | 2,802 (68.9) | |
| Village | 2,122 (26.1) | 909 (22.4) | 1,213 (29.8) | |
| Badia and Camps | 375 (4.6) | 325 (8.0) | 50 (1.2) | |
| **Region** | | | | *P* <0.01 |
| Central | 5,217 (64.2) | 2,793 (68.7) | 2,424 (59.6) | |
| North | 2,071 (25.5) | 923 (22.7) | 1,148 (28.2) | |
| South | 841 (10.3) | 348 (8.6) | 493 (12.1) | |
| **Maternal Education Level** | | | | $\chi^2$ 2.52 |
| Illiterate | 1,215 (15.0) | 623 (15.3) | 592 (14.6) | |
| Basic | 2,275 (28.0) | 1,113 (31.0) | 1,162 (28.6) | |
| Secondary | 2,907 (35.8) | 1,449 (35.7) | 1,458 (35.9) | |
| College or University | 1,732 (21.3) | 879 (21.6) | 853 (21.0) | |
| **Paternal Education Level** | | | | *P* <0.05 |
| Illiterate | 609 (7.5) | 333 (8.2) | 277 (6.8) | |
| Basic | 1,912 (23.5) | 981 (24.1) | 931 (22.9) | |
| Secondary | 2,409 (29.6) | 1,136 (27.9) | 1,273 (31.3) | |
| College or University | 3,199 (39.4) | 1,615 (39.7) | 1,584 (39.0) | |
| | **Total** | **Male** | **Female** | |
| | | Mean (SD) | | |
| **Age in years** | 17.23 (± 1.88) | 17.25 (± 1.89) | 17.21 (± 1.87) | t-test 0.99 |
| **Number of siblings** | 7.18 (± 2.7) | 7.06 (± 2.75) | 7.29 (± 2.66) | *P* <0.01 |
| **Number of rooms** | 4.84 (± 2.07) | 4.89 (± 2.19) | 4.8 (±1.94) | *P* <0.1 |

*SD = standard deviation.*

maternal education variables. Multiple imputation procedures were used to impute data for these two variables. The findings from the imputed dataset did not differ from the analysis conducted on the original data with missing cases.

## Results

The total sample consisted of 8,129 youths and was equally distributed by gender, with 4,064 male participants (50%) and 4,065 female participants (50%). The sociodemographic characteristics of the sample are presented in Table 1. The sample included young people between 14 and 25 years of age, the mean age being 17.23 years (standard deviation [SD] = ± 1.88). Participants reported having on average 7 other siblings (mean [M] = 7.18; standard deviation [SD] = ± 2.7) with some participants reporting as many as 20 siblings. The number of rooms, used as a proxy of household wealth, ranged from 1 to 11 rooms with the average apartment or house having 4 rooms (M = 4.84; SD = ± 2.07). Out of 8,129 participants, the majority (69.3%) was from the central region of Jordan, followed by participants from the northern (25.5%) and southern (10.3%) regions. At the time of the interview, over half of the participants (55.6%) were attending secondary school, 21.2% had achieved only a basic level of education, and 14.1% were studying at a university. About 15% of mothers and 7.5% of fathers of respondents had only basic education or no education at all.

The overwhelming majority of respondents (97.2%) had heard of HIV/AIDS. As presented in

