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Meta-Analysis
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The Social Face of Stigma: A Meta-Analysis of Gender, Support, and Living Environment in HIV/AIDS Perception

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ABSTRACT

Background: The stigma of society towards people living with HIV/AIDS (PLWH) itself is influenced by various factors, where there are three factors that can be used as a benchmark, namely gender, place of residence, and social support. This study aims to estimate the magnitude of the influence of gender, social support, and housing on stigma in people living with HIV/AIDS, based on the results of a number of previous primary studies.
Subjects and Method: This study is a meta-analysis and systematic review study, with PICO, Population: people living with HIV/AIDS (PLWH), Intervention: Women, low social support and village dwelling, Comparison: men, high social support and urban dwelling, Outcome: HIV/ AIDS stigma. Primary study searches used electronic databases: PUBMED, BMC, Scopus, and ScienceDirect published from 2012 to 2022. The keywords used are "people living with HIV" AND "gender" AND "social support" AND "residence" AND "perceived stigma HIV, cross-sectional". There are 9 English full-text articles with effect size using adjusted odds ratio from 2012 to 2022. Articles selected with PRISMA Flow and analyzed using RevMan 5.3.
Results: This meta-analysis was conducted on 9 primary studies from India and Ethiopia with a sample = 14,191 HIV/AIDS patients. This study showed that the risk of stigma perception increased with female sex (aOR=1.35; CI 95%=0.75 to 2.46; p=0.320; I^2=91%) and rural housing (aOR=1.49; CI 95%=0.89 to 2.47; p=0.130), but it is not statistically significant. The risk of stigma perception decreased with high social support (aOR=0.53; CI 95%=0.32 to 0.90; p=0.020), and the results are statistically significant.
Conclusion: The risk of stigma perception increases with female gender, rural housing, and high social support.

Keywords: Gender, social support, residence, perceived stigma.

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BACKGROUND

Human Immunodeficiency Virus (HIV) is a virus that infects white blood cells which causes a decrease in human immunity so that it is very easy to be infected with various types of other diseases. The World Health Organization (WHO) (2021) shows data on the incidence of HIV/AIDS in 2020 in the world as many as 37.7 million cases, of which the number of new infections is 1.5

million cases, and deaths due to HIV/AIDS are 680,000 cases. Based on data from the Ministry of Health of the Republic of Indonesia (2021), the estimated number of people living with HIV/AIDS in Indonesia in 2020 is 543,100 people with the number of new infection cases of 29,557 people and the number of deaths as many as 30,137 people (Ministry of Health of the Republic of Indonesia, 2021).

The increase in the number of deaths due to HIV/AIDS is often caused by the very complex problem of HIV/AIDS, so that PLWH often receive a bad stigma from society (Maharani, 2014). The stigma that PLWH often receives is reflected in negative attitudes, such as excessive feelings of fear and experiences that do not apply to PLWH. The stigma received by PLWH harms HIV/AIDS prevention and control programs (Asra et al. 2020). The stigma of society towards PLWH itself is influenced by various factors, where three factors can be used as a benchmark, namely gender, place of residence, and social support.

First, gender factors can affect the community's stigma towards PLWH. Research shows that community stigma against PLWH is influenced by several factors, including gender involvement. For example, a study in Ethiopia found that female respondents were 2.4 times more likely to be stigmatized than men. Hormonal differences may play an important role and make one more susceptible to gender discrimination. Women may get more stigma because society views them as having had promiscuity at least once in their lives when they were infected with HIV (Chekole and Tarekegn, 2021).

The second factor is the place of residence, the place of residence is the area or area of residence that describes the availability of facilities and health service personnel. Several studies have shown the influence of housing on stigma. Such as a study conducted in Ethiopia, which showed that the area of residence has a statistically meaningful relationship with the existence of stigma. The possibility of stigma among rural residents is greater than that of urban residents. It may also be due to a lack of knowledge about HIV (Adane et al., 2020).

The third factor of social support, social support has the greatest influence on the occurrence of stigma on PLWH. Social support helps individuals to cope with stress, either directly or indirectly. Social support means the acceptance of parents or a group of people towards an individual who creates the perception that he or she is loved, cared for, valued, and helped. HIV patients who had more social support in terms of emotional and information had lower levels of HIV-related stigma, while compassion support was positively associated with HIV-related stigma. Emotional support is closely related to the struggle of HIV patients to change negative experiences, which allows patients to improve their mental status and reduce HIV-related stigma (Yang et al., 2020). This study aims to estimate the magnitude of the influence of gender, social support, and housing on the perception of stigma in people living with HIV/ AIDS, based on the results of several previous primary studies.

