

# Determinants of HIV Stigma among Adolescents: A Comparative Analysis of 2007, 2012, and 2017 IDHS Data

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**Abstract.** In 2022, the Human Immunodeficiency Virus (HIV) stigma in Indonesia remained high, namely 68.7%, posing a challenge to efforts in combating HIV/Acquired Immune Deficiency Syndrome (AIDS), especially among adolescents. This study aimed to identify the factors influencing HIV stigma toward people living with HIV (PLWH/PLHIV) among adolescents in Indonesia and examine changes from 2007 to 2017. Data from the 2007, 2012, and 2017 Indonesian Demographic and Health Surveys (IDHS) were analyzed using frequency distribution and multivariate logistic regression. HIV stigma decreased from 76% in 2007 to 61.6% in 2012 but slightly increased to 69.4% in 2017. Boys in 2012 were 1.15 times more likely to exhibit higher stigma than girls, but this trend reversed by 2017, with boys being 0.82 times less likely to be stigmatized by HIV. Urban residents had 1.4 times higher stigma in 2007 but were 0.88 times less likely to show stigma in 2017. Mass media exposure significantly influenced stigma reduction, with those reading or watching HIV-related content being 1.14 times and 1.13 times more likely to have lower stigma in 2012 and 2017, respectively. Higher HIV knowledge consistently reduced stigma, with those knowledgeable being 0.39 times less likely in 2007 and 0.23 times less likely in 2017. Targeted awareness campaigns and comprehensive education programs are essential in reducing stigma effectively.

## 1 Introduction

HIV/AIDS remains a critical global health issue, with approximately 85.6 million individuals worldwide infected with HIV and over 40.4 million deaths reported as of 2022 [1]. In Indonesia, from January to March 2022, 94,1973 individuals underwent HIV testing, revealing 10,525 new HIV cases [1]. Data from 2022 indicate that the highest incidence of HIV cases was among individuals aged 15-49 years, underscoring a significant public health concern within this demographic. The global vision for HIV response aims to achieve three key goals: zero new HIV infections, zero AIDS-related deaths, and zero discrimination [2].

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soSo skibidiThe Ministry of Health, in collaboration with national and international partners, strives to realize these goals by 2030 [3].

Stigma and discrimination against people living with HIV/AIDS (PLHIV) persist as major barriers to effective prevention, treatment, and care [4,5]. In Indonesia, the prevalence of HIV stigma reached 67% in 2022 [1]. Additionally, studies reveal that eight out of ten women and married men exhibit discriminatory attitudes toward PLHIV, largely due to misconceptions about HIV transmission mechanisms [6]. This persistent stigma not only affects social integration but also significantly hinders access to healthcare services.

Adolescence is a pivotal developmental stage where individuals form attitudes and behaviors that can influence their long-term health choices [7]. During this period, adolescents are increasingly exposed to risky behaviors such as unprotected sex and drug use, which heightens their vulnerability to HIV [8]. Understanding adolescent attitudes toward HIV/AIDS is crucial because this age group plays a critical role in shaping future societal norms and behaviors [9]. Research shows that adolescents often exhibit stigmatizing behaviors toward PLHIV. The stigma can exacerbate the challenges faced by affected individuals, including social exclusion, bullying, and barriers to accessing essential health services [10].

Addressing these issues requires targeted research to uncover the determinants of stigma among adolescents. Socioeconomic and demographic factors, including age, gender, marital status, education level, area of residence, employment status, and economic status, significantly influence attitudes toward PLHIV [11–15]. In addition, misunderstandings and lack of knowledge about HIV/AIDS often fuel fear and stigma, exacerbated by factors such as media exposure [16].

While previous research has largely concentrated on the general population or specific age groups for a single year, the unique focus of this study lies in its comparative analysis of adolescents over multiple years. The study fills a critical gap by specifically addressing adolescent HIV stigma in a multi-year framework, providing insights into trends and shifts that are often overlooked in single-year studies. This research seeks to uncover how these factors have shifted over time in response to changing conditions in Indonesia, such as public health interventions, HIV awareness campaigns, and societal attitudes toward HIV/AIDS. By conducting a comparative analysis of three years, this study aims to provide a clearer understanding of the unique factors shaping stigma each year. Besides, it also addresses a gap in research that often overlooks adolescents and their evolving experiences with HIV stigma over multiple periods.

