

HIV-related Perceptions, Knowledge, Professional Ethics, Institutional Support, and HIV/AIDS-related Stigma in Health Services in West Sumatra, Indonesia: An Empirical Evaluation Using PLS-SEM

Vivi Triana¹, Nursyirwan Effendi², Brian Sri Pra Hastuti³, Cimi Ilmiawati¹, Dodi Devianto⁴, Afrizal Afrizal⁵, Adang Bachtiar⁶, Rima Semiarty¹, Raveinal Raveinal⁷

¹Doctoral Program of Public Health, Faculty of Medicine, Universitas Andalas, Padang, Indonesia; ²Department of Anthropology, Faculty of Social and Political Sciences, Universitas Andalas, Padang, Indonesia; ³Public Policy Analyst, Executive Office of the President Republic of Indonesia, Jakarta, Indonesia; ⁴Department of Mathematics and Data Science, Universitas Andalas, Padang, Indonesia; ⁵Department of Sociology, Faculty of Social and Political Sciences, Universitas Andalas, Padang, Indonesia; ⁶Department of Public Health, Faculty of Public Health, Universitas Indonesia, Jakarta, Indonesia; ⁷Department of Internal Medicine, Allergy and Immunology Subdivision, Dr. M. Djamil General Hospital, Faculty of Medicine, Universitas Andalas, Padang, Indonesia

Objectives: The aim of this study was to investigate the significance of associations between knowledge, professional ethics, institutional support, perceptions regarding HIV/AIDS, and HIV/AIDS-related stigma among health workers in West Sumatra, Indonesia.

Methods: We conducted a cross-sectional study involving health workers at public hospitals and health centers in West Sumatra in June 2022. The Health Care Provider HIV/AIDS Stigma Scale was employed to assess the stigma associated with HIV/AIDS. To estimate and evaluate the model's ability to explain the proposed constructs, we utilized the standardized partial least squares structural equation model (PLS-SEM).

Results: In total, 283 individuals participated in this study (average age, 39 years). The majority were female (91.2%), nearly half were nurses (49.5%), and 59.4% had been working for more than 10 years. The study revealed that HIV/AIDS-related stigma persisted among health workers. The PLS-SEM results indicated that all latent variables had variance inflation factors below 5, confirming that they could be retained in the model. Knowledge and professional ethics significantly contributed to human immunodeficiency virus (HIV)-related stigma, with an effect size (f^2) of 0.15 or greater. In contrast, perceived and institutional support had a smaller impact on HIV-related stigma, with an effect size (f^2) of at least 0.02. The R^2 value for health worker stigma was 0.408, suggesting that knowledge, professional ethics, institutional support, and perceived support collectively explain 40.8% of the variance in stigma.

Conclusions: Improving health workers' understanding of HIV, fostering professional ethics, and strengthening institutional support are essential for reducing HIV-related stigma in this population.

Key words: HIV/AIDS, Perceived, Knowledge, Ethics professional, Institutional support, Health workers

Received: Nov 7, 2023 Revised: May 19, 2024 Accepted: Jun 26, 2024

Corresponding author: Cimi Ilmiawati

Doctoral Program of Public Health, Faculty of Medicine, Universitas Andalas, Limau Manis Campus, FK Gedung A Lt.2, Padang-25166, Indonesia

E-mail: ilmiawati@med.unand.ac.id

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INTRODUCTION

HIV/AIDS stigma among health workers continues to be a major obstacle to accessing health services, affecting efforts to prevent and control the disease [1-3]. A survey by the Asia Pacific Network of People Living with HIV/AIDS (APN+) in India, Indonesia, the Philippines, and Thailand revealed that over 50% of people living with human immunodeficiency virus

(HIV; PLHIV) had encountered stigma within the healthcare system. Additionally, PLHIV who face stigma in healthcare settings may experience delays in starting treatment [4,5].

Various studies have recognized that stigma occurs at several levels and have conceptualized it as a multi-level phenomenon [6]. In healthcare, stigma can be predicted based on individual and social levels [7]. At the individual level, the origin of stigmatization lies in the perceptions that individuals hold, which become cognitive representations associated with emotional and behavioral reactions toward PLHIV. Often, PLHIV are associated with behaviors that violate societal norms [8,9]. Additionally, limited knowledge can lead to misconceptions about HIV, potentially increasing irrational fears of HIV transmission [10,11].