SUBJECTS METHOD

1. Study Design

The type of data used in this study was collected with a quantitative approach, with a cross-sectional design. This research was carried out from September to October 2024. The location of this research was carried out in Surakarta, Central Java, Indonesia. This study uses meta-analysis and a systematic review. Article searches were conducted in several electronic databases, PUBMED, BMC, Scopus, and SciDirect. The

keywords used were "people living with HIV AND "gender" AND "social support" AND "residence" AND "perceived HIV stigma, cross-sectional". The search for articles was carried out by considering the eligibility criteria defined using the PICO (Population, Intervention, Comparisons, Outcome) model. Population: PLWH. Interventions: Gender (Women), Social Support (High), and Residence (Rural). Comparison: Gender (Male), Social Support (Low), and Residence (Urban).

2. Steps of Meta-Analysis

1) Create research questions using the PICO format, which involves defining the Population, Intervention, Comparison, and Outcome.
2) Search electronic and non-electronic databases.
3) Conduct a screening process to establish criteria for inclusion and exclusion, followed by a thorough critical assessment.
4) Gather data from the primary studies and compile effect estimates using the RevMan application.
5) Analyze the findings and formulate conclusions based on the interpreted results.

3. Inclusion Criteria

This research article is a complete paper in English with a cross-sectional study design that analyzes stigma in PLWH. The multivariate analysis used is adjusted to the Adjusted odds ratio (aOR) and confidence interval (CI) of 95%. The subjects of the study were adults. The year range of the article used is 2012-2022.

4. Exclusion Criteria

Articles published other than in English, results that are not perception of stigma in people with HIV/AIDS, and articles published before 2012.

5. Operational Definition of Variables

HIV/AIDS stigma: is a social behavior that discredits in a certain way to PLWH. Stigma refers to the process of psychological acceptance of negative behaviors and stereotypes, and incorporates them into a self-concept that contains negative self-esteem, interpersonal insecurities, and the disclosure of wisdom.

Gender: is a biological attribute that distinguishes the subject as male, female, and intersex. sexual characteristics are not limited to the reproductive organs.

Social Support: is the support that individuals receive from certain people that makes the recipient feel cared for, loved and appreciated, both in material and non-material forms.

Place of Residence: is the area of residence, describing the availability of facilities and health service personnel. In general, urban areas have more information and health facilities compared to rural areas. Shelter also has an impact on the perception of HIV stigma, as there are differences between urban and rural areas.

6. Study Instruments

Primary studies will be screened with critical assessments to determine eligibility. The assessment instrument used the Critical Appraisal cross-sectional study for Meta-Analysis Research published by the Master of Public Health Program, Sebelas Maret University of Surakarta (2023).

7. Data Analysis

Data processing was carried out using Review Manager (RevMan 5.3) by entering the adjusted odds ratio (aOR) value to determine the combined study model and form the final result of the meta-analysis. Forest plots and funnel plots are used to determine the relationships and heterogeneity of data.

RESULTS

The article search process was carried out using 4 online databases, namely PUBMED, BMC, Scopus, and ScienceDirect, and the results obtained were 9 articles, according to

the PRISMA diagram Figure 1. The related article review process can be seen in the PRISMA diagram in Figure 1. Research related to the perception of stigma in people living with HIV/AIDS consisted of 1,640 articles from the search process; the process of deleting articles resulted in 1,009 articles, then the selection of eligible articles was carried out, so in 9 articles that were included in the meta-analysis research. Articles obtained from India and Ethiopia.