## **2 Materials and Methods**

### **2.1 Data Sources**

The study utilized data from the IDHS conducted in 2007, 2012, and 2017 by the National Statistical Office on behalf of the Ministry of Health, with financial and technical support from the United States Agency for International Development (USAID). These IDHS surveys are extensive, nationwide, and cross-sectional, gathering data using a two-stage stratified cluster sampling technique. DHS is based on a two-stage-stratified cluster sampling of households. In the first stage of the survey, predetermined numbers of enumeration area (EA) were selected with probability proportional to EA size, and then in the second stage of the survey, a systematic sampling procedure was used to select an average number of

households per EA to collect the information [17]. Detailed methodologies for each survey were documented in the final survey reports.

The 2007, 2012, and 2017 IDHS datasets were chosen for this study due to their comprehensive coverage of reproductive health and HIV-related stigma, particularly among adolescents. These years also correspond with significant public health developments in Indonesia, such as the scaling up of HIV testing, the expansion of antiretroviral therapy (ART) programs, and increased HIV awareness campaigns, especially targeting younger populations. The inclusion of multiple years allows for the examination of trends and shifts in adolescent attitudes toward people living with HIV/AIDS (PLHIV) over time, providing valuable insights into how stigma has evolved in response to these policy changes and interventions.

While the most recent IDHS was conducted in 2022, the data from this year has not yet been publicly released. Accordingly, this limits its availability for research purposes. Thus, the 2007, 2012, and 2017 datasets remain the most recent and reliable sources for analyzing longitudinal trends in HIV stigma among adolescents. Although the data may appear slightly outdated by 2024, it remains relevant because many of the underlying factors contribute to HIV stigma. Therefore, the analysis of these years provides meaningful insights into the drivers of stigma, which can inform current and future public health strategies.

Statistics Indonesia conducted IDHS in collaboration with the Indonesia Population and Family Planning Agency and the Indonesia Ministry of Health and publicly available for research. IDHS divided the discussion into two reports on Household and Adolescent Reproductive Health. IDHS published the report regularly once every five years. This research focused on adolescent reproductive health reports and used a cross-sectional design which could provide information about the prevalence of outcomes and exposures [18].

## **2.2 Study Design**

This study implemented a cross-sectional design approach utilizing secondary data from the IDHS in December 2017. A cross-sectional design was used to determine the factors associated with the HIV stigma among adolescents in Indonesia.

## **2.3 Population and Sample**

IDHS sampling framework was Block Sample Master from the 2010 Population Census. There were about 1,970 census blocks in urban and rural areas. The household sample was estimated to be about 49,250. The sampling design used two stratified stages. First, selecting the census block by probability proportional to the size, and then selecting 25 households in every block. The sample design for this study involved total sampling, with inclusion criteria specifying unmarried girls and boys aged 15-24 years and had complete data in the subset data. Based on these statements, the sample size in this study was 11,027 respondents in 2007, 16,996 respondents in 2012, and 20,756 respondents in [17].

## **2.4 Dependent Variables**

Our primary dependent variable of interest was focused on HIV stigma, specifically beliefs tied to the fear of infection through everyday contact with HIV-positive individuals. This dimension of HIV stigma was chosen because it was consistently measured across the available IDHS in 2007, 2012, and 2017. While seven questions were included in the 2017 IDHS to assess stigma, only four of these questions were consistently available across all

three years. The remaining three questions, while valuable, were not included in the 2007 and 2012 surveys. To ensure comparability and maintain consistency across the three periods, the four common indicators were selected for analysis. The indicators were based on responses to the following questions: 1) the respondents' willingness to care for a family member with AIDS at home; 2) an individual diagnosed with HIV but asymptomatic should be allowed to attend school with non-HIV-positive children; 3) the respondents' willingness to buy fresh produce from a vendor with HIV; and 4) a family should keep a member's AIDS diagnosis confidential. The responses to these four questions were categorized into two levels of stigma: high stigma and low stigma.

