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A Cross-Sectional Study of Depression, Insomnia, and Quality of Life Level among Community-Dwelling Older Adults

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Abstract: *Older adults with depression and insomnia had increased, which affected their quality of life. This study investigates the correlation between depression and insomnia in older adults and their quality of life (QoL). This study used a quantitative descriptive method with a cross-sectional approach among 215 older adults in Indonesia, utilizing the Geriatric Depression Scale Short Form, insomnia rating scale, and WHO-QoL Bref for QoL assessment. The study was using the Spearman Correlation Test and multiple linear regression. The results show that depression is unrelated to physical, psychological, social, or ecological QoL. Insomnia was related to QoL of physical health ($r = 0.138$, $p = 0.04$) and QoL of psychological health ($r = 0.140$, $p = 0.03$), but insomnia was not associated with QoL of social health ($r = 0.120$, $p = 0.06$) or environmental health ($r = 0.05$, $p = 0.38$). Furthermore, the regression hierarchy analysis found that insomnia was the most dominant variable affecting the QoL on physical health ($\beta = 0.17$). There is a notable correlation between rates of insomnia and physical and psychological QoL that has essential implications for the health status and well-being of older adults. This finding suggests that nursing intervention may be necessary to address sleep disorders among older persons.*

Keywords: *Community-Dwelling, Depression, Insomnia, Older Adult, Quality of Life*

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INTRODUCTION

Annually, the old population is expected to grow since it is expanding practically everywhere globally. The number of adults 60 and older worldwide increased by 48% between 2000 and 2015, based on data from the United Nations (Nations, 2015). In Indonesia, there is a general trend toward an increase in the population of seniors. The proportion of seniors 65 and over increased from 5.0 to 10.6 percent in 2020. The number of older adults in Indonesia by 2020 reached 30-40 million. The population census by 2020 recorded 3.77 million in Eastern Kalimantan, and the presentation of the number of elders in Samarinda gained 3.57 percent (Badan Pusat Statistik Indonesia, 2022; Kemenkes RI, 2022). Various psychological and social changes, especially depression and insomnia, are highly likely to occur in older adults.

Depression and insomnia are common problems in elderly people. According to World Health Organization (WHO) reports, 20% of adults in Indonesia suffer from depression, with women experiencing it more frequently than men in 2020. The rate of depression in Indonesia has tripled since the 2020 pandemic, reaching 28% by 2020 and 32% by 2021 (WHO, 2016). Previous studies also show that most community-dwelling older adults in Indonesia have mild and moderate depression (Bahtiar

et al., 2020). Data suggests that many older people experience depression along with various psychological changes. 30% of people experience insomnia, a condition causing sleep deprivation, energy shortage, irritability, and difficulty sleeping. It is compared to a person's high frequency of sleep and will increase in older adults (Vinjamury et al., 2014).

Quality of life (QoL) indicates life satisfaction, especially in older adults. The research shows that psychological and social problems are significantly connected to all quality of life domains (Dorji et al., 2017). QoL of community-dwelling older adults was influenced by personal elements such as health status, behavioral capability, and inner energy (Levasseur et al., 2009). Previous research on older adults in Canada and Brazil found that enough savings, health satisfaction, a good meaning of life, and recreational activity were determinant factors of QoL (Paskulin & Molzahn, 2007). Health status, level of education, physical exercises, medical group, age, and visiting primary health facilities contributed to overall QoL in the elderly group in Brazil (Paskulin et al., 2009).

Depression and insomnia in older adults substantially impact quality of life. Previous research shows that depression has a positive relationship with insomnia among older adults in Greece (Tsaras et al., 2021). Insomnia and depression of the elderly in Japan significantly correlate with oral health-related QoL (Noguchi et al., 2017). Depressed mood in older adults has an impactful relationship with sleep disturbance in Singapore (Cheng et al., 2018). Severe depression among older adults significantly correlates with sleep quality and affects quality of life (Sarıarslan et al., 2015). More senior adults with insomnia and depression issues had a poor QoL regarding physical, psychological, social relationships, and environmental domains (Tsaras et al., 2022).