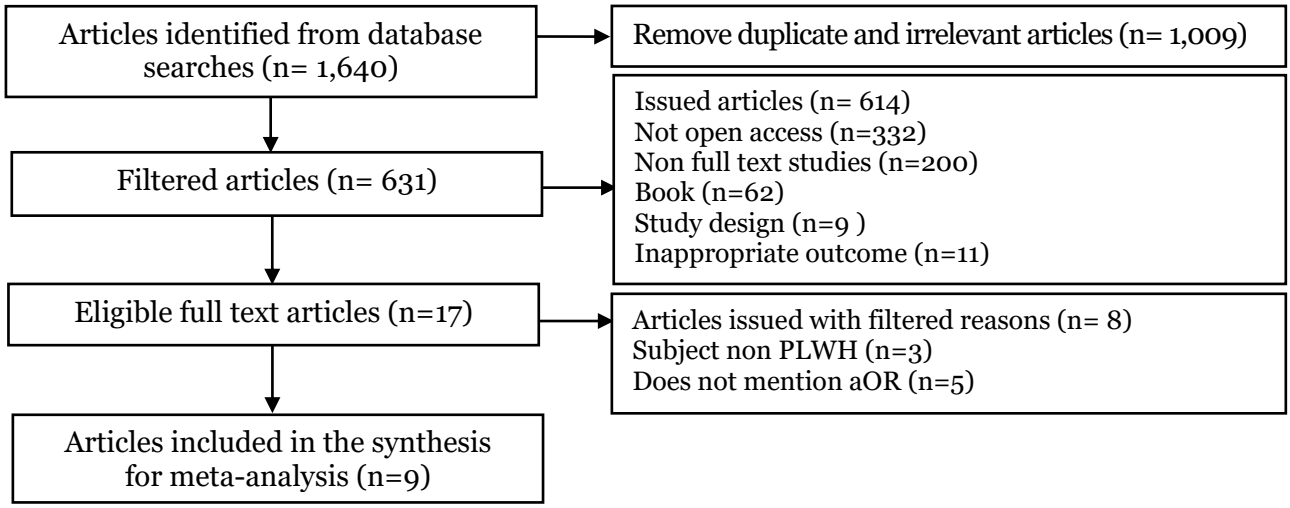

Figure 1. PRISMA flowchart diagram of the influence of gender, social support, and housing on the perception of stigma in PLWH

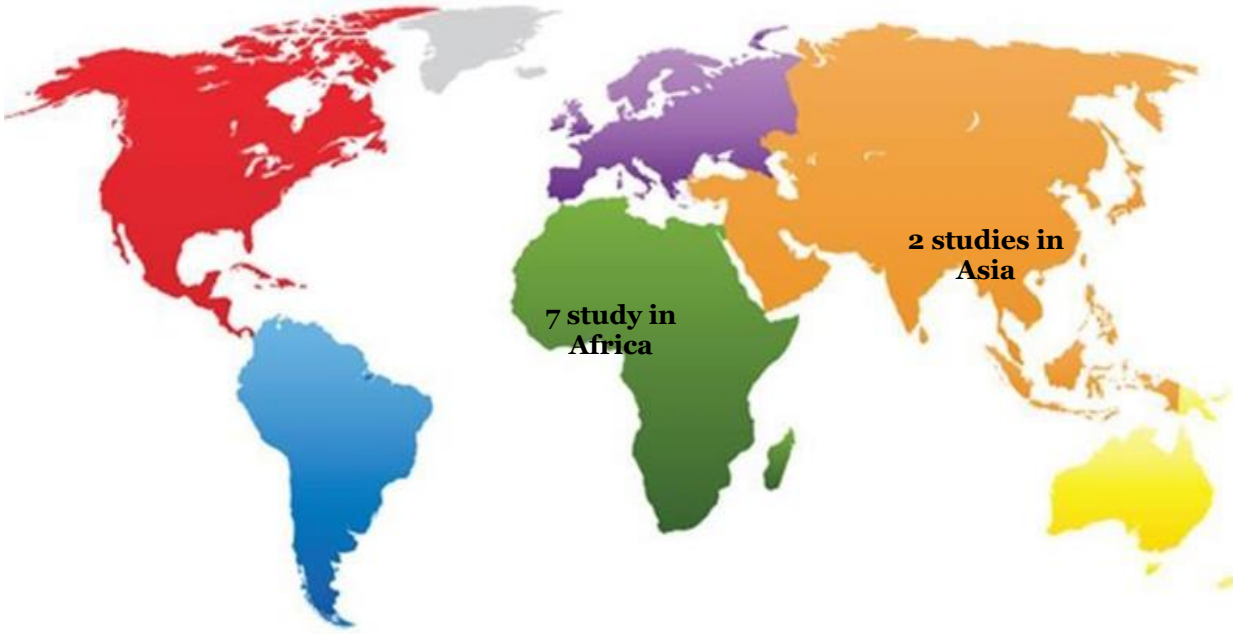

Figure 2. Distribution map of the study of the influence of gender, social support, and place of residence on the perception of stigma in PLWH

Figure 2 shows that the research article comes from 2 continents, namely the African continent and the Asian continent. Each of the 7 articles from the African continent is

located in Ethiopia, and 2 articles from the Asian continent are located in India.