**2.5 Independent Variables**

Our independent variables, extensively utilized in prior research, encompassed three main areas: 1) socio-economic and demographic factors, 2) mass media exposure, and 3) knowledge of HIV transmission. The socioeconomic and demographic controls included gender (male vs. female), age (in years), education level, occupation, and types of residence (urban vs. rural). For mass media exposure, the original data from IDHS were used without categorization. Participants' exposure to mass media was assessed based on their access to print media (newspapers or magazines), radio, and television, particularly information on HIV and Sexually Transmitted Infections (STIs). The mass media exposure variable was measured using nine questions to evaluate the extent of respondents' exposure to relevant information. These responses were used without further classification. HIV knowledge was measured using nine questions related to HIV transmission, and the responses were categorized into three levels: low, medium, and high knowledge. This categorization was carried out to simplify the analysis, with the thresholds determined using the mean and standard deviation of the knowledge score. The original scores were calculated based on correct responses to the questions, but for ease of analysis, they were classified into these three categories, representing the varying levels of knowledge among the respondents.

**2.6 Statistical Analysis**

Descriptive analyses were conducted to summarize the characteristics of the study population, the levels of HIV stigma, knowledge about HIV, and mass media exposure across different years. Bivariate analyses were performed using chi-square tests to explore the association between independent variables and dependent variables. The logistic regression represents the probability of engaging in HIV Stigma. Multivariate logistic regression was used to examine the determinants of HIV stigma among adolescents in Indonesia. The use of logistic regression is based on the fact that the dependent variable, HIV stigma is dichotomous. Furthermore, logistic regression can model interaction effects between variables, offering a deeper understanding of how relationships between variables may change under different conditions. The logistic regression model given is as follows:

$$\left(\frac{P_i}{1 - P_i}\right) = \alpha + \beta_1X_1 + \beta_2X_2 + \cdots + \beta_nX_n$$

$P_i$  is the probability of having HIV stigma,  $1-P_i$  is the probability of not having HIV stigma,  $\alpha$  is the constant, and  $\beta$ 's are the coefficients associated with independent variables,  $X$ 's in the study. The regression coefficients were exponentiated to obtain Exp (B). Associations were reported using adjusted odds ratios with their respective 95% confidence

intervals (CIs). Data were organized, tabulated, and analyzed in line with the objectives of the study using SPSS version 25.

2.7 Ethical Statements

All respondents were given informed consent before entering the interview. Respondents’ participation was voluntary. A parent or guardian of an adolescent was also provided consent before data collection. Questionnaires for standard IDHS 2007, 2012, and 2017 surveys had been reviewed and approved by the ICF Institutional Review Board (IRB).

3 Results

**Table 1.** Descriptive analysis of HIV stigma, socio-economic and demographic, mass media exposure, and level of knowledge