At the societal level, HIV-related stigma within the health sector is perceived as a breach of the professional ethics upheld by healthcare workers. These ethical principles are essential for providing high-quality health services and encompass justice, patient autonomy, and non-discrimination. Additionally, professional ethics incorporate social principles and norms, which include a strong sense of social responsibility that influences the quality of services offered [12,13]. Recognizing the crucial role of institutional support, the provision of safe and inclusive facilities can foster an environment where stigmatization is minimized.

Many HIV/AIDS communities have emphasized that reducing stigma is crucial for curbing the HIV/AIDS epidemic [14-19]. Therefore, it is essential to explore and address HIV/AIDS stigma from the perspective of health workers. Previous research has not thoroughly examined the impact of knowledge, professional ethics, and institutional support on both perceived and actual HIV-related stigma among health workers. Therefore, this study aims to assess how these variables—knowledge, professional ethics, and institutional support—affect perceived and actual HIV-related stigma within healthcare settings. Additionally, we will explore in greater detail the various indicators that constitute these variables using partial least squares structural equation model (PLS-SEM) analysis.

METHODS

Design and Sampling

This study employed a cross-sectional design to explore the relationships of HIV/AIDS-related stigma among health workers. Padang and Bukittinggi, cities with the highest incidence

of HIV cases in West Sumatra Province, Indonesia, were chosen for the study from among 19 regions. Our focus was on public hospitals and primary public healthcare facilities in these areas. In each city, a main public hospital known for providing essential HIV treatment services was selected. In Padang, 10 primary public health care facilities were randomly chosen from a total of 23. Similarly, in Bukittinggi, three facilities were selected from a pool of seven. A comprehensive sample of 283 participants, including doctors, midwives, and nurses, was randomly drawn from these facilities. Data collection was conducted using a structured and internally administered questionnaire.

Statistical Analysis

Individual characteristics were presented using numbers and proportions for categorical variables, and mean \pm standard deviation for numerical variables. This study employed PLS-SEM analysis using SmartPLS 4 software. We ensured that the data were adequately prepared for analysis. The interrelationships among research variables were examined through 2 stages of analysis: (1) reflective measurement model analysis (outer model) and (2) structural model estimation analysis (inner model).

Reflective measurement model analysis was conducted by evaluating four key values. First, indicator reliability was assessed by examining the outer loading (λ) value of each indicator. Second, internal consistency reliability was evaluated using the composite reliability (ρ_c) value for each latent variable. Third, convergent validity was assessed through the average variance extracted (AVE) value. Fourth, discriminant validity was determined by comparing the λ values across indicators (cross-loadings).

Structural model estimation analysis elucidated the direct correlation between various factors and HIV-related stigma by considering the path coefficient (β), collinearity via the variance inflation factor (VIF), coefficient of determination (R^2), effect size (f^2), and relevance [20,21]. The modified path model, which excluded insignificant paths, was employed to re-estimate the measurement model evaluation values.

Instrument

This study employed constructs derived from various survey questionnaires. The stigma variable, an endogenous latent response variable, was assessed using the Health Care Provider HIV/AIDS Stigma Scale (HPASS) questionnaire. HPASS is a vali-

dated tool comprising 30 items that evaluate prejudice, stereotypes, and discrimination [22].

Ethics Statement

All procedures received approval from the Faculty of Medicine Ethics Committee at Universitas Andalas (No. 750/UN.16.2/KEP-FK/2022). Participants voluntarily provided informed consent prior to responding to the survey. The questionnaire included the purpose of the study and other relevant information, and participants were assured that the information collected would remain confidential.

RESULTS

Descriptive Results

Table 1 presents the characteristics of the study participants. The average age was 39.1 years, with a predominance of women participants. Nearly half of the participants were nurses with over 10 years of experience. The mean stigma scores were generally low across all sub-variables, showing only minor variations (a lower score indicates higher stigma). Additionally, the data revealed an even distribution around the mean value (mode=mean), suggesting that health workers continue to harbor significant stigma towards HIV/AIDS. The subsequent sections detail the results from the measurement and structural model evaluations using PLS-SEM.