Table 1. Critical Appraisal for cross-sectional studies in meta-analysis

Primary Study	Criteria													Total
	1a	1b	1c	1d	2a	2b	3a	3b	4	5	6a	6b	7	
Alemu et al. (2022)	2	2	2	2	0	2	2	2	1	2	2	2	2	23
Ajong et al. (2018)	2	2	2	2	0	2	2	2	2	2	2	2	2	24
Charles et al. (2012)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Adane et al. (2020)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Turi et al. (2021)	2	2	2	2	0	2	2	2	2	2	2	2	1	23
Peltzer and Pengpid (2019)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Melis et al. (2020)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Chowdhury and Chakrabort (2017)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Chekole and Tarekegn (2021)	2	2	2	2	2	2	2	2	1	2	0	2	2	23

Description of the question criteria:

1. Formulation of research questions in the acronym PICO.
a. Is the population in the primary study the same as the population in the PICO meta-analysis?
b. Is the operational definition of exposure/ intervention in the primary study the same as the definition intended in the meta-analysis?
c. Are the comparisons used in the primary study the same as those planned in the meta-analysis?
d. Are the outcome variables studied in the primary study the same as those planned in the meta-analysis?
2. Methods for selecting research subjects.
a. Descriptive cross-sectional studies (prevalence): Were the samples randomly selected?
b. Cross-sectional analytical studies: Are the samples randomly selected or purposive?
3. Methods for measuring interventions and outcome variables
a. Are exposures/interventions and outcome variables measured with the same instruments in all primary studies?
b. If the variables are measured on a categorical scale, are the cutoffs or categorical used the same between primary studies?
4. Design-related bias
a. What is the Response Rate?
b. Is non-response related to outcome?
5. Methods to control confounding
a. Is there any confusion in the results/ conclusions of the primary study?
b. Have primary study researchers used the right methods to control the effects of confusion?
6. Statistical analysis methods
a. In cross-sectional studies, is a multivariate analysis performed? Multivariate analysis includes multiple linear regression analysis, multiple logistic regression analysis, and Cox regression analysis.
b. Do primary studies report effect measures or relationships of multivariate analysis outcomes? (for example, adjusted OR, adjusted regression coefficient).
7. Conflict of Interest
a. Is there a conflict of interest with the research sponsor?
b. If there is a conflict of interest, give it a value of "0".
c. If there is no conflict of interest, give it a grade of "2".
d. When in doubt, give it a "1".

The assessment instructions are as follows:

1. The total answer score for each question is "2".
2. If in one question all answer items are "Yes", then give a score of "2" to the question.
3. If there is one item in one question whose answer is "No", then give the question a score of "1".
4. If in one question all the answer items are "No", then give the question a score of "0".
5. If the total score = 14, then the primary study can be used in the meta-analysis.
6. If the total score is <14, then the primary study cannot be used in the meta-analysis

Table 2. Description of PICO with a Cross-sectional article on stigma perception of people living with HIV/AIDS with sample number (n=13,861)

Author (Year)	Country	Sample	P	I	C	O
Charles et al. (2012)	South India	400	PLHA	High social support	Low social support	Perceived stigma
Chowdhury and Chakraborty (2017)	North India	400	Adult PLHIV	Female, rural	Male, urban	Perceived stigma
Ajong et al. (2018)	North West Region of Cameroon	308	PLHIVA on ART Patient	Rural	Urban,	Perceived Stigma
Peltzer and Pengpid. (2019)	South Africa	10,473	PLHIV	Female, high social support, rural	Male, low social support Urban	Percieved Stigma
Melis et al. (2020)	Southern Ethiopia	399	ART Patient	Female	Male	Perceived stigma
Adane et al. (2020)	Ethiopia	422	PLHIV	Female, rural	Male, urban	Perceived stigma
Chekole and Tarekegn (2021)	Ethiopia	403	ART Patient	Female	Male	Perceived stigma
Turi et al. (2021)	Western Ethiopia	418	PLWHA	Female, high social support, rural	Male, low social support, urban	Perceived stigma
Alemu et al. (2022)	Southern Ethiopia	638	PLWHA	High social support, rural	Low social support, urban	Perceived stigma

a. Effect of gender on stigma in people living with HIV/ AIDS

The figure above presents a forest plot about the influence of gender on the perception of stigma in PLWH. The forest plot shows that there is an influence of gender on the perception of stigma in PLWH. Female PLWH had a 1.35-fold risk of stigma compared to male PLWH, but the difference was statistically insignificant (aOR=1.35, 95% CI=0.75 to 2.46; p=0.320).