Previous studies show that the depression and insomnia problems of older adults have a meaningful influence on QoL. However, there is a lack of results to explore depression, insomnia, and QoL in the group of community-dwelling elderly in low- and middle-income countries, including the Indonesian perspective. Also, previous studies only focus separately on depression, insomnia, and quality of life. On the other hand, there is an urgency to explore depression, insomnia, and QoL of older adults. The view of older adult is still rare in Samarinda City and East Kalimantan Province, so it will add new knowledge and perspectives to this problem. Therefore, this study focuses on psychosocial problems to see depression, insomnia, and four domains of QoL among older adults community-dwelling in Samarinda City.

METHODS

The study was a quantitative descriptive cross-sectional. The population was elderly in Samarinda City, East Kalimantan Province. The sample criteria in this study were (a) age 46 years or above, (b) living in a community place, (c) willingness to participate, and (d) having good cognitive ability. Exclusion criteria were (a) suddenly not being involved and (b) having the worst condition because of the older adult disease.

Sampling of research was purposive sampling, and data collection was the consecutive sampling method. The researcher collected data by looking at the list of older adults at the public health center or integrated health post (posyandu) for the older adults. The researcher informed and confirmed the respondents to find out whether older adults were included in the research criteria to be determined as research respondents. The number of older adults who participated in this study was 215, and all respondents stayed in.

The measure used to measure the degree of depression was the Geriatric Depression Scale Short Form, with 15 questions asked to the respondents with the answer "yes or no" and evaluation criteria: 0-5 score for average, 6-10 score for mild, and 11-15 score for severe. The instrument used to measure this study's insomnia level was the insomnia rating scale questionnaire consisting of 11 questions. Insomnia assessment criteria are not insomnia by 11-19 points, mild insomnia by 20-27 points, severe insomnia by 28-36 points, and very severe insomnia by 37-44 points. The WHOQOL-BREF quality of life instrument included 26 questions that were scored on 1 (very poor) to 5 (very good) and 1 (excessively) to 5 (not at all).

Descriptive analysis aims to describe the characteristics of each of the variables studied. The

relationship between depression and insomnia level and quality of life uses the Spearman Correlation Test. We tested demographic characteristics and quality of life variables using Mann-Whitney and Spearman. Hierarchical regression analysis was using multiple linear regression. All assumptions in this analysis were confirmed before conducting the research. Hierarchy analysis was carried out between demographic characteristics, depression and insomnia level, and quality of life specified in four domains (physical, psychological, social, and environmental). Data were analyzed using SPSS version 21 (IBM Corporation, Armonk, New York, USA). All analysis tests used two-tailed and a significance level of $p < 0.05$.

The Health Research Ethics Committee, Faculty of Medicine, Mulawarman University (No. 57/KEPK-FK/III/2023), approved the research protocol. The objectives and procedures of this study were explained to the respondents, and the respondents were able to leave the research process. All respondents voluntarily participated in this research and signed the informed consent.

RESULTS

The descriptive results of respondents in this study are as follows: The characteristics of respondents are shown in Table 1:

Table 1. Characteristics of respondent (n=215)

Variable	n (%) or M ± SD
Age	**59.73 ± 10.41**
Early Older adults (46-55 years)	94 (43.7)
Late Older adults (56-65 years old)	57 (26.5)
Seniors (over 65 years old)	64 (29.8)
Sex	**1.65 ± 0.47**
Male	75 (34.9)
Female	140 (65.1)
Depression	**1.67 ± 0.58**
Average	85 (39.5)
Mild	117 (54.4)
Severe	13 (6)
Insomnia	**1.40 ± 0.53**
Not	133 (61.9)
Mild	74 (34.4)
Severe	8 (3,6)
Physical QoL	**1.72 ± 0.45**
Bad	169 (78.6)
Low	46 (21,4)
Psychological QoL	**1.21 ± 0.41**
Bad	60 (27.9)
Low	155 (72.1)
Social Relationship QoL	**1.01 ± 0.09**
Bad	213 (99.1)
Low	2 (0,9)
Environmental QoL	**1.95 ± 0.22**
Bad	11 (5.1)
Low	204 (94.9)

