

Meta-Analysis the Effect of Residence on the Risk of Anxiety and Depression in General Population during COVID-19 Pandemic

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ABSTRACT

Background: The area of residence is one aspect that affects a person's mental health, especially during the COVID-19 pandemic. The difference in the area of residence determines the frequency of exposure to pandemic information in the form of valid invalid information which is increasingly massive, so that between urban and rural areas there can be a potential risk of depression and anxiety. This study aimed to analyze the effect of residence on the risk of anxiety and depression in the population during the COVID-19 pandemic.

Subjects and Method: The meta-analysis was performed by searching for articles from Google Scholar, Pubmed, and ScienceDiret. The keywords used in the article search were "infodemic social media" AND "rural vs urban areas" AND "gender" AND "depression and anxiety" OR "mental health risk". Other keywords used were "COVID-19 information" AND "residence" AND "mental health" OR "depression and anxiety". The inclusion criteria in this study were full-text articles, 2020-2021, with a cross-sectional study design. Article analysis was performed using RevMan 5.3.

Results: There were 12 articles analyzed, the results showed that the effect of living in an urban area had a 1.47 times risk of experiencing mental health problems in the form of anxiety during the COVID-19 pandemic with a statistically significant result of anxiety (aOR= 1.47; 95% CI= 1.18 to 1.83) with heterogeneity $I^2 = 96\%$. Then, the effect of residence in urban areas has a 1.53 times risk of experiencing mental health problems in the form of depression during the COVID-19 pandemic with a statistically significant result of depression (aOR= 1.53; 95% CI= 1.25 to 1.86) with heterogeneity $I^2 = 97\%$.

Conclusion: There is a significant effect of living in an urban area on mental health problems such as anxiety and depression during the COVID-19 pandemic.

Keywords: rural vs urban areas, covid-19, mental health, depression and anxiety, general population

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BACKGROUND

The COVID-19 outbreak has caused various health problems among people in different places of residence, especially in the case of health literacy in the form of infodemic (pandemic information) obtained from social media with great risks related to the validity

of information dissemination where this can lead to the risk of experiencing mental health. (Gao et al., 2020). WHO identified the underlying drivers of stress, anxiety and stigma from rumors and invalid information, particularly through social media. Previous research has shown that the infodemic from social media exposure can cause mass trauma and increase stress in society. A previous study also showed that the infodemic from social media exposure may influence the formation of risk perceptions during the MERS outbreak in South Korea (Choi et al., 2017).

A recent study showed that nearly 45% of youth in the US reported an impact on mental health related to psychological problems (Liang et al., 2020). Increased concern about mental health issues was identified as another possible predictor for COVID-19-related fear. During previous psychosocial investigations pandemics, found that morbidity was associated with younger age (Wagas et al., 2020). The pandemic has progressed rapidly and has had an impact on the psychology of society. Previous studies have highlighted the importance of mental and behavioral health screening during a pandemic, which will evaluate the effectiveness of disease prevention. A number of mental health indicators, such as anxiety and worry levels, have been shown to increase during the early stages of the pandemic. Specific health measures are proposed to address, for example, illness-related anxiety or quarantine-related depression (Wenjun et al., 2020).

The disease development research agency is providing the first approach to emotional reactions to the COVID-19 outbreak. Studies from Oxford report that general anxiety has increased in Germany since its inception (Oxford, 2020). The degree of psychological distress is reaching clinical relevance during the COVID-19 pandemic. Xiong et al reported that the general population in China, Spain, Italy, Iran, USA, Turkey, Nepal and Denmark showed high levels of anxiety (6.33%- 50.9%), depression (14.6%-48.3%), posttrauma (7%-53.8%), psychological (34.43% to 38%), and stress (8.1%-81.9%) (Xiong et al., 2020). Multi-national studies examined the relationship between the prevalence of physical and psychological symptoms (Chew et al., 2020).

Brodin et al. (2020) have shown that people's knowledge and behavior is positively correlated with preventive measures related to COVID-19. Better knowledge and constructive behavior will contribute to controlling the pandemic, as well as controlling aspects that trigger mental health. With this in mind, evaluation of knowledge and behavior will help in slowing the spread of the virus (Brodin., 2020).