| Variables           | Category                 | 2007  |      | 2012  |      | 2017  |      |
|---------------------|--------------------------|-------|------|-------|------|-------|------|
|                     |                          | f     | %    | f     | %    | f     | %    |
| HIV Stigma          | High Stigma              | 8380  | 76.0 | 10464 | 61.6 | 14404 | 69.4 |
|                     | Low Stigma               | 2647  | 24.0 | 6532  | 38.4 | 6352  | 30.6 |
| Gender              | Girls                    | 5349  | 48.5 | 7832  | 46.1 | 9656  | 46.5 |
|                     | Boys                     | 5678  | 51.5 | 9164  | 53.9 | 11100 | 53.5 |
| Age                 | 15-17                    | 4137  | 37.5 | 7096  | 41.8 | 8491  | 40.9 |
|                     | 18-24                    | 6890  | 62.5 | 9900  | 58.2 | 12265 | 59.1 |
| Educational Levels  | Primary                  | 2780  | 25.2 | 4451  | 26.2 | 2915  | 14   |
|                     | Secondary                | 6322  | 57.3 | 9233  | 54.3 | 13086 | 63   |
|                     | Higher                   | 1925  | 17.5 | 3312  | 19.5 | 4755  | 23   |
| Occupations         | No.                      | 10926 | 99.1 | 11912 | 70.1 | 12282 | 59.2 |
|                     | Yes                      | 101   | 0.9  | 5084  | 29.9 | 8474  | 40.8 |
| Types of Residence  | Urban                    | 6327  | 57.4 | 10396 | 61.2 | 8213  | 39.6 |
|                     | Rural                    | 4700  | 42.6 | 6600  | 38.8 | 12543 | 60.4 |
| Mass Media Exposure | Reading HIV information  | 5669  | 51.4 | 5716  | 33.6 | 5496  | 26.5 |
|                     | Reading STI information  | 2993  | 27.1 | 2826  | 16.6 | 2759  | 13.3 |
|                     | Hearing HIV information  | 4679  | 42.4 | 4083  | 24.0 | 2892  | 13.9 |
|                     | Hearing STI information  | 2089  | 18.9 | 1667  | 9.8  | 1204  | 5.8  |
|                     | Watching HIV information | 8283  | 75.1 | 9996  | 58.8 | 11337 | 54.6 |
|                     | Watching STI information | 3682  | 33.4 | 3986  | 23.5 | 4545  | 21.9 |
| HIV Knowledge       | Low                      | 958   | 8.7  | 1150  | 6.8  | 1116  | 5.4  |
|                     | Medium                   | 5974  | 54.2 | 8398  | 49.4 | 17574 | 84.7 |
|                     | High                     | 4095  | 37.1 | 7448  | 43.8 | 2066  | 10.0 |

In this study, the majority of adolescents in 2007, 2012, and 2017 were characterized as having stigma toward HIV (76%, 61.6%, and 69.4%, respectively). Demographically, most were aged 18-24 years (62.5%, 58.2%, and 59.1%), with boys constituting a slight majority (51.5%, 53.9%, and 53.5%). The highest educational levels showed that the majority had secondary education across all years (57.3% in 2007, 54.3% in 2012, and 63% in 2017). There was a notable shift in occupational status, with a significant increase in employment

from 2007 (0.9%) to 2017 (40.8%). Residence types varied, with more adolescents residing in urban areas in 2007 (57.4%) and 2012 (61.2%), but a shift toward rural areas by 2017 (60.4%). Mass media exposure to HIV-related information declined over the years (51.4% in 2007, 33.6% in 2012, and 26.5% in 2017). Additionally, there was variation in HIV knowledge levels among adolescents, with a majority demonstrating medium knowledge in 2007 (54.2%) and 2012 (49.4%), and a substantial increase was noted in 2017 (84.7%).