**Table 2:** Level of human immunodeficiency virus (HIV) knowledge among Jordanian youth and gender differences

| HIV-related variables | Total (N = 8,129) | Male (n = 4,064) | Female (n = 4,065) | *P* value |
|---|---|---|---|---|
| **HIV Knowledge Score mean (SD), (range 0–13)** | 7.21 (± 2.63) | 7.39 (± 2.66) | 7.03 (± 2.58) | ***P* >0.01** |
| **Attended lectures on AIDS** | 2,631 (± 32.4) | 1,200 (± 29.5) | 1,431 (± 35.2) | ***P* >0.01** |
| **Fear of getting AIDS** | 2,053 (± 25.3) | 1,277 (± 31.4) | 776 (± 19.1) | ***P* >0.01** |
| **Feels hesitant or embarrassed to see a doctor if experiencing pain in reproductive area** | 4,492 (± 56.5) | 1,733 (± 43.9) | 2,759 (± 69.0) | ***P* >0.01** |
| **Gender awareness mean (SD), (range 1–4)** | 3.1 (± .7) | 2.8 (±0.71) | 3.4 (± 0.55) | ***P* >0.01** |
| **Favorable attitudes to drug use mean (SD), (range 1–5)** | 2.07 (± 0.5) | 2.16 (± 0.54) | 1.99 (± 0.45) | ***P* >0.01** |
| **Sources of HIV information n (%)** | | | | |
| Parent/s | 3,411 (42) | 1,362 (33.5) | 2,049 (50.4) | ***P* >0.01** |
| Sibling/s | 3,603 (44.3) | 1,578 (38.8) | 2,025 (49.8) | ***P* >0.01** |
| Friend/s | 5,153 (63.4) | 2,679 (65.9) | 2,474 (60.9) | ***P* >0.01** |
| Relatives | 2,313 (28.5) | 1,339 (32.9) | 974 (24.0) | ***P* >0.01** |
| Teachers | 5,984 (73.6) | 3,030 (74.6) | 2,954 (72.7) | **t-test 3.73** |
| Books, magazines, or Internet | 6,941 (85.4) | 3,519 (86.6) | 3,422 (84.2) | ***P* >0.05** |
| Mass media (TV or radio) | 6,628 (81.5) | 3,372 (83.0) | 3,256 (80.1) | ***P* >0.01** |
| Health centres | 5,119 (63) | 2,492 (61.3) | 2,627 (64.6) | ***P* >0.05** |
| **Currently smokes** | 1,312 (16.14) | 1,113 (27.4) | 199 (4.9) | ***P* >0.01** |
| **Ever drank alcohol** | 2,296 (28.24) | 1,500 (36.9) | 796 (19.6) | ***P* >0.01** |

*SD = standard deviation.*

Table 2, the average score on the HIV knowledge test was 7.21 (SD = ± 2.63) demonstrating that respondents answered 7 out of 13 questions correctly. A third of respondents (32.4%) had attended lectures on HIV/AIDS. The most common sources of information about HIV were books, magazines, and the Internet (85.4%), mass media (81.5%), and teachers (73.6%). Significant gender differences were observed in regards to the sources of HIV information. As compared to male participants, more female participants received information about HIV within the family setting. A total of 50% of females mentioned parents as a source of information as compared to 33.5% of males, and the difference was statistically significant ($\chi^2$ = 238.11; *P* <0.001). Similarly, more female respondents received information about HIV from their siblings (49.8%) as compared to their male counterparts (38.8%, $\chi^2$ = 99.41; *P* <0.001). Participants primarily received information from a parent or sibling of the same gender. Boys more than girls learned about HIV from their peers ($\chi^2$= 22.42; *P* <0.001) and other relatives ($\chi^2$ = 80.63; *P* <0.001).

Overall, respondents disapproved of the use of drugs and the average score on the 5-point favourable attitude toward drugs scale was 2.07 (SD = ± 0.5). Male participants demonstrated more favourable attitudes toward drug use (M = 2.16; SD = ± 0.54) as compared to girls (M = 1.99; SD = ± 0.45; $\chi^2$ = 15.13; *P* <0.001). The gender awareness score measuring participants' attitudes to the equal roles of men and women was 3.1 (SD = ± 0.7) out of 4. Females demonstrated more supportive attitudes toward gender equality (M = 3.4; SD = ± 0.55) compared to male respondents (M = 2.8; SD = ± 0.71; $\chi^2$ = -42.57; *P* <0.001).

The results of the regression analysis are presented in Table 3. The analysis demonstrated that girls reported a significantly lower score on the HIV knowledge test (regression coefficient [b] = -0.51; *P* <0.001), while controlling for other important sociodemographic covariates. Compared to respondents with a basic level of education, respondents pursuing a college or university education demonstrated significantly higher scores on the HIV knowledge test (b = 0.52; *P* <0.01 and b = 0.51; *P* <0.001, respectively). Respondents attending secondary or vocational schools did not differ significantly in their level of HIV knowledge from respondents with basic education. Compared to youth from the central region of Jordan, youths from the north or south of Jordan showed lower levels of HIV knowledge (b = -0.33; *P* <0.001