The forest plot also showed that there was a high heterogeneity of the estimated effect between studies (I^2 = 91%). Thus, the calculation of the average effect estimate is carried out using the random effect model approach.

Table 3. Adjusted Odds Ratio (aOR) data and 95% CI of gender influence on stigma in people living with HIV/AIDS

Author (year)	aOR	95% CI	
		Lower Limit	Upper Limit
Chowdhury and Chakraborty (2017)	0.17	0.09	0.32
Peltzer and Pengpid (2019)	1.32	1.16	1.50
Melis et al. (2020)	2.50	1.41	4.43
Adane et al. (2020)	2.08	1.26	3.43
Chekole and Tarekegn (2021)	2.36	1.28	4.35
Turi et al. (2021)	2.10	1.15	3.83

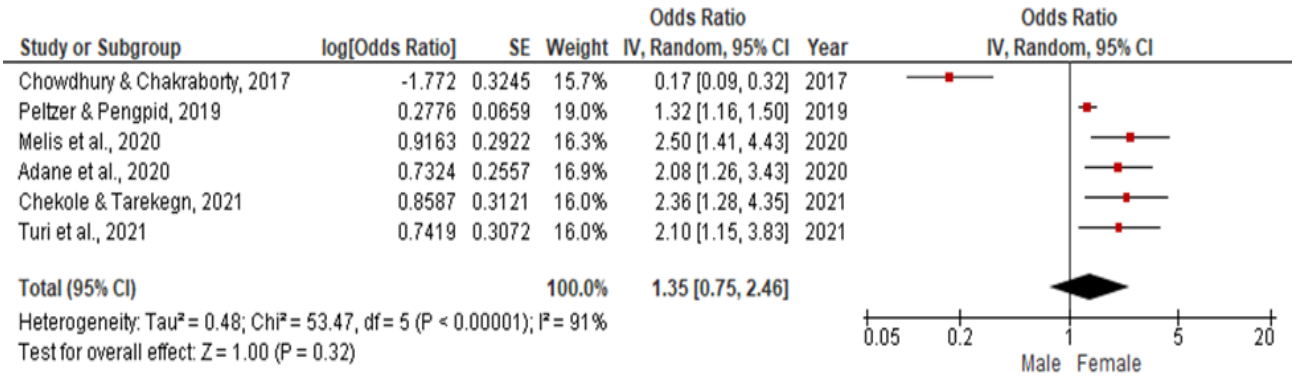

Figure 3. Forest plot of the effect of gender on stigma in PLWH patients

Figure 4 presents a funnel plot about the influence of gender on the perception of stigma in PLWH. The funnel plot shows more effect estimation distribution to the right than to the left of the effect estimation vertical line, thus indicating that there is a publication bias. Because the distribution in the funnel plot image is more located to the right of the same average as the location of the diamond shape image in the forest plot image which is also located to the right of the vertical line of the null hypothesis, the publication bias tends to overestimate the actual effect (overestimate).