Considering the differences in health literacy status between urban (urban) and rural (rural) residents, there is a need to clarify the conditions and differences in knowledge, behavior, and mental health of residents in urban and rural environments so as to promote equity in health literacy. Given the importance of knowledge in controlling COVID-19, it is imperative to examine related factors and explore differences between urban and rural areas, to provide evidence-based public health policies and resource allocation in the hope that findings will provide data support for a sustainable future, relatively stable, and effective during the pandemic, and discuss ways to promote cognition so as to develop targeted measures for the prevention of COVID-19 (Zhang et al., 2021).

Meta-analysis is a statistical method carried out by combining the results of several collected studies, as well as measuring and interpreting the relevant degree of heterogeneity by proposing modifications of the method to apply evidencebased results (Berchilla et al., 2021). This study aimed to analyze the effect of residence on the risk of anxiety and depression

in the population during the COVID-19 pandemic.

SUBJECTS AND METHOD

1. Study Design

This study was conducted using a metaanalysis carried out by following the PRISMA flow chart. Meta-analysis was performed by searching articles from electronic databases on Google Scholar, Pubmed, and ScienceDirect. The keywords used in the article search were "infodemic social media" AND "rural vs urban areas" AND "gender" AND "depression and anxiety" OR "mental health risk". Other keywords used were "COVID-19 information" AND "residence" AND "mental health" OR "depression and anxiety".

2. Inclusion Criteria

Inclusion criteria for the articles reviewed were full articles published in English and Indonesian, articles reporting the final results of the study with Adjusted Odds Ratio (aOR) and Confidence Interval (CI) 95% full-text articles with a cross-sectional study design and articles published in 2020-2021.

3. Exclusion Criteria

Exclusion criteria for articles that have been previously meta-analyzed, duplicate articles, and research subjects < 100.

4. Definition of Operational Variable

The search for articles was carried out by considering the eligibility criteria defined using the P (Population) I (Intervention), C (Comparison), O (Outcome) models. The population in this study is the general population for intervention in residential areas in urban areas by comparing residences in rural areas with the aim of seeing the results between urban areas and rural areas that are at risk of experiencing anxiety and depression during the COVID-19 pandemic.

5. Study Instruments

This study uses a data collection instrument in the form of a meta-analysis conducted by following PRISMA flow diagrams.

6. Data Analysis

The data collection stage in this study was to search for published articles that analyzed the effect of residence on the risk of anxiety and depression during the COVID-19 pandemic. The data collection technique in this study consists of identifying articles from reputable journal sites, screening for articles that meet the requirements and conditions according to the criteria set by the researcher so that they are included in the eligibility criteria which will then be analyzed using meta-analysis software which is carried out by following the PRISMA flow. diagrams.

The data analysis process in this study was carried out using RevMan (Review Manager 5.3) to determine the effect size and heterogeneity in this study. The results of data analysis in the meta-analysis are presented in the form of forest plots and funnel plots.

RESULTS

The search process for articles to be used in this meta-analysis was obtained from electronic databases at Google Scholar, Pubmed, and ScienceDiret. The keywords used in the article search were "infodemic social media" AND "rural vs urban areas" AND "gender" AND "depression and anxiety" OR "mental health risk". Other keywords used were "COVID-19 information" AND "residence" AND "mental health" OR "depression and anxiety". The flow of the article search process can be seen in Figure 1.

There are 12 articles with 4 articles from China, 1 article from the United States, 1 article from the United Kingdom, 1 article from France, 1 article from South Korea, 1 article from Bangladesh, 1 article

from India, 1 article from Iran, and 1 article from Ethiopia. The process of searching for articles is carried out by searching through the database according to the PRISMA flow diagram.

From a total of 2,552 articles there were 546 duplicates, articles were filtered to 2,006, 1,967 irrelevant titles, 1,654 irrelevant titles, 273 non-cross-sectional articles, 36 non-full text articles, 36 non-English articles 4, 39 complete and eligible articles, 27 complete articles but excluded with reasons, 10 articles without aOR, 17 articles not relevant to outcome, 12 articles included in the qualitative systematic review, articles included in the study systematic and meta-analysis of 12.