**Table 3:** Regression analysis of factors associated with human immunodeficiency virus knowledge among Jordanian youth (N = 8,128)

| Variables | Unstandardised Coefficients | | *P* value/t-test |
|---|---|---|---|
| | b | SE | |
| **(Constant)** | **5.79** | **0.28** | ***P* >0.01** |
| **Female** | **-0.51** | **0.07** | ***P* >0.01** |
| **Age** | | | |
| Ages 14–16 years (ref.) | 1.0 | - | - |
| Ages 17–19 years | 0.09 | 0.08 | **1.14** |
| Ages 20–25 years | 0.11 | 0.14 | **0.78** |
| **Level of education** | | | |
| Basic Education (ref.) | 1.0 | - | - |
| Secondary Education | -0.12 | 0.09 | **-1.32** |
| Vocational Education | -0.13 | 0.17 | **-0.79** |
| College Education | 0.52 | 0.18 | ***P* >0.05** |
| University Education | 0.51 | 0.14 | ***P* >0.01** |
| **Number of rooms in home** | **0.06** | **0.01** | ***P* >0.01** |
| **Number of siblings** | **-0.05** | **0.01** | ***P* >0.01** |
| **Region** | | | |
| Central (ref.) | 1.0 | - | - |
| North | -0.33 | 0.07 | ***P* >0.01** |
| South | -0.41 | 0.1 | ***P* >0.01** |
| **Place of residence** | | | |
| City (ref.) | 1.0 | - | - |
| Village | -0.35 | 0.07 | ***P* >0.01** |
| Badia or Camp | -0.07 | 0.14 | **-0.47** |
| **Maternal level of education** | | | |
| Illiterate | 1.0 | - | - |
| Basic | -0.18 | 0.11 | **1.6** |
| Secondary | -0.14 | 0.11 | **1.23** |
| College or University | 0.42 | 0.13 | ***P* >0.01** |
| **Paternal level of education** | | | |
| Illiterate | 1.0 | - | - |
| Basic | -0.07 | 0.15 | **-0.46** |
| Secondary | -0.05 | 0.15 | **-0.32** |
| College or University | 0.14 | 0.16 | **0.89** |
| **Favourable attitudes toward drug use** | **-0.38** | **0.06** | ***P* >0.01** |
| **Gender awareness** | **0.31** | **0.04** | ***P* >0.01** |
| **Sources of HIV information** | | | |
| Parent/s | -0.25 | 0.06 | ***P* >0.01** |
| Sibling/s | 0.18 | 0.06 | ***P* >0.05** |
| Other relatives | -0.03 | 0.06 | **-0.53** |
| Friend/s | 0.28 | 0.07 | ***P* >0.01** |
| Teachers | 0.48 | 0.07 | ***P* >0.01** |
| TV or Radio | 0.35 | 0.09 | ***P* >0.01** |
| Books, magazines, or internet | 0.74 | 0.10 | ***P* >0.01** |
| Health centres | -0.18 | 0.06 | ***P* >0.05** |
| **Attended lectures on AIDS** | **0.72** | **0.06** | ***P* >0.01** |
| **Fear of getting AIDS** | **-0.27** | **0.06** | ***P* >0.01** |
| **Hesitation to see a doctor** | **-0.001** | **0.06** | **-0.02** |
| **Risk behaviours** | | | |
| Currently smokes cigarettes | 0.2 | 0.08 | ***P* >0.1** |
| Ever drank alcohol | 0.01 | 0.07 | **0.09** |

*b= regresion coefficient; SE = standard error.*

and b = -0.41; *P* <0.001). Respondents living in villages demonstrated a lower level of knowledge (b = -0.35; *P* <0.001) as compared to respondents from cities. However, the residents of the Badia or camps did not differ significantly from their urban counterparts in their levels of HIV knowledge. Higher levels of maternal education, namely college or university education, were associated with an increased knowledge of HIV (b = 0.42; *P* <0.001). The level of paternal education did not demonstrate any significant relationships with the level of HIV knowledge.

Receiving information from parents (b = -0.25; *P* <0.001) or health centres (b = -0.18; *P* <0.01) was associated with a lower (or incorrect) level of HIV knowledge. The sources of information that showed the strongest contribution to accurate HIV knowledge were informational materials such as books, magazines, and the Internet (b = 0.74; *P* <0.001) and teachers (b = 0.48; *P* <0.001). Receiving information from peers, including siblings (b = 0.18; *P* <0.01) and friends (b = 0.28; *P* <0.001), also contributed to higher levels of HIV knowledge, but the effect was lower when compared to information derived from educational materials and teachers.