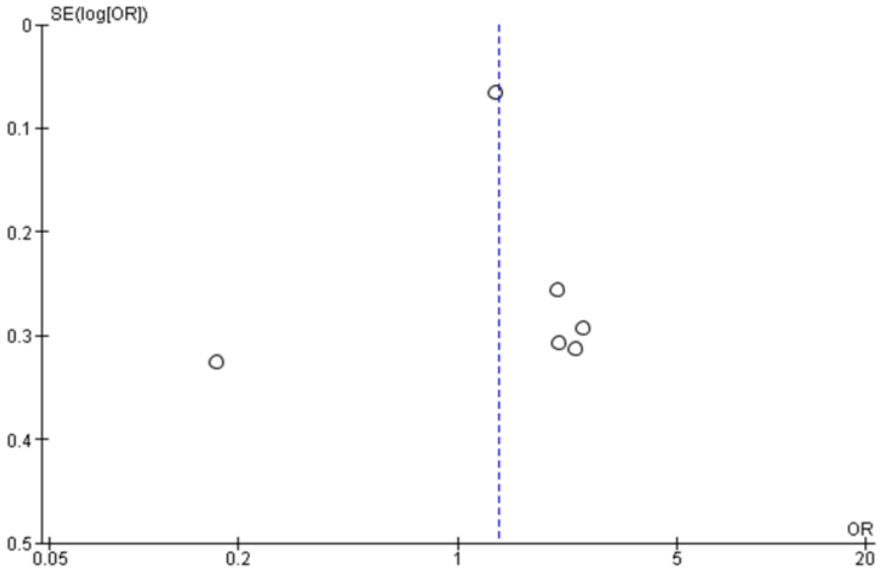

Figure 4. Funnel plot of the influence of gender on stigma in PLWH

b. Effect of social support on stigma in people living with HIV/AIDS

Figure 5 presents a forest plot about the influence of social support on the perception of stigma in PLWH. The forest plot shows that there is an influence of social support on the perception of stigma in PLWH. PLWH with high social support lowered the risk of stigma by 0.53 times compared to low social support and the difference was statistically significant (aOR= 0.53, 95% CI= 0.32 to 0.90; p=0.020). The forest plot also showed that there was a high heterogeneity of the estimated effect between studies (I^2= 79%). Thus, the calculation of the average effect estimate is carried out using the

random effect model approach.

Table 4. Adjusted Odds Ratio (aOR) data and CI 95% effect of social support on stigma perception in people living with HIV/AIDS

Author (year)	aOR	95% CI	
		Lower Limit	Upper Limit
Charles et al. (2012)	0.52	0.25	1.08
Peltzer and Pengpid (2019)	0.86	0.77	0.96
Turi et al. (2021)	0.28	0.13	0.60
Alemu et al. (2022)	0.48	0.29	0.79

