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Effect of Multimorbidity on Depression of Indonesian Older Persons: An Application of the Utility Function

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Abstract:

Previous studies have found adverse relationships between physical deterioration and depression among older persons. Relying on the utility function, this study assumed that living in good health condition and at an older age contributes to higher utility. To assess the causal relationship, the study used longitudinal panel data of 253 older adults drawn from three waves of the Indonesian Family Life Survey (IFLS), waves 3, 4, and 5. Good health status and higher utility were represented by fewer morbidities and lower depression, respectively. By applying the Robust Hausman test (p-value 0.3903), the Random Effect (RE) Model is more appropriate than the Fixed Effect (FE) Model. The RE Model suggests that more morbidities and being older have significant associations with higher depression. Meanwhile, older persons living in urban areas tend to have lower depression than those in rural areas. Promotion of mental health services for Indonesian older persons and utilization of the national health insurance are important for older persons to mitigate the adverse effects of multimorbidity.

Keywords: *IFLS, panel, mental health, health insurance*

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1. Introduction

Previous studies have described deteriorating health status in various ways. Altman (2014) defines an impairment as a problem with physical and psychological functions, shown by deviations or loss of mental, sensory, disease, body structure, physical activity, or social participation. The problems could be due to injuries or diseases that occurred when an individual was born or developed in adulthood. Furthermore, the impairments may exist for a long time and result in disabilities. UNDESA defines disability as a condition of individuals with limitations in their physical and social function compared to others in a range of normal activities (Gutterman, 2023).

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Disability depends not only on functional limitation but also on support from the surrounding environment.

Previous studies have discussed deteriorating health in various terms. For instance, Ishida et al. (2020) use chronic diseases as representatives of health conditions. The study includes arthritis, asthma, cancer, bronchitis, diabetes, heart disease, hypertension, and blood circulation problems. Another study by Zhang et al. (2024) also uses chronic diseases and includes arthritis, asthma, cancer, cardiovascular disease, and pulmonary disease. Meanwhile, Segel-Karpas et al. (2017) discuss chronic morbidity in terms of heart problems, cancer, diabetes, joint disease, and thyroid disease.

In a broader view, we can say that those diseases and physical limitations are morbidities. Adair (2019) covers diseases, injuries, and disabilities in morbidities. Hamza et al. (2019) state that morbidities may happen because of injury and adverse events during medical treatment. Morbidities have become issues in health, economic, and social studies, together with the increasing population of older persons. With more individuals with higher incomes and wider access to health services, as well as the provision of better health facilities, more individuals have an opportunity to live longer (Adair, 2019). Conversely, living longer is associated with a higher risk of having morbidities.

Being older is associated with a higher risk of morbidity and depression. Moreover, getting older is associated with multimorbidity, thus resulting in a higher risk of depression. Individuals with multimorbidity have more than one disease. A study in China found that older persons experience difficulties in physical and social functioning due to limitations in mobility, reduced social engagement, and limited economic opportunities (Zhang et al., 2024). They also experience a financial burden of health maintenance. Those difficulties cause geriatric depression, which refers to a depression that occurs at age 60 or above for the first time. Unfortunately, the proportion of individuals with depression is higher with advancing age. For instance, a study in India found