**Table 2.** Multivariate Logistic Regression Analysis

| Variables           | Category                     | 2007    |           | 2012    |           | 2017    |            |
|---------------------|------------------------------|---------|-----------|---------|-----------|---------|------------|
|                     |                              | Exp(B)  | 95% CI    | Exp(B)  | 95% CI    | Exp(B)  | 95% CI     |
| Gender              | Girls                        | 1.0 ref |           | 1.0 ref |           | 1.0 ref |            |
|                     | Boys                         | 1.15**  | 1.05-1.26 | 1.04    | 0.96-1.13 | 0.82*** | 0.77-0.874 |
| Age                 | 15-17                        | 1.0 ref |           | 1.0 ref |           | 1.0 ref |            |
|                     | 18-24                        | 1.01    | 0.91-1.11 | 0.79*** | 0.73-0.85 | 0.90*   | 0.84-0.97  |
| Educational Levels  | Primary                      | 1.0 ref |           | 1.0 ref |           | 1.0 ref |            |
|                     | Secondary                    | 0.91    | 0.71-1.17 | 0.60*** | 0.48-0.75 | 0.65**  | 0.51-0.83  |
|                     | Higher                       | 0.79*   | 0.63-0.99 | 0.66*** | 0.56-0.78 | 0.77**  | 0.64-0.93  |
| Occupations         | No                           | 1.0 ref |           | 1.0 ref |           | 1.0 ref |            |
|                     | Yes                          | 1.67    | 0.97-2.88 | 0.99    | 0.90-1.08 | 0.96    | 0.90-1.03  |
| Types of Residence  | Urban                        | 1.40*** | 1.27-1.53 | 0.99    | 0.93-1.06 | 0.88*** | 0.82-0.93  |
|                     | Rural                        | 1.0 ref |           | 1.0 ref |           | 1.0 ref |            |
| Mass Media Exposure | Not reading HIV information  | 1.0 ref |           | 1.0 ref |           | 1.0 ref |            |
|                     | Reading HIV information      | 1.09    | 0.98-1.21 | 1.01    | 0.93-1.10 | 1.04    | 0.95-1.13  |
|                     | Not reading STI information  | 1.0 ref |           | 1.0 ref |           | 1.0 ref |            |
|                     | Reading STI information      | 1.04    | 0.91-1.18 | 1.14*   | 1.02-1.27 | 1.04    | 0.92-1.16  |
|                     | Not hearing HIV information  | 1.0 ref |           | 1.0 ref |           | 1.0 ref |            |
|                     | Hearing HIV information      | 0.99    | 0.89-1.11 | 1.05    | 0.96-1.15 | 0.98    | 0.88-1.09  |
|                     | Not hearing STI information  | 1.0 ref |           | 1.0 ref |           | 1.0 ref |            |
|                     | Hearing STI information      | 1.06    | 0.97-1.23 | 1.13    | 0.98-1.29 | 1.07    | 0.91-1.26  |
|                     | Not Watching HIV information | 1.0 ref |           | 1.0 ref |           | 1.0 ref |            |
|                     |                              |         |           |         |           |         |            |
|                     |                              |         |           |         |           |         |            |
|                     |                              |         |           |         |           |         |            |

| Variables       | Category        | 2007    |           | 2012    |           | 2017    |           |
|-----------------|-----------------|---------|-----------|---------|-----------|---------|-----------|
|                 |                 | Exp(B)  | 95% CI    | Exp(B)  | 95% CI    | Exp(B)  | 95% CI    |
| HIV information | Watching        | 1.06    | 0.95-1.19 | 1.16*** | 1.07-1.24 | 1.13*** | 1.05-1.20 |
|                 | Not watching    | 1.0 ref |           | 1.0 ref |           | 1.0 ref |           |
|                 | STI information |         |           |         |           |         |           |
| STI information | Watching        | 1.11    | 0.99-1.25 | 1.06    | 0.97-1.16 | 1.07    | 0.98-1.17 |
|                 | Not watching    | 1.0 ref |           | 1.0 ref |           | 1.0 ref |           |
|                 | STI information |         |           |         |           |         |           |
| HIV Knowledge   | Low             | 1.0 ref |           | 1.0 ref |           | 1.0 ref |           |
|                 | Medium          | 0.55*** | 0.47-0.63 | 0.52    | 0.46-0.60 | 0.42**  | 0.37-0.47 |
|                 | High            | 0.39*** | 0.33-0.45 | 0.47*** | 0.41-0.53 | 0.23**  | 0.19-0.27 |

CI, confidence interval; ref, reference.