Attending lectures on HIV/AIDS was among the strongest predictors of a high level of HIV knowledge (b = 0.72; *P* <0.001). Having more supportive attitudes toward gender equality was associated with high HIV knowledge (b = 0.31, *P* <0.001), whereas attitudes justifying drug use showed an inverse relationship with HIV knowledge (b = -0.38, *P* <0.001).

## Discussion

This is the first research study that examines HIV knowledge among a random sample of youths recruited from all administrative districts of Jordan. Using this national sample, this study described youths' levels of HIV knowledge, identified the most commonly held perceptions and misperceptions regarding HIV, and identified significant predictors of HIV knowledge among young people in Jordan. The findings of the present study suggest an improvement in the level of HIV knowledge over the past decade; however, the level of HIV knowledge is still insufficient. The low levels of HIV knowledge among Jordanian youth in this study were similar to the results from other Arab countries, including Lebanon, Yemen, and Egypt.[9,13–15] Youths in the Middle Eastern region lack access to information on sexual health, including STIs and HIV.[9] A systematic review showed that behavioural research on HIV/AIDS in Jordan is limited, even when compared to other Middle Eastern countries.[23]

However, youth in other Muslim countries in the region, such as Iran, Turkey and Morocco, demonstrated a greater awareness of HIV, including more accurate knowledge about the method of HIV transmission and protection.[3,16–20] Analysis of a global school-based student health survey among 13- to 15-year-old adolescents from the Middle East and North Africa between 2004 to 2008 showed that HIV/AIDS-related knowledge varied significantly according to countries and gender.[24] Such differences might exist for different reasons. Despite the similar taboos on talking about sexuality within the family in these cultures, the HIV information provided through educational institutions and youth-friendly clinics created better access to information among youth in these countries.[3,20]

This study confirmed that the strongest predictor of accurate HIV knowledge among youths in Jordan was attending lectures on HIV/AIDS and receiving information from teachers or books. These findings have significant implications for practice, and support the importance of conducting HIV education programmes for youth. Moreover, our finding that a large percentage of youths regard receiving information from parents to be associated with incorrect HIV knowledge might be explained by barriers in communication between parents and their adolescents. Additionally, a lack of parental knowledge of HIV and safe sexual behaviours may have contributed to youths' low confidence in their parents' information. Finally, youths may be reluctant to ask questions that their parents may interpret as an indication that their children are sexually active.

This last finding may be explained by looking into gender inequalities. In the literature, gender inequalities in Middle Eastern countries were reported as a barrier to acquiring information on sexual and reproductive health.[9,21] Our findings were consistent with the literature. First, females in this study demonstrated a significantly lower level of HIV knowledge, which might be the result of societal gender inequalities. Women in the Middle East are expected to be timid, and neither

to negotiate regarding their reproductive or sexual health, nor to be knowledgeable about sexual health or be sexually active.[22] Second, positive attitudes toward gender equality were associated with a higher level of HIV knowledge. The literature reports that gender inequalities undermine the status of women and reinforce the power imbalances associated with health vulnerabilities and increased risky sexual behaviours.[21] Our findings were consistent with the international literature, in which young people who have favourable gender attitudes have demonstrated better HIV knowledge. Third, a higher level of maternal education was a significant factor associated with a higher level of HIV knowledge. The educational level of the father did not have a significant impact on his child's level of HIV knowledge.

## Conclusion

This study's findings have significant implications for the development of health education programmes in Jordan. Most HIV education programmes in Jordan target youth at universities and colleges, and those who are living or studying in urban areas or camps. However, youth living in northern and southern regions, as well as those in VTCs usually do not receive enough attention from organisations that provide HIV education. Poor HIV knowledge among these groups might contribute to higher risk sexual behaviours and increase youths' risk of HIV. Teachers and lecturers can play significant roles in educating young people about risky sexual behaviours. The benefits of sex education programmes can be enhanced by targeting parents and teachers. A governmental commitment to encouraging national programmes that provide equal healthcare and education to youth in different regions of the country is important.

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