Independent predictors of comprehensive knowledge of HIV in general population: findings from the Myanmar Demographic and Health Survey (2015-16) [version 1; peer review: awaiting peer review]

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Abstract

Background: Myanmar has the third highest number of people living with HIV in Southeast Asia behind Indonesia and Thailand. The independent predictors of comprehensive HIV knowledge among general population are not known.

Methods: In this nationally representative study, we adopted a cross-sectional design using secondary data from the Myanmar Demographic and Health Survey (2015-16). We included all women and men aged 15-49 years who participated in the survey. We have provided weighted estimates as the analyses were weighted for the multi-stage sampling design. We used modified Poisson regression with robust variance estimates model to identify independent predictors of comprehensive knowledge.

Results: Of 17,622 analyzed, 3,599 (20.4%, 95% CI: 19.7, 21.1) had comprehensive knowledge of HIV. Late adolescents, those with less than a high school education, those involved in agriculture and the poorest two quintiles were less likely to have comprehensive knowledge of HIV.

Conclusion: In Myanmar, comprehensive knowledge of HIV among the general population needs to be improved and we identified certain independent predictors that could be specifically targeted by the national programme.

Keywords

Cross sectional survey, demographic health survey, HIV AIDS knowledge, risk factors, SORT IT
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Introduction
Human immunodeficiency virus (HIV) infection is a global epidemic and is the second leading cause of death among infectious diseases after tuberculosis. During 2017, there were 1.8 million new infections, 37 million people living with HIV and nearly one million acquired immunodeficiency syndrome (AIDS) related deaths. The right knowledge and a positive attitude towards HIV along with awareness regarding availability of HIV counseling and testing services is a pre-requisite for meeting the first ‘90’ of the UNAIDS ’90-90-90’ targets: by 2020, 90% of people living with HIV should know their HIV status.

Myanmar has the third highest number of people living with HIV in Southeast Asia behind Indonesia and Thailand. In 2015, the prevalence of HIV among adults aged 15–49 years was 0.59%, and 53% of estimated people living with HIV knew their status. The focus of the national AIDS programme is on testing key populations, pregnant women (to reduce mother to child transmission), people with sexually transmitted infections, tuberculosis patients and prisoners. Among young men who have sex with men in Myanmar (2015), having good HIV related knowledge was associated with HIV testing.

In Uganda, four in ten women aged 15–49 years from the general population had comprehensive knowledge of HIV. The Myanmar Demographic and Health Survey (MDHS) 2015–16 reported that one in five respondents had comprehensive knowledge of HIV, three quarters were willing to care a family member with HIV/AIDS, and 29% were ever tested for HIV. The independent predictors of comprehensive HIV knowledge among the general population have not been analyzed or reported. Therefore, this study aimed to identify the factors associated with comprehensive of HIV knowledge among the general population. Understanding these will aid the programme in taking corrective actions and moving a step closer to attain the first ‘90’ target by 2020.

Methods
Study design and population
In this nationally representative study, we adopted a cross-sectional design using secondary data from the MDHS 2015–16. We included all women and men aged 15–49 years who participated in the survey.

Setting
The Republic of the Union of Myanmar is divided administratively into the Nay Pyi Taw council territory, seven states and seven regions. There are 74 districts and 330 townships. Geographically, states and regions have diversities of plains, delta and hilly regions. The population is over 51 million, of which nearly 70% reside in rural areas.

MDHS 2015–16
The sampling for MDHS 2015–16 was based on the 2014 census frame and excluded institutional populations (persons in hotels, barracks, and prisons) but included those from internally displaced population camps.

Comprehensive knowledge was considered as ‘yes’ if a person (i) knew about condom use and that limiting sexual intercourse to one partner could prevent HIV and (ii) knew that a healthy looking person could have HIV and (iii) rejected the two most common local misconceptions about the transmission of HIV, which in Myanmar were that HIV could be transmitted through mosquito bites and that a person could get infected with HIV by sharing food with someone who has AIDS.

All completed questionnaires were entered into the tablets by the field editors after they were edited on paper in the field. Data entered into the tablets were transferred into the electronic structured query language (SQL) database.

The survey followed a stratified two stage sample design. The first stage involved selecting clusters that were either a census enumeration area or ward/village tracts. Probability proportional to size sampling was used. Stratification was achieved by separating each state or region into urban and rural areas, each of which formed a separate sampling stratum. A total of 442 clusters (319 rural and 123 urban) were selected independently from total of 30 sampling strata (Figure 1). Second, using systematic random sampling, a fixed number of 30 households were sampled from each cluster. All men aged 15–49 years in every second selected household and all women aged 15–49 years in the selected households were interviewed using the pre-tested Myanmar language questionnaires. They were either residents or visitors who stayed the night before the survey. The response rate among women was 96% and men was 91%.

Figure 1. Location of the 442 selected clusters* (319 rural and 123 urban) in Myanmar Demographic and Health Survey 2015–16. *Census enumeration area or ward/village tracts.
were re-entered and validated by data processing personnel in Nay Pyi Taw using the CSPro computer package.