The table above shows that the age of older adults varies greatly, with the majority in the early older adult age group being as many as 94 people (43.7%). The late older adult age group was 57 people (26.5%), and the older adults were 64 people (29.8%). Then, the most dominant gender is older adults, women as many as 140 people (65.1%). Furthermore, the older adults are male, as many as 75 people (34.9%). Most of the elderly were having mild depression and not having insomnia. Consequently, QoL physical was dominant on a bad level, QoL psychological was on a low level, QoL social was on a bad level, and QoL environmental was on a low level. Analysis of the correlation between respondent

characteristics, depression, and insomnia with QoL in older adults is shown in the following Table 2:

Table 2. Correlation Coefficient of Respondent Characteristic Variables, Depression, and Insomnia with Quality of Life (Physical, Psychological, Social, and Environmental Domains) in older adults (n = 215)

Variable	QoL Physical Health	QoL Psychological	QoL Social Relationship	QoL Environmental
	r (*p*)	r (*p*)	r (*p*)	r (*p*)
Age	-0.009 (0.901)	0.046 (0.503)	-0.023 (0.740)	-0.001 (0.986)
Sex	-0.108 (0.114)	-0.085 (0.214)	-0.111 (0.105)	-0.077 (0.259)
Depression	-0.008(0.910)	0.083 (0.228)	-0.024 (0.723)	-0.003 (0.971)
Insomnia	0.138 (0.044)	0.147 (0.031)	0.125 (0.068)	0.059 (0.388)

From the table above, it was found that age has a negative correlation with the QoL domains of physical health, psychological health, social relationships, and environmental health. Then, sex did not correlate with the QoL of the physical health, psychological, social relationships, and environmental. Older adults' depression was not correlated with QoL of physical health, psychological, social relationships, and environmental factors. On the other hand, older adults' insomnia was positively correlated with QoL in the physical and psychological domains but not correlated with the social relationship and environmental domains.

Multivariate analysis between characteristics, depression, and insomnia with quality of life in the elderly is shown in Table 3.:

Table 3. Hierarchy of Regression Analysis between factors, Depression, and insomnia with QoL on the physical health domain of older adults (n = 215)

Variable	Step 1					Step 2				
	B	SE	β	t	*p*	B	SE	β	t	*p*
Sex	-1.08	0.82	-0.08	-1.32	0.18	-1.07	0.81	-0.08	-1.30	0.19
Depression	-0.08	0.12	-0.04	-0.68	0.49					
Insomnia	0.24	0.09	0.17	2.58	0.01	0.23	0.09	0.17	2.51	0.01
	R^2 = 0.037, Adjusted = 0.024, F=82,71 *p=0.04*					R=0.035, Adjusted R=0.026, F=3.85, p=0.02				
Variable	**Step 3**					**Step 4.**				
	B	**SE**	**β**	**t**	***p***	**B**	**SE**	**β**	**t**	***p***
Sex						-1.07	0.81	-0.08	-1.03	0.19
Depression										
Insomnia	0.23	0.09	0.16	2.44	0.01	0.23	0.09	0.17	2.51	0.01
	R=0.027, Adjusted F=5.98, p=0.01					R^2 = 0.187, adjusted R = 0.026, F=3.85, *p=0.02*				

Multivariate analyses were conducted between characteristics, depression, and insomnia with QoL in the physical, psychological, social, and environmental domains. The results of the multivariate analysis found that only the characteristics of respondents, depression, and insomnia with the quality of life of the physical health domain met the requirements where a significant p-value of 0.04 (<=0.05) was obtained. The quality of life of the psychological part obtained a *p*-value of 0.12 (>=0.05), the social relationship obtained a *p*-value of 0.06 (>=0.05), and the environmental obtained a *p*-value of 0.60 (>=0.05).

Hierarchy analysis regression characteristics, depression, insomnia, and the QoL in older adults in the physical health domain are shown in Table 3. In Step 1, covariates of gender, depression, and insomnia are included. Those control variables explained 19.3% of the physical health domain's total

QoL variance. In step 2, depression variables were excluded from the modeling, and insomnia was associated with physical health (β=0.17, *p*=0.01). Insomnia significantly affected the QoL of the physical health domain when controlled for covariate (adjusted R^2=0.026, F=3.85 *p*= 0.02). In step 3, sex variables were excluded from the modeling, and insomnia was correlated to physical health (β=0.16, *p*=0.01). Insomnia significantly affected the QoL of the physical health domain when controlled for covariates (adjusted R^2=0.023, F=5.98 *p*=0.01). In step 4, the sex variables were put back into the modeling, and after analysis, the regression model was found to be gender and insomnia. The coefficient of determination (R-squared) shows 0.187, which means the regression model can account for an 18.7% variation in the dependent variable of quality of life of physical health. Our research also shows a p-value of 0.02 means that the variable can significantly predict the physical health domain's QoL variable. Insomnia is the dominant significant variable influencing the QoL of the physical health domain (β=0.17).