Figure 1. PRISMA flow diagrams The Effect of Residence on the Risk of Anxiety and Depression in the General Population During the COVID-19 Pandemic

Author (Year)	Title	Location	Study Design	Population	Inter- vention	Compa rison	Outcome
Gao	Mental health problems and social media	China	Cross-	4,827 general	urban	rural	Anxiety and
et al. (2020)	exposure during COVID-19 outbreak		sectional	population in China			Depression Risk
Kantor	Mental Health Outcomes and Associations	United	Cross-	1,005 general	urban	rural	Anxiety and
et al. (2020)	During the COVID-19 Pandemic: A Cross-	States	sectional	population in			Depression Risk
	Sectional Population-Based Study in the			United States			
	United States						
Wathelet	Factors Associated with Mental Health	French	Cross-	69,054 students in	urban	rural	Anxiety and
et al. (2020)	Disorders Among University Students in		sectional	French			Depression Risk
	France Confined During the COVID-19						
~ 11	Pandemic	• •	~		-	-	
Sevlin	Anxiety, depression, traumatic stress and	United	Cross-	2,025 general	urban	rural	Anxiety and
et al. (2021)	COVID-19-related anxiety in the UK general	Kingdom	sectional	population in			Depression Risk
1	population during the COVID-19 pandemic	a .1	~	United Kingdom			
Lee et al.	Associations Between COVID-19	South	Cross-	1,049 general	urban	rural	Anxiety and
(2020)	Misinformation Exposure and Belief With	Korean	sectional	population in South			Depression Risk
	COVID-19 Knowledge and Preventive			Korea			
	Benaviors: Cross-Sectional Unline Study	Develade al	0	o= (1	A
Knan et al.	Mental health of young people amidst COVID-	Bangladesh	Cross-	974 general	urban	rural	Anxiety and
(2021)	19 pandemic in Bangladesn		sectional	population in Bongladash			Depression Risk
Shuldo et al	A Moderating Dole of Indian Dural and Urban	India	Cross	baligiauesii	unhan	munal	Anviotiond
	A Moderating Role of Indian Rural and Orban	mula	Cross-	ogi general	urban	rurai	Allxlety allu
(2020)	Various Social Networking Sites and Anviety		sectional	population in mula			Depression Risk
	and Depression during Courid 10						
Shi at al	Browelenes of and Pick Factors Associated	China	Cross	r6 000 gonoral	urbon	mirol	Anvioty and
(2020)	with Mental Health Symptoms Among the	Ciiiia	sectional	50,932 general	urban	Turai	Depression Rick
(2020)	General Population in China During the		sectional	population in China			Depression Kisk
	Coronavirus Disease 2010 Pandemic						
Wang et al	Prevalence of Anxiety and Depression	China	Cross-	11 117 students in	urhan	rural	Anviety and
(2020)	symptom and the Demands for Psychological	Ciinia	sectional	China	urban	iuiui	Depression Risk
(2020)	Knowledge and Interventions in college		sectional	Cimiu			Depression rusk

Table 1. Overview of primary studies meta-analyses of the effect of residence on risk of anxiety and depression in the general population during the COVID-19 pandemic

	students during COVID-19 epidemic: A large Cross-Sectional Study						
Maroufizad	Prevalence of Anxiety and Depression in	Iran	Cross-	5,328 general	urban	rural	Anxiety and
et al.	General Population of Iran during the COVID-		sectional	population in Iran			Depression Risk
(2020)	19 Pandemic: A Web-Based Cross-Sectional						
	Study						
Zhang et	Prevalence of anxiety and depression	China	Cross-	123,768 workers in	urban	rural	Anxiety and
al. (2020)	symptoms, and association with epidemic-		sectional	China			Depression Risk
	related factors during the epidemic period of						
	COVID-19 among 123,768 workers in China:						
	A large cross-sectional study						
Shifera et	The Psychological Impacts During the Initial	Ethiopia	Cross-	845 pastoral	urban	rural	Anxiety and
al. (2020)	Phase of the COVID-19 Outbreak, and its		sectional	population in			Depression Risk
	Associated Factors Among Pastoral			Ethiopia			
	Community in West Omo Zone, South-West						
	Ethiopia, 2020: A Community-Based Study						

1. Forest plot effect of residence on anxiety

Interpretation of the primary results from the meta-analysis, it was found that the effect of residence in urban areas has a 1.47 times risk of experiencing mental health problems in the form of anxiety during the COVID-19 pandemic with a statistically significant result of anxiety (aOR= 1.47; 95% CI= 1.18 to 1.83; p= 0.007) with heterogeneity I^2 =96%.