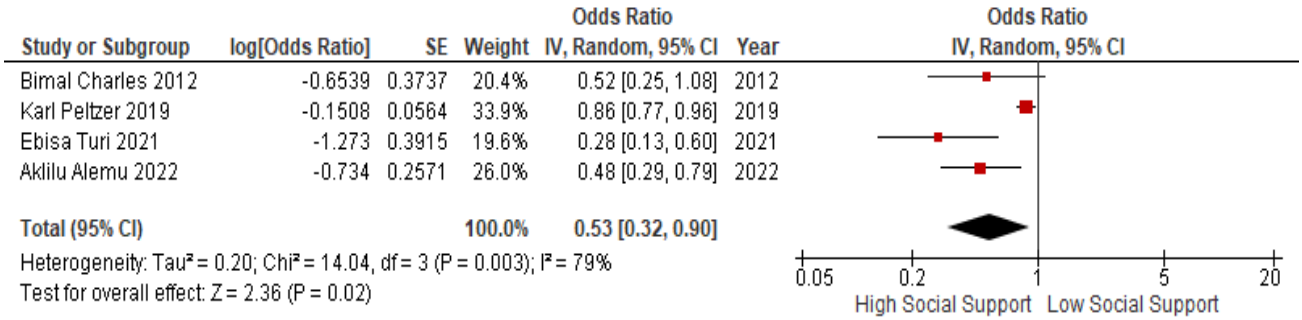

Figure 5. Forest plot of the effect of social support on stigma in PLWH

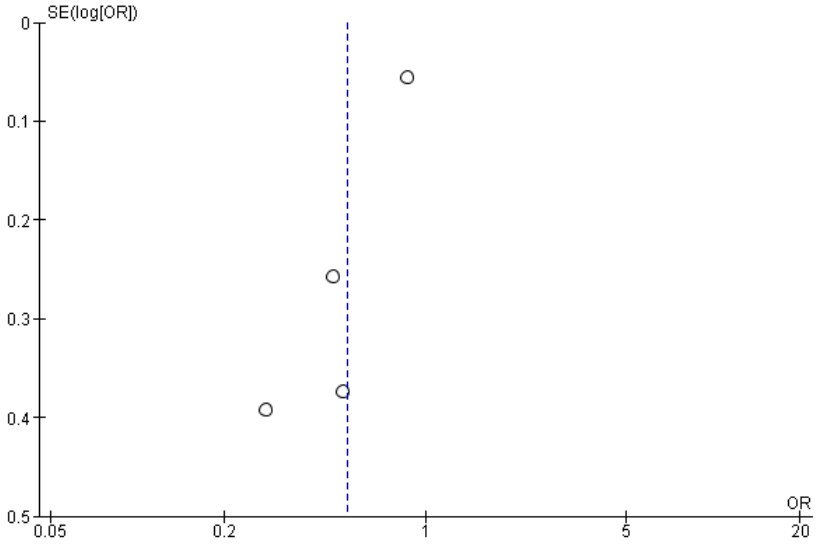

Figure 6. Funnel plot of the effect of social support on stigma in PLWH

Figure 6 presents a funnel plot about the influence of social support on the perception of stigma in PLWH. The funnel plot shows a greater distribution of effect estimation on the left than the right vertical line of effect estimation, indicating that there is a publication bias. Because the distribution in the funnel plot image is more located on the left side of the same average as the location of the diamond shape image in the forest plot image which is also located to the left of the vertical line of the null hypothesis, the publication bias tends to overestimate the actual effect (overestimate).

c. Effect of rural living on stigma in people living with HIV/AIDS

Figure 7 presents a forest plot about the determinants of stigma perception in

PLWH. The forest plot shows that there is an influence of rural living on the likelihood of getting stigmatized. PLWH living in rural areas were 1.49 times more likely to be stigmatized compared to those living in urban areas, but the difference was not statistically significant (aOR=1.49; CI 95%=0.89 to 2.47; p=0.130).

The forest plot also showed that there was a high heterogeneity of the estimated effect between studies (I^2=86%). Thus, the calculation of the average effect estimate is carried out using the random effect model approach.

Table 4. Adjusted Odds Ratio (aOR) data and CI 95% of rural residents on stigma perception in people living with HIV/AIDS

Author (year)	aOR	95% CI	
		Lower Limit	Upper Limit
Ajong et al. (2018)	0.74	0.42	1.30
Peltzer and Pengpid (2019)	1.05	0.89	1.24
Chowdhury and Chakraborty (2017)	8.30	4.00	17.22
Adane et al. (2020)	1.80	1.10	2.95
Turi et al. (2021)	0.91	0.44	1.88
Alemu et al. (2022)	1.27	0.75	2.15

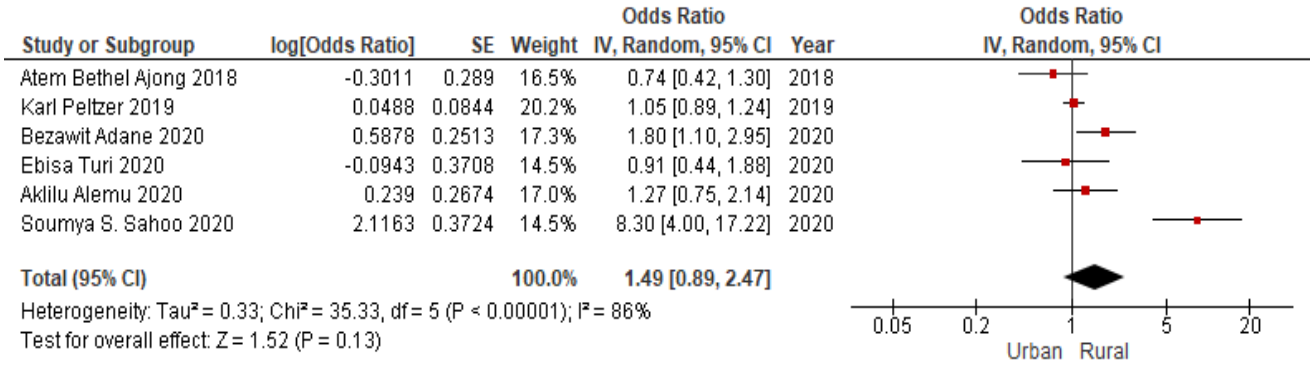

Figure 7. Forest plot of the influence of rural living on stigma in PLWH

Figure 8 presents a funnel plot about the determinants of stigma perception in PLWH. The funnel plot shows a more or less balanced distribution of effect estimates on the right and left of the average vertical line of estimation. Thus, the funnel plot does not indicate any publication bias in this meta-analysis.

DISCUSSION

a. Effect of gender on stigma in PLWH

Female PLWH had a 1.35-fold risk of stigma compared to male genders, however, the difference was statistically significant (aOR= 1.35; 95% CI=0.75 to 2.46; p=0.320). In some studies, it has been found that women are significantly more likely than men to experience HIV/AIDS-related discrimination in their families and communities. It includes the norms, behaviors, and roles associated with the existence of a woman and a man, as well as relationships with each other (WHO, 2020).