Reflective Measurement Model Analysis (Outer Model)

The results of the PLS-SEM analysis for the latent variable measurement model, which includes HIV-related stigma, perceptions regarding HIV/AIDS, knowledge, professional ethics, and institutional support, indicate generally high reliability values ($\lambda > 0.7$) for each indicator. This suggests that the indicators are robust and can be retained in the model. However, the reliability of one indicator under perceptions regarding HIV/AIDS, specifically perceived contagiousness, is moderate ($\lambda = 0.446$). Despite this, the indicator can still be considered valid for the model because it demonstrates good internal consistency reliability ($\rho_c > 0.70$) and adequate convergent validity ($AVE > 0.50$). Conversely, the reliability value for the institutional support indicator, specifically rewards and punishments, is low ($\lambda = 0.446$) and therefore should be removed from the model. Furthermore, all constructed indicators are confirmed as valid for measuring latent variables, as evidenced

Table 1. Characteristics of health workers in West Sumatra, Indonesia (n=283)

Characteristics	n (%)
Age (y)	
Mean \pm SD	39.1 \pm 9.1
21-30	59 (20.8)
31-40	101 (35.7)
41-50	84 (29.7)
51-60	39 (13.8)
Gender	
Men	25 (8.8)
Women	258 (91.2)
Occupation	
Physician/dentist	55 (19.4)
Midwife	76 (26.9)
Nurse	140 (49.5)
Other health-related occupation	12 (4.2)
Work experience (y)	
< 1	33 (11.7)
1-5	47 (16.6)
6-10	35 (12.4)
> 10	168 (59.4)
HIV-related stigma mean \pm SD/median (Min-Max)	
Stereotype	22 \pm 5/22 (9-35)
Prejudice	37 \pm 8/38 (18-55)
Discrimination	72 \pm 8/73 (37-90)

SD, standard deviation; Min, minimum; Max, maximum.

by satisfactory results in the discriminant validity assessment. This is demonstrated by each indicator's λ value in the cross-loadings being greater than the λ values of indicators for other latent variables. Details are provided in Table 2.

Structural Model Estimation Analysis (Inner Model)

The path coefficient results from the PLS-SEM model, which describe the direct correlations between various factors and HIV-related stigma, are presented in Table 3. The findings indicate that all variables are significantly and directly correlated with HIV-related stigma ($p < 0.01$). Furthermore, the estimated path coefficient value is near +1, suggesting that perceived HIV, knowledge, professional ethics, and institutional support positively and significantly influence HIV-related stigma.

The path coefficient results from the PLS-SEM model reveal correlations among knowledge, professional ethics, and institutional support in relation to HIV-related stigma, with perceived HIV serving as a mediating variable. The analysis indi-

Table 2. Evaluation of the PLS-SEM measurement model

Construct	Outer loading	Composite reliability	AVE	Cross loadings					Description
				K	PE	IS	P	S	
K		0.858	0.602						
Basic knowledge	0.779			0.779	0.211	0.308	0.351	0.389	Valid
Prevention	0.741			0.741	0.139	0.263	0.337	0.360	Valid
Transmission routes	0.793			0.793	0.264	0.198	0.313	0.453	Valid
Treatment	0.790			0.790	0.280	0.301	0.437	0.414	Valid
PE		0.895	0.631						
Accountability	0.748			0.256	0.748	0.323	0.117	0.165	Valid
Self-awareness	0.795			0.356	0.795	0.224	0.170	0.242	Valid
Motivation	0.835			0.231	0.835	0.291	0.158	0.214	Valid
Self-confidence and self-control	0.821			0.134	0.821	0.208	0.158	0.203	Valid
Interpersonal communication	0.770			0.133	0.770	0.251	0.091	0.118	Valid
IS		0.703	0.501						
Support facilities	0.571			0.173	0.416	0.563	0.152	0.230	Valid
Workload	0.796			0.293	0.089	0.803	0.163	0.345	Valid
Rewards and punishments	0.150								Eliminated
P of HIV/AIDS		0.782	0.502						
Perceived contagiousness	0.800			0.414	0.211	0.216	0.800	0.428	Valid
Perceived seriousness	0.446			0.197	0.142	0.100	0.447	0.258	Valid
Perceived responsibility	0.716			0.285	0.114	0.195	0.718	0.319	Valid
Norm violating behavior	0.763			0.354	0.028	0.096	0.758	0.337	Valid
S		0.798	0.569						
Stereotype	0.740			0.425	0.212	0.404	0.305	0.746	Valid
Prejudice	0.781			0.353	0.152	0.177	0.484	0.778	Valid
Discrimination	0.742			0.399	0.194	0.366	0.330	0.741	Valid