Figure 2. Forest plot effect of residence on anxiety risk in the general population during the COVID-19 pandemic

2. Funnel plot effect of residence on anxiety

Interpretation of primary results from meta-analysis, the results show that the effect of living in an urban area on depression shows a publication bias as evidenced by the number of 6 plots on the left and 6 plots on the right, which are not balanced, and the distance between plots is not symmetrical.





3. Forest plot effect of residence on depression

Interpretation of the primary results from the meta-analysis, it was found that the effect of living in an urban area has a 1.53 times risk of experiencing mental health problems in the form of depression during the COVID-19 pandemic with a statistically significant result of depression (aOR= 1.53; 95% CI = 1.25 to 1.86; p<0.001) with heterogeneity I^2 = 97%.





4. Funnel plot effect of residence on depression

Interpretation of the primary results from the meta-analysis, it was found that the effect of living in an urban area on depression showed a publication bias as evidenced by the number of 6 plots on the left and 6 plots on the right being unbalanced, and the distance between plots was not symmetrical.



Figure 5. Funnel plot of the effect of residence on depression risk In the general population during the COVID-19 pandemic

DISCUSSION

Place of residence has a major influence on the risk of increasing mental health problems related to the spread of the COVID-19 pandemic. In various countries, control measures have been taken by implementing measures to combat the infodemic by monitoring and filtering out hammer information, as well as promoting accurate information through the collaboration of official services. In China, implementing control measures related to mental health, among others, by providing mental health treatment services including hotlines, online courses, and online consultations (Gao et al., 2020).

This systematic study and metaanalysis raised the topic of the influence of residence on the risk of depression and anxiety during the COVID-19 pandemic. This study is considered important because it strengthens the evidence that predicts and explains the effect of residence on mental health risk in urban and rural areas of residence during the COVID-19 pandemic. The study in this study uses multisectoral collaboration related to controlling the COVID-19 situation, which is a world health problem. This study has controlled the confounding factor which can be seen from the inclusion criteria, namely adjusted odds ratio and 95% Confidence Interval (CI).

The estimates from this meta-analysis were processed using RevMan 5.3 with the generic inverse variance method to analyze the data in the form of adjusted odds ratio and 95% Confidence Interval (CI). The estimation results in this study use forest plots and funnel plots. Forest Plot is the amount of variation (heterogeneity) that is presented visually (Murti, 2018). Funnel Plot is the relationship between the magnitude of the study effect and the sample size from various studies that are studied and measured in different ways (Murti, 2018).

1. The effect of residence on anxiety risk

The effect of living in an urban area has a 1.47 times risk of experiencing mental health problems in the form of anxiety during the COVID-19 pandemic with statistically significant results (aOR= 1.47; 95% CI= 1.18 to 1.83; p= 0.007) with heterogeneity I²= 96%. These results are supported by WHO (2020) where living in an urban area can significantly affect the risk of anxiety (Khan et al., 2021).

The results of this study are in line with Qiu et al. (2020) which states that urban areas can affect the risk of anxiety and are statistically significant (Shi et al., 2020).

2. The effect of residence on depression risk

The results of the meta-analysis in this study showed that living in an urban area had a 1.53 times risk of experiencing mental health problems in the form of depression during the COVID-19 pandemic with statistically significant results (aOR= 1.53; 95% CI= 1.25 to 1.86; p<0.001) with heterogeneity I^2 = 97%. These results are supported by Xie et al. (2017) which states that living in an urban area can significantly affect the risk of depression (Gao et al., 2020).

This is in line with Son et al. (2020) which states that urban areas can affect the risk of depression statistically significantly (Mekonen et al., 2021).

AUTHORS CONTRIBUTION

Riyesti Hero Fresna is the main researcher who selects the topic, searches for and collects research data. Hanung Prasetya and Bhisma Murti played a role in analyzing data and reviewing research documents.

CONFLICT OF INTEREST

There is no conflict of interest in this study.

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