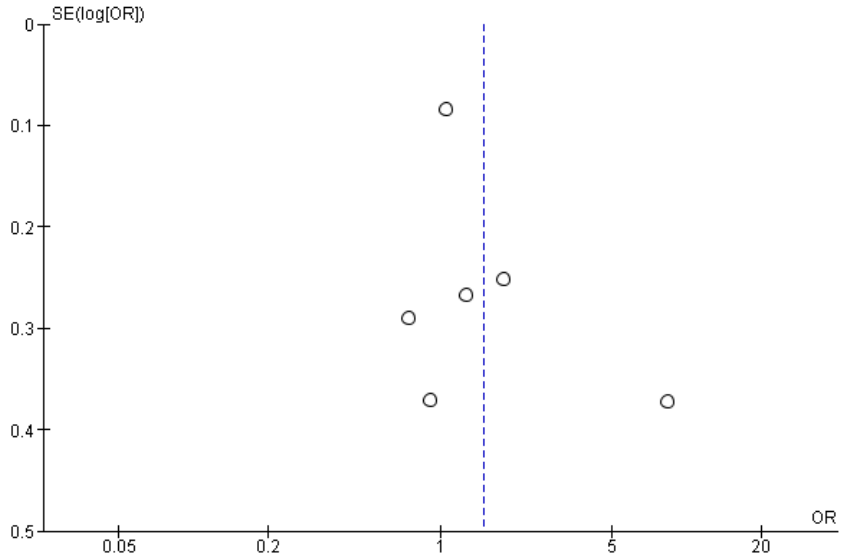

Figure 8. Forest plot of the influence of rural living on stigma in PLWH

The influence of gender on the perception of stigma may be caused by social disparities that make women inferior to men so they receive less support (Subedi et al., 2019). The data showed that the female sex had a 1.35-fold risk of stigma compared to the male sex, and the difference was statistically significant (aOR=1.35; 95% CI=1.20 to 1.51; p=0.001). This research is in line with Turi's (2021) study in Ethiopia that women are twice as likely to experience HIV/AIDS-related stigma compared to men (aOR=2.10; CI 95%=1.15 to 3.82; p= 0.002).

b. Effect of social support on stigma in PLWH

PLWH with high social support had a risk of stigma of 0.53 times compared to low social support, and the difference was statistically significant (aOR=0.53; CI95%=0.32 to 0.90; p=0.020). In some studies, it has been found that the likelihood of HIV/AIDS stigma perception is higher in patients who receive low social support than in patients who receive good social support. This is due to the fact that a higher level of social support gives patients a sense of belonging to feelings of love and affection, so that patients can cope psychologically better compared to people with low social support (Turi et al., 2021).

The data revealed that individuals with high social support had a 0.81 times lower likelihood of experiencing stigma compared to those with low social support, with a statistically significant difference (aOR = 0.81; 95% CI = 0.73 to 0.90; p = 0.001). These findings align with Alemu's (2022) research in Ethiopia, which found that low social support was associated with a higher likelihood of HIV/AIDS-related stigma, being twice as high compared to individuals with high social support (aOR = 2.05; 95% CI = 1.95 to 3.43; p = 0.009).

c. Effect of residence on stigma in PLWH

PLWH living in rural areas were 1.49 times more likely to be stigmatized than those living in urban areas, but the difference was statistically significant (aOR=1.49; CI 95%= 0.89 to 2.47; p=0.13). In some studies, it has been found that the likelihood of HIV /AIDS stigma perception is higher among rural residents than among urban residents. The reason is that beliefs and traditions of customs will increase their impact on rural residents. It may also be due to a lack of

knowledge and awareness about the causes and different misconceptions found in rural residents (Chowdhury and Chakraborty, 2017).

The data showed that rural dwellings were 1.71 times more likely to be stigmatized compared to urban dwellings, and the difference was statistically significant (aOR=1.71; CI 95%=1.02 to 1.34; p=0.03). This research is in line with Sahoo's (2020) research in India shows that rural dwellings experience HIV/ AIDS-related stigma ten times higher than urban dwellings (aOR=0.12; CI 95%= 0.01 to 0.25; p= 0.001).

AUTHORS CONTRIBUTIONS

Indri Nur Utami, Rachael Saraswaty Dewi, and Rizky Nur Aprilianti Amalia acted as authors who chose topics, searched, collected primary studies, and analyzed. Bhisma Murti reviews and reviews research documents.

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CONFLICT OF INTEREST

There is no conflict of interest in this study.

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