PLS-SEM, partial least squares structural equation model; AVE, average variance extracted; K, knowledge; PE, professional ethics; IS, institutional support; P, perceptions; S, HIV-related stigma; HIV, human immunodeficiency virus.

cates a significant indirect relationship between knowledge and stigma, mediated by perceived HIV ($\rho=0.128$, $p<0.05$). However, the relationships between professional ethics and stigma, as well as between institutional support and stigma—with perception as the mediating variable—were not significant ($\rho=0.009$ and 0.019 , respectively; $p>0.05$). These findings are presented in Table 3.

The modified path model, with non-significant paths removed, was re-estimated to obtain accurate model evaluation values. The results of this re-estimation are shown in Table 3 and Figure 1. Among health workers, the direct relationship between knowledge and stigma is stronger than the indirect relationship through perception. This is evidenced by the coefficient value of the direct relationship ($\beta=0.296$) being more significant than that of the indirect relationship ($\beta=0.138$), with a p -value of 0.001 .

Table 4 presents the results of the PLS-SEM modified path

model, which includes evaluations of the VIF, effect size (f^2), and the coefficient of determination (R^2). All latent variables have VIF values below 5, suggesting that they are suitable for retention in the model. The effect size (f^2) assesses the impact of exogenous variables on endogenous variables. In this model, effect size (f^2) is used to evaluate how the variables of perceived knowledge, professional ethics, and institutional support contribute to HIV/AIDS-related stigma. The analysis shows that knowledge and professional ethics have a significant impact ($f^2 \geq 0.15$), whereas perception and institutional support have a lesser impact on HIV-related stigma ($f^2 \geq 0.02$). The coefficient of determination (R^2) for the health worker stigma variable is 0.408 , indicating that knowledge, professional ethics, institutional support, and perception collectively explain 40.8% of the variance in stigma. Additionally, the R^2 value for the perceived variable is 0.217 , demonstrating that the knowledge variable alone accounts for 21.7% of the variance in perception (Figure 1).

Table 3. Path coefficient values for direct and indirect relationships in the PLS-SEM model

Models	Path coefficient	p-value
PLS-SEM model		
Direct relationship		
Perceptions→HIV-related stigma	0.295	0.001
HIV knowledge→HIV-related stigma	0.291	0.001
HIV knowledge→Perceptions	0.434	0.001
Professional ethics→Perceptions	0.030	0.648
Professional ethics→HIV-related stigma	0.501	0.026
Institutional support→Perceptions	0.064	0.314
Institutional support→HIV-related stigma	0.240	0.001
Indirect relationship		
HIV knowledge→Perceptions→ HIV-related stigma	0.128	0.001
Professional ethics→Perceptions→ HIV-related stigma	0.009	0.660
Institutional support→Perceptions→ HIV-related stigma	0.019	0.328
PLS-SEM modified path model		
Direct relationship		
HIV knowledge→Perceptions	0.466	0.001
HIV knowledge→HIV-related stigma	0.296	0.001
Professional ethics→HIV-related stigma	0.535	0.015
Institutional support→HIV-related stigma	0.255	0.001
Perceptions→HIV-related stigma	0.297	0.001
Indirect relationship		
HIV knowledge→Perceptions→ HIV-related stigma	0.138	0.001

PLS-SEM, partial least squares structural equation model; HIV, human immunodeficiency virus.