DISCUSSIONS

Our results show that only insomnia positively relates to the QoL of physical and psychological health. Still, a negative relationship was found between QoL of social relationships and the environment. A previous study had a similar result to our research, revealing that insomnia correlates with decreasing quality-adjusted life-years (Olfson et al., 2018). Frailty and sleep quality are also linked to older individuals' quality of life (Lorber et al., 2023). Poor daily sleep duration among Finnish older adults positively relates to lower quality of life (Tuomilehto et al., 2013).

Conversely, the previous study shows different results. Older adults have sleep problems, mild to moderate severity insomnia, and lousy nights and do self-management such as exercising until tired, diet restriction, coffee consumption, and using drugs. QoL and daily function significantly affect older adults with insomnia (Berkley et al., 2020). Older adults were more likely to suffer insomnia, depression, and anxiety, but insomnia has a negative correlation to physical health and mental QoL (Kim et al., 2017).

Study results show that depression negatively correlates with overall domain QoL among community-dwelling older adults. Our study results align with a previous study, which showed that older adults with depression negatively correlated to physical, psychological, and environmental health of QoL (Cao et al., 2016a). Another study shows that depression was negatively affected by QoL among Chinese rural older adults (Sun et al., 2016). Also, results from older adults community-dwelling in Nepal found a negative correlation between depression and QoL (Shrestha et al., 2020). On the other hand, depression in individuals with type 2 diabetes who are older impacted QoL and sleep quality (Zhang et al., 2023). Older adults with chronic diseases implemented coping mechanisms to overcome physical and psychological problems, such as behavioral, spiritual, cognitive focus coping, and social relationships (Bahtiar et al., 2022). Research results among the elderly in rural areas found that there were correlations between quality of life and psychological distress mediated by cognitive impairment and behavioral disturbance (Scogin et al., 2016). Previous research shows a decline of anxiety, depression, and mental function in quality-of-life scores using mental health nursing intervention (Huang et al., 2021).

The multivariate research results show that predictor variables influenced QoL regarding physical health, including sex and insomnia. Insomnia is the most influential variable in the QoL physical health domain. Our research result is similar to a previous study, which showed that sleep disturbances in older adults were associated with quality of life during the COVID-19 pandemic (Xu et al., 2022). Insomnia and poor sleep quality are the most significant components for all domains of QoL, and lower all QoL domains were associated with insomnia (Shafazand et al., 2017; Tang et al., 2015)—a weak physical domain significantly associated with insomnia (Stein et al., 2008). Aging leads to frequent and severe sleep disturbances, affecting sleep stages and circadian rhythms. Older adults experience more or more fragile sleep due to reduced sleep capacity, often resulting in more awakenings and decreased TST (Crowley, 2011).

Insomnia in older adults has an impact on quality of life. Previous studies have similar results, which show sleep problems have a negative effect on the QoL of elderly people with hypertension, especially