\*\*\**p* value < 0.001  
 \*\**p* value < 0.01  
 \**p* value < 0.05

When all independent variables to gender, age, education, occupation, residence, media exposure, and HIV knowledge were analyzed, several important predictors of HIV stigma among adolescents emerged. Gender was a significant factor, where boys in 2007 were 1.15 times more likely to experience stigma compared to girls. However, by 2017, this shifted, and boys were 0.82 times less likely to exhibit stigma compared to girls. Age also influenced the possibility of holding stigmatizing attitudes. Adolescents aged 18 to 24 in 2012 were 0.79 times less likely to have stigmatizing attitudes toward HIV than those aged 15 to 17. A similar trend was observed in 2017, where those aged 18 to 24 were 0.90 times less likely to stigmatize HIV compared to younger adolescents. Education level played a key role in predicting stigma. In both 2012 and 2017, adolescents who had completed secondary education were significantly less likely to stigmatize HIV compared to those with only primary education, being 0.60 times and 0.65 times less likely, respectively. Those with higher education were also less likely to stigmatize HIV, with adolescents in 2012 being 0.66 times and in 2017 being 0.77 times less likely to exhibit stigmatizing attitudes compared to those with lower education. Types of residence were other influential factors. In 2007, adolescents living in urban areas were 1.40 times more likely to hold stigmatizing attitudes than those in rural areas. However, by 2017, adolescents in urban areas were 0.88 times less likely to stigmatize HIV compared to their rural counterparts, indicating a reversal in trends over time.

Exposure to mass media regarding HIV had a varied effect. Adolescents who watched HIV- content on television in 2012 were 1.16 times more likely to show reduced stigma, while in 2017, they were 1.13 times more likely to demonstrate less stigmatizing attitudes compared to those who did not watch such content. HIV knowledge emerged as a strong predictor of stigma. Adolescents with medium knowledge about HIV in 2007 were 0.55 times less likely to hold stigmatizing attitudes compared to those with low knowledge. In 2017, this trend was even more pronounced, where adolescents with high HIV knowledge were 0.23 times less likely to stigmatize HIV compared to those with lower levels of knowledge. This finding highlighted the importance of comprehensive HIV education in reducing stigma among adolescents.

Determinants of HIV Stigma towards PLWH among Adolescents in 2007, 2012 and 2024

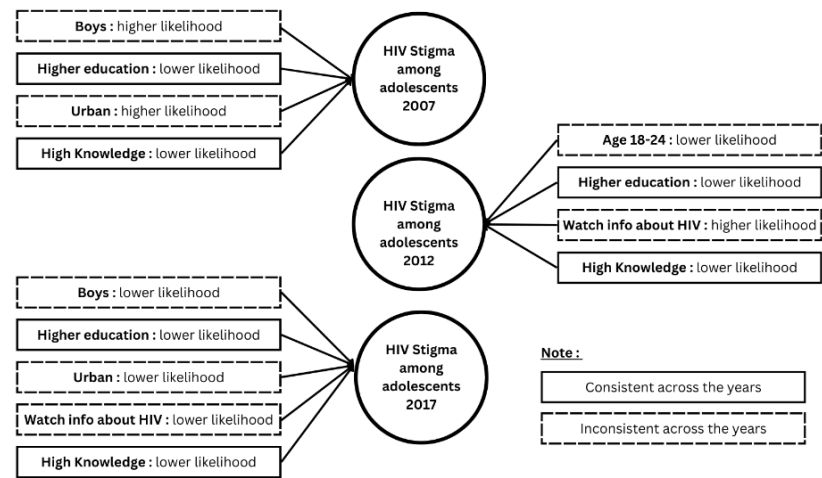


Fig. 1. Determinants of HIV Stigma towards PLWH among Adolescents in 2007, 2012 and 2024

4 Discussion

This study addressed the changes in stigma and discriminatory behaviors toward PLWH from 2007 to 2017, revealing new insights into the sociocultural dynamics influencing HIV-stigma. A key gap identified in this research was the shift in gender-based stigma behaviors over time, highlighting the evolving nature of HIV stigma across different demographic groups. Findings indicated a reversal in gender-based stigma behaviors. In 2007, men were more likely to engage in stigmatizing behaviors, while in 2017, higher levels of discrimination toward PLWH were exhibited by women. This shift aligned with studies from Pakistan [19] and Vietnam [20], suggesting that women generally refrain from discrimination more than men due to higher social responsibility and empathy. Higher levels of stigma behavior toward PLWH were exhibited by males in 2007, consistent with studies suggesting that men are more likely to engage in discriminatory behavior due to societal norms and lower levels of empathy compared to women [21]. However, by 2017, this trend reversed, with higher levels of discrimination displayed by females. This shift could be explained by increased awareness and social responsibility among men, while women, despite their higher empathy, were subjected to societal pressures and moral expectations that increased their stigmatizing behaviors [22]. It is suggested that women nowadays, despite their higher empathy, are more influenced by societal expectations and moral judgments.