DISCUSSION

HIV-related stigma in health services must be addressed. It is crucial to identify the factors influencing HIV/AIDS stigma from the perspective of health workers, as this is a key strategy in reducing stigmatizing behavior within health services. This study identified several significant factors that directly correlate with the occurrence of HIV-related stigma, including perceived stigma, level of knowledge, professional ethics, and institutional support. These factors are considered the primary predictors of stigmatizing behavior among health workers. Additionally, our findings reveal an indirect correlation between the level of knowledge and the degree of stigmatization, with perceived stigma acting as a mediating factor. This suggests that stigma may originate from perceptions, which are the initial predictive factors that can lead to emotional re-

actions such as stereotyping and prejudice, and subsequently to discriminatory behavior in service delivery that adversely affects PLHIV. Many individuals harbor unrealistic beliefs about HIV transmission, viewing it as a deadly disease linked to sexual behavior that breaches societal norms and attributing it to past actions that contravene religious teachings [8-10,23].

The second significant predictor was HIV-related knowledge. The perceived fear of HIV transmission stems from a lack of knowledge and is linked to misconceptions about how HIV is transmitted. This fear often leads health workers to avoid contact with HIV/AIDS patients as much as possible, which is indicative of stigmatization [10,11,24,25].

The third significant predictor of stigmatization is the factor of professional ethics. Our findings indicate that the application of health workers' professional ethics, evaluated in terms of accountability, self-awareness, motivation, trust, self-control, and interpersonal communication, positively influences the reduction of stigma. The final predictive factor identified in this study is institutional support, which includes supporting facilities, infrastructure, and division of workload. This finding is corroborated by previous research, which demonstrates that greater perceived institutional support correlates with fewer discriminatory intentions toward PLHIV in the workplace [26].

These results underscore the need to evaluate and improve healthcare workers' knowledge, encompassing their grasp of professional knowledge, policies, best practices, standards, and clinical procedures pertinent to healthcare professional ethics. Interventions aimed at reducing stigma often concentrate solely on boosting general knowledge, neglecting the importance of more specialized knowledge [27-30]. Additionally, it is crucial to acknowledge that ethical breaches can impinge on patients' rights. Therefore, heightened professionalism is anticipated to reduce stigma and discrimination in healthcare settings [26]. In this regard, institutional support is vital to ensure that health workers have access to adequate facilities and equipment necessary for preventing workplace transmission, including sterile hand practices, personal protective equipment, and HIV testing availability. This support can alleviate anxiety associated with HIV infection and mitigate discriminatory attitudes towards PLHIV [31]. It is important to highlight that the enforcement of professional ethical standards is measured by the degree to which health workers internalize and adhere to these standards, thereby ensuring they practice non-stigmatization towards PLHIV.