the QoL of the physical domain. The presence of sleep disorders in individuals with hypertension is affected by various factors like advanced age, less formal education, being overweight, engaging in certain occupational activities, and having a longer duration of illness (Uchmanowicz et al., 2019). The pandemic had little effect on older adults' sleep patterns, quality of life, or psychosocial characteristics, but their health conditions deteriorated. Protective factors for this demographic include regular physical activity, maintaining social connections, strong family ties, a high level of education, and financial security, enabling them to successfully handle obstacles (Almondes et al., 2022). Age significantly impacts sleep quality, especially for women. The 15-29-year-old group has the highest quality of life, while those over 50 have the lowest. Subjective sleep quality and quality of life have a substantial relationship (Zeitlhofer et al., 2000). The previous study found that overall quality of life was high among participants but negatively correlated with sleep issues, depression, religion, and daily activities. Health care and social support availability had a favorable effect on living quality. It is recommended that intervention programs targeting key determinants be implemented to improve older individuals' well-being (Uddin et al., 2017). The study shows that older adult Korean-American immigrants experience sleep disruptions and dissatisfaction, with women showing a higher preference for complementary therapy for insomnia management, possibly due to a strong desire for traditional healthcare methods (Sok, 2008). Sleep quality may indirectly influence depression in older adults, mainly through sleep duration and daytime dysfunction. Both direct effects and intermediary roles suggest that sleep quality can help manage perceived stress, potentially reducing depression severity in older adults (Liu et al., 2017). Non-pharmacological treatments, such as sensory control, sleep restriction, sleep hygiene, paradoxical intention, relaxation training (autogenic training, imagery training, hypnosis, meditation), cognitive therapy, cognitive behavior therapy for insomnia, multicomponent therapy, and temporal control therapy, are recommended as health interventions (Maness & Khan, 2015).

There is a plethora of confounding factors that affect depression, insomnia, and QoL among the elderly. Socioeconomic status factors such as reduced income, inadequate financial resources, and diminished educational achievement correlate with elevated incidences of depression and insomnia, as well as decreased quality of life metrics (Cao et al., 2016b; Malak & Khalifeh, 2023; Yang et al., 2021). The existence of chronic medical conditions and functional impairments is significantly associated with both depression and insomnia, serving as major factors in diminished quality of life (Correa-Muñoz et al., 2023; de Paula Rebouças et al., 2021; Li et al., 2021; Stein & Barrett-Connor, 2002). Social determinants, for example, marital status, living conditions (e.g., cohabitation with family), and social engagement, affect depression and overall quality of life. For instance, cohabiting with family may exacerbate depressive symptoms, whereas enhanced social engagement correlates with elevated life satisfaction, in part by alleviating depression (Lv et al., 2024; Malak & Khalifeh, 2023; Yang et al., 2021). Cognitive impairment serves as both a risk factor and a consequence of insomnia and depression, thereby adversely affecting quality of life (Correa-Muñoz et al., 2023; Lv et al., 2024).

The study may have had certain limitations. Firstly, the participants in our study were older persons residing in Samarinda City, East Kalimantan, Indonesia. It is important to note that our research focused solely on an urban city context. Consequently, we should be extrapolating our results to different contexts, such as rural regions. Furthermore, a sufficient quantity of research data may ensure the quality and depth of the research findings. Thirdly, it is imperative to include an adequate sample size to enhance the statistical power and enable the generalization of the results.

CONCLUSION

The study involving older adults found no significant association between age, gender, depression, or environmental, social, psychological, or physical aspects of quality of life (QoL). However, insomnia was positively correlated with quality of life in cognitive and physical domains, but not in social or ecological contexts. Sex and insomnia significantly predicted QoL of physical health, with insomnia being the most dominant variable. Further research needs to be conducted on older adults residing in rural settings,, and there also needs to be urgency in capturing several range times of alteration of

depression, insomnia, and QoL of older individuals. Then, in developing health interventions, community health nurses must consider insomnia a determinant component of QoL among older adults.

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AUTHOR CONTRIBUTION
Author 1 contributes to the idea, collection, processing, and presentation of data and preparation of articles. Author 2 contributes to ideas and the collection and processing of data. Author 3 contributes to the preparation of the articles. Author 4 contributes to processing data and preparingthe articles. Author 5 contributes to the preparation of the articles.

ETHICAL APPROVAL AND CONSENT
The Health Research Ethics Committee, Faculty of Medicine, Mulawarman University (No. 57/KEPK-FK/III/2023), approved the research protocol. The objectives and procedures of this study were explained to the respondents, and the respondents were able to leave the research process. All respondents voluntarily participated in this research and signed the informed consent.

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This study received no external funding.

CONFLICT OF INTEREST
The authors hereby declare that there's no conflict of interest in this study, either to any institutions or individuals

DATA AVAILABILITY STATEMENT
The data that support the findings of this study are not publicly available due to privacy or ethical restrictions. However, they are available from the corresponding author on reasonable request and with permission from Mulawarman University.

PROTOCOL REGISTRATION
This study was not registered.

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