Data analysis
We analyzed the data extracted from MDHS 2015–16 using STATA (version 12.1 STATA Corp., College Station, TX, USA). We assessed comprehensive knowledge using proportions and 95% confidence intervals (CIs). In the multivariable model to identify independent predictors of comprehensive knowledge (predictive modelling), we used modified Poisson regression with robust variance estimates. We included age, sex and variables with a crude Chi square p-value of <0.2. Before including the variables in the model, we ruled out multicollinearity using variance inflation factor. We assessed the association between socio-economic and demographic factors and comprehensive knowledge (outcome) using adjusted prevalence ratios (aPR) and 95% CI. We first considered programmatically significant association if aPR was ≥1.5 or ≤0.67, and then looked for statistical significance (p<0.05) because MDHS 2015–16 had a large sample size.

We have provided weighted estimates as the analyses were weighted for the multi-stage sampling design. We used the probability of selection of clusters and households to derive the weights (inverse probability sampling).

Ethics approval
We obtained ethics approval from Ethics Review Committee, Department of Medical Research, Ministry of Health and Sports, Myanmar (Ethics/DMR/2018/163, dated 27 December 2018) and the Ethics Advisory Group of the International Union against Tuberculosis and Lung Disease (The Union), Paris, France (EAG number 38/18 dated 23 August 2018). This study uses existing DHS data and re-analysis was done under the original consent provided by the participants.

Results
A total of 17,622 respondents participated in the survey. Their mean age was 31.5 (standard deviation: 9.9) years, with 2,541 (14.4%) being late adolescents. A total of 4,737 (26.8%) were men, 2,181 (12.4%) had no formal education and 3,121 (17.7%) were involved in agriculture (Table 1).

Of 17,622 respondents, 3,599 (20.4%, 95% CI: 19.7, 21.1) had comprehensive knowledge of HIV. On unadjusted analysis,
<table>
<thead>
<tr>
<th>Factors</th>
<th>Total</th>
<th>Comprehensive knowledge</th>
<th>PR (95%CI)</th>
<th>aPR* (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (col %)</td>
<td>n (row %)</td>
<td>N (col %)</td>
<td>n (row %)</td>
</tr>
<tr>
<td>Place of residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>5119</td>
<td>(29.0)</td>
<td>1870 (36.5)</td>
<td>ref</td>
</tr>
<tr>
<td>Rural</td>
<td>12503</td>
<td>(71.0)</td>
<td>1729 (13.8)</td>
<td>0.38</td>
</tr>
<tr>
<td>Current marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never married</td>
<td>5924</td>
<td>(33.6)</td>
<td>1270 (21.4)</td>
<td>1.06</td>
</tr>
<tr>
<td>Married</td>
<td>10715</td>
<td>(60.8)</td>
<td>2160 (20.2)</td>
<td>ref</td>
</tr>
<tr>
<td>Widowed</td>
<td>453</td>
<td>(2.6)</td>
<td>79 (17.5)</td>
<td>0.87</td>
</tr>
<tr>
<td>Divorced</td>
<td>476</td>
<td>(2.7)</td>
<td>77 (16.2)</td>
<td>0.80</td>
</tr>
<tr>
<td>Separated</td>
<td>54</td>
<td>(0.3)</td>
<td>13 (23.0)</td>
<td>1.14</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not working and/or homemaker</td>
<td>3845</td>
<td>(21.8)</td>
<td>782 (20.3)</td>
<td>0.42</td>
</tr>
<tr>
<td>Agriculture</td>
<td>3120</td>
<td>(17.7)</td>
<td>350 (11.2)</td>
<td>0.23</td>
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<td>Manual labor</td>
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<td>(36.8)</td>
<td>971 (15.0)</td>
<td>0.31</td>
</tr>
<tr>
<td>Clerical/sales/services</td>
<td>3092</td>
<td>(17.6)</td>
<td>981 (31.7)</td>
<td>0.66</td>
</tr>
<tr>
<td>Professional/technical/managerial</td>
<td>1045</td>
<td>(5.9)</td>
<td>504 (48.2)</td>
<td>ref</td>
</tr>
<tr>
<td>Missing</td>
<td>39</td>
<td>(0.2)</td>
<td>11 (28.9)</td>
<td>-</td>
</tr>
<tr>
<td>Wealth quintile</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First (poorest)</td>
<td>3165</td>
<td>(18.0)</td>
<td>167 (5.3)</td>
<td>0.13</td>
</tr>
<tr>
<td>Second</td>
<td>3324</td>
<td>(18.9)</td>
<td>351 (10.6)</td>
<td>0.26</td>
</tr>
<tr>
<td>Third</td>
<td>3612</td>
<td>(20.5)</td>
<td>578 (16.0)</td>
<td>0.39</td>
</tr>
<tr>
<td>Fourth</td>
<td>3688</td>
<td>(20.9)</td>
<td>927 (25.1)</td>
<td>0.61</td>
</tr>
<tr>
<td>Fifth</td>
<td>3833</td>
<td>(21.7)</td>
<td>1576 (41.1)</td>
<td>ref</td>
</tr>
<tr>
<td>Household size</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-3</td>
<td>3584</td>
<td>(20.3)</td>
<td>818 (22.8)</td>
<td>ref</td>
</tr>
<tr>
<td>4-6</td>
<td>9856</td>
<td>(55.9)</td>
<td>1911 (19.4)</td>
<td>0.84</td>
</tr>
<tr>
<td>&gt;6</td>
<td>4182</td>
<td>(23.8)</td>
<td>870 (20.8)</td>
<td>0.91</td>
</tr>
<tr>
<td>Moved in at this residence within last one year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>423</td>
<td>(2.4)</td>
<td>111 (26.1)</td>
<td>ref</td>
</tr>
<tr>
<td>No</td>
<td>17198</td>
<td>(97.6)</td>
<td>3488 (20.3)</td>
<td>0.78</td>
</tr>
<tr>
<td>Missing</td>
<td>1 (&lt;0.1)</td>
<td>0 (0.0)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

col %, column percentage; row %, row percentage; PR, prevalence ratio; aPR, adjusted prevalence ratio; CI, confidence interval; HIV, Human Immunodeficiency Virus.

Composite measure that a person (i) knows about condom use and limiting sexual intercourse to one partner can prevent HIV, and (ii) knows that a healthy looking person can have HIV, and (iii) rejects the two most common local misconceptions about the transmission of HIV, which in Myanmar are that HIV can be transmitted through mosquito bites and that a person can become infected with HIV by sharing food with someone who has AIDS.

Weighted estimates (for multistage survey design) for frequency, proportion and prevalence ratio.

We first considered programmatically significant association if aPR was ≥1.5 or ≤0.67, and then looked for statistical significance (p<0.05).

Adjusted analysis using modified Poisson regression with robust variance estimates, 41 records with at least one variable missing were excluded from the adjusted analysis.
age, education, region, place of residence (urban or rural), occupation and wealth quintile were associated with comprehensive knowledge of HIV. On adjusted analysis, age, education, occupation and wealth quintile were identified as independent predictors.

When compared to adults aged 30–39 years, late adolescents were less likely to have comprehensive knowledge of HIV [aPR: 0.60 (95% CI: 0.52, 0.69)]. When compared to those educated to high school level and above, those educated less than high school level were less likely to have comprehensive knowledge, with those with no formal education being 92% less likely [aPR: 0.08 (95% CI: 0.06, 0.11)]. In addition, those involved in agriculture and belonging to the poorest two quintiles were less likely to have comprehensive knowledge (Table 1).

Discussion
This study from Myanmar investigating the predictors of comprehensive knowledge of HIV among the general population had two strengths. First, we used data from a nationally representative survey. Second, the data were robust as double data entry and validation was done. There were some limitations as well. The study population might include some key affected population that could influence the true prevalence among general population. Residual confounding cannot not be ruled out.

Comprehensive knowledge about HIV in the general population was relatively low and this was prominent among late adolescents. This finding is supported by studies from Nigeria (2013) and Democratic Republic of Congo (2013). Young people including late adolescents are particularly vulnerable because of high risk sexual behavior and substance use. They lack access to accurate and personalized HIV information and prevention services.

Comprehensive HIV knowledge among those with no formal education was poor. Similar results were also found among Indonesian women (2012). This might be linked to not having access to information that is usually available as part of the curriculum and academic activities, resulting in a better understanding of HIV. Moreover, wealth was also a factor that influenced comprehensive knowledge of HIV. People belonging to the poorest two quintiles had poor comprehensive knowledge of HIV, similar to the findings from the Nigerian Demographic and Health Survey (2013). Accessing or learning health information could be minimal for those of the poorest quintiles as they might need to engage more with daily work for their living.

There is a need to target late adolescents and this is possible through school health services. In 2017, the Ministry of Health and Sports issued standardized health messages in the local language for basic health staff. By using these, health promotion activities at the community level should specially be targeted towards late adolescents and socioeconomically disadvantaged people with no formal education.

In conclusion, comprehensive knowledge of HIV among the general population needs to be improved in Myanmar and we identified certain independent predictors that could be specifically targeted. Further translational health education research should be done on the possible knowledge transfer mechanism for these sub-groups.

Data availability
Underlying data
The underlying data for this study is owned by the DHS Program (https://www.dhsprogram.com/data/dataset/Myanmar_Standard-DHS_2016.cfm?flag=0). The electronic data is available from the DHS Program under its terms of use (https://dhsprogram.com/Data/terms-of-use.cfm). Before downloading the data, users must register as a DHS user for reasons laid out on the DHS Program website (https://www.dhsprogram.com/data/Registration-Rationale.cfm) and dataset access is only granted for legitimate research purposes.

References
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