Respondents aged 18-20 were less likely to exhibit HIV- stigma. Previous research indicating a 1.6 times higher possibility of stigma among older age groups aligned with this finding. Age is often linked to an individual's life experience and mental maturity, which affects their acceptance of differences and uniqueness in others [23]. This study highlights a gap in understanding how younger respondents, particularly those aged 15-19, may demonstrate higher levels of stigma due to lower acceptance compared to older age groups. It is a key demographic that requires more focused intervention strategies. Higher education correlates with a lower possibility of engaging in stigmatizing behavior. These results are consistent with studies conducted in Indonesia [24], Ethiopia [25], and Bangladesh [26]. Educated individuals typically have greater access to accurate information about HIV/AIDS, which is essential for dispelling misconceptions [27]. This underscores the need for awareness-raising campaigns targeting those without formal education, particularly through

mass media, to enhance overall knowledge about HIV/AIDS. The existence of social and cultural barriers that impede access to comprehensive knowledge is highlighted by the study. This indicates a need for effective educational programs to improve individual understanding [28].

Geographical differences significantly influence stigma behaviors. In 2007, higher stigma due to limited information in rural areas was exhibited by urban areas. By 2017, more stigma was shown in rural areas. These studies align with other research using IDHS data with the general population, which found that rural respondents had a lower probability of high-level stigma ( $OR=0.78$ ) [24]. This suggests two possible conditions: either conservative values in rural areas mean that HIV/AIDS is rarely discussed, or rural communities tend to be close-knit with small populations knowing each other more intimately [29]. Interestingly, in 2017, a lower probability of discrimination toward PLWH was shown in urban areas compared to rural areas. As time passes, information becomes more accessible although rural areas still have more limitations compared to urban areas. Individuals in rural areas face more barriers, such as less information on safe sexual behaviors, leading to greater stigma against PLWH, as shown by studies conducted in Ethiopia [30]. These limitations result in incomplete and misleading information. In the Indonesian context, societal and cultural beliefs play a significant role, with individuals in rural societies often associating HIV with immoral behavior and believing that PLWH deserve punishment. The condition leads to higher levels of discrimination [31]. A notable gap in this study is the increasing divide in stigma levels between rural and urban areas, emphasizing the need for more targeted interventions in rural regions, where social and cultural factors significantly influence HIV- stigma. This finding is consistent with research conducted in various rural settings globally, indicating that rural communities often stigmatize PLWH due to strong cultural norms and misconceptions [32].

Media exposure plays a significant role in shaping public perceptions and attitudes toward HIV/AIDS, influencing levels of stigma, as shown by the study. In Indonesia, findings from 2012 and 2017 IDHS data indicate that higher levels of media exposure, particularly through newspapers and television, were associated with increased HIV stigma. An alignment with a study from Ganjam who points out that biased and prejudicial media coverage can actually exacerbate stigma and discrimination. Such coverage can reinforce negative stereotypes and contribute to the marginalization of those affected by HIV/AIDS [33], instead of mitigating these issues. How HIV/AIDS is often portrayed in the media can be attributed to this. Newspapers and television programs frequently sensationalize HIV/AIDS which perpetuates fear and misunderstanding to attract viewers [34]. Media reports tend to focus on dramatic and fear-inducing aspects of the disease, such as severe health consequences and instances of rapid transmission, rather than providing balanced and educational content [35]. Stigmatizing beliefs are reinforced by this focus, which emphasizes the dangers of HIV/AIDS without equally highlighting advances in treatment and the effectiveness of preventive measures [36]. Furthermore, media coverage often emphasizes how HIV is transmitted rather than how it can be prevented and managed. Anxiety about casual transmission and interactions with PLHIV is created by this emphasis, fostering an environment where stigma thrives. Similar patterns, where media focus on transmission and sensationalism heightened stigma, have been shown by studies in Ethiopia [30]. In Indonesia, the lack of comprehensive health education in the media also contributes to this issue. Fragmented information may be provided by media outlets, leaving out important context and allowing misconceptions to fill the gaps. This results in the public receiving incomplete or misleading information about HIV/AIDS, perpetuating stigma [37]. Moreover, prevailing cultural and moral narratives are often reflected and reinforced by media content. Media content can inadvertently reinforce these stigmatizing views in societies where there is a strong association between HIV/AIDS and moral failings [38]. This study fills a gap by highlighting the critical role of media in