This study demonstrates that stigma associated with HIV/

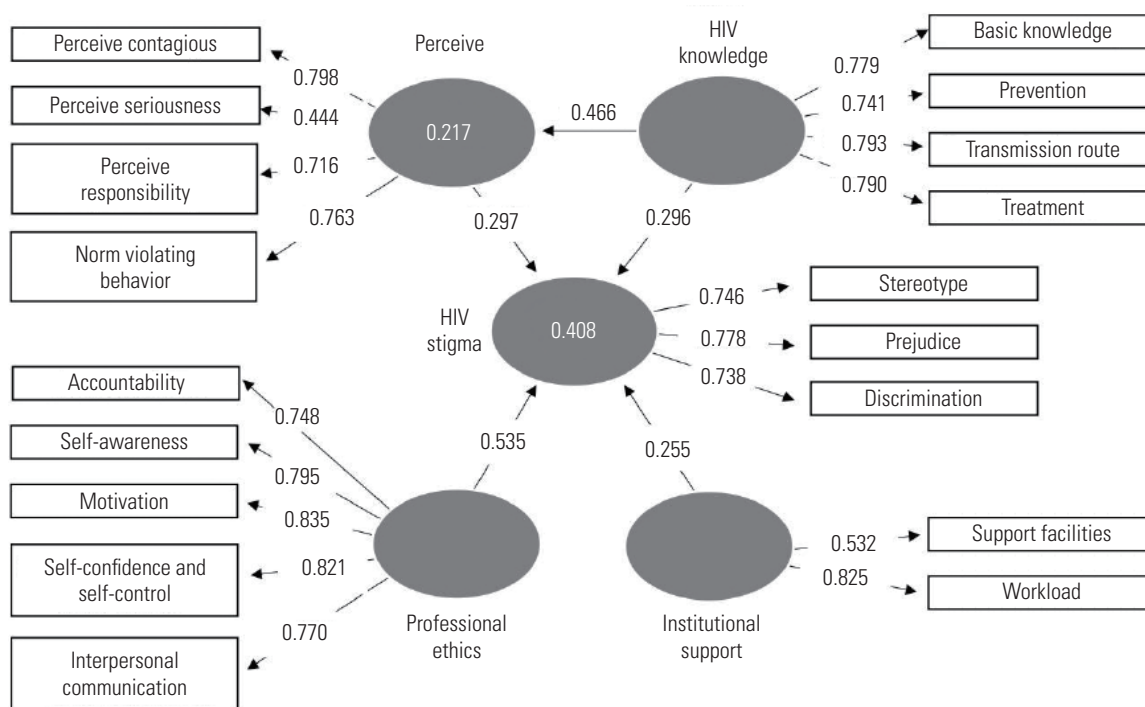


Figure 1. Diagram of the partial least squares structural equation model modified path model. HIV, human immunodeficiency virus.

Table 4. Structural model evaluation of the modified PLS-SEM path model

Construct	VIF value		Effect size (f^2)		R^2 -value
	Perceptions	HIV-related stigma	Perceptions	HIV-related stigma	
VIF of the structural model					
HIV knowledge	1,000	1.386	-	-	-
Professional ethics	-	1.231	-	-	-
Institutional support	-	1.142	-	-	-
Perceptions	-	1.285	-	-	-
Effect size (f^2)					
HIV knowledge	-	-	0,277	0.107	-
Professional ethics	-	-	-	0.207	-
Institutional support	-	-	-	0.096	-
Perceptions	-	-	-	0.116	-
Coefficient of determination (R^2)					
Perceptions	-	-	-	-	0.217
HIV-related stigma	-	-	-	-	0.408

PLS-SEM, partial least squares structural equation model; VIF, variance inflation factor; HIV, human immunodeficiency virus.

AIDS is prevalent in healthcare settings. Our structural model indicates that high perceptions of HIV, insufficient knowledge, weak professional ethics, and a lack of institutional support contribute to elevated levels of HIV/AIDS-related stigma. Training programs focused on HIV/AIDS are crucial, and the development of policies to protect PLHIV can aid in reducing this

stigma among healthcare workers. Consequently, intervention strategies aimed at diminishing HIV-related stigma in healthcare services should focus on enhancing knowledge, reinforcing professional ethics, bolstering institutional support, and implementing necessary changes. It is hoped that these efforts will foster a more inclusive and supportive care environment

for PLHIV and promote care practices among health workers that are both more empathetic and free of stigmatization.

NOTES

Conflict of Interest

The authors have no conflicts of interest associated with the material presented in this paper.

Funding

None.

Acknowledgements

None.

Author Contributions

Conceptualization: Triana V, Effendi N. Data curation: Triana V. Formal analysis: Triana V, Devianto D. Funding acquisition: None. Methodology: Triana V, Sri Pra Hastuti B. Project administration: Semiarty R. Writing – original draft: Triana V, Ilmiawati C, Afrizal A, Bachtiar A, Raveinal R, Effendi N, Sri Pra Hastuti B, Devianto D, Semiarty R. Writing – review & editing: Triana V, Ilmiawati C.

ORCID

Vivi Triana <https://orcid.org/0009-0006-6190-9754>
Nursyirwan Effendi <https://orcid.org/0000-0001-9714-9968>
Brian Sri Pra Hastuti <https://orcid.org/0009-0000-1012-5083>
Cimi Ilmiawati <https://orcid.org/0000-0001-5743-3331>
Dodi Devianto <https://orcid.org/0000-0003-0360-8604>
Afrizal Afrizal <https://orcid.org/0000-0002-8315-056X>
Adang Bachtiar <https://orcid.org/0000-0003-3321-9757>
Rima Semiarty <https://orcid.org/0000-0002-4255-8729>
Raveinal Raveinal <https://orcid.org/0009-0006-0841-1324>

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