perpetuating HIV stigma, emphasizing the need for reform in media messaging and more responsible health communication strategies to reduce stigma.

The findings of this study indicate that higher levels of knowledge about HIV are associated with a lower possibility of engaging in stigmatizing behaviors. The importance of providing comprehensive education about HIV/AIDS is highlighted by this. The study aligns with this, showing that respondents with comprehensive knowledge about HIV/AIDS are more likely to have positive attitudes toward PLHIV [39]. Myths and misconceptions that often underlie stigma can be dispelled by accurate information about HIV/AIDS [40]. Fear and stigmatization of PLHIV are less likely to happen when individuals understand the actual modes of HIV transmission and recognize that casual contact poses no risk [41,42]. Misunderstandings about HIV transmission, such as the belief that HIV can be contracted through casual contact like hugging or sharing utensils, contribute significantly to stigma. Educated individuals who understand that HIV is transmitted through specific behaviors (e.g., unprotected sex and sharing needles) are less likely to be irrational [42]. Moreover, information about the challenges and discrimination faced by PLHIV is often included in education, fostering empathy. However, greater knowledge can sometimes lead to more discriminatory behavior, as indicated by research in Indonesia using the general population [43]. Understanding the social and personal struggles of PLHIV can lead to more supportive and less judgmental attitudes [44,45]. A more inclusive and supportive approach to those affected by the virus is promoted by this broader understanding. The gap identified in this context is the need for more focused educational interventions that target populations with lower levels of formal education, as well as those in rural and remote areas, to ensure equitable access to accurate information. A more inclusive and supportive approach to those affected by the virus is promoted by this broader understanding. The gap identified in this context is the need for more focused educational interventions that target populations with lower levels of formal education, as well as those in rural and remote areas, to ensure equitable access to accurate information. Evidence has shown that training programs conducted in rural areas have been effective in preventing HIV and reducing stigma, demonstrating that the key factor is accurate information and increased knowledge. This underscores the potential for rural populations to become well-informed, challenging the assumption that lower formal education equates to limited understanding [46]. Therefore, fostering accurate knowledge through government programs and health education initiatives is essential to reduce the stigma associated with PLHIV, as it provides the community with precise information that can diminish discriminatory behaviors [47].

## **5 Conclusion**

Factors to HIV stigma from 2007 to 2017 include significant changes and consistent trends. Gender- stigma shifted over time, with boys exhibiting higher stigma in 2007 and girls showing increased stigma in 2017. Age also plays a role, with older individuals (18-24) generally demonstrating lower levels of stigma. The educational level remains a consistent factor, with higher education associated with lower stigma across all years. Occupational status has a relatively minor effect on stigma compared to other variables. Types of residence experience a reversal in stigma trends, with urban areas displaying higher stigma in 2007 and rural areas in 2017. Media exposure, particularly watching HIV- content, is linked to increased stigma. Lastly, a higher level of HIV knowledge consistently correlates with lower stigma throughout the study period. Policy recommendations include targeted awareness campaigns, comprehensive media guidelines, better rural information access, gender-sensitive interventions, and integrating comprehensive HIV/AIDS education into school curricula and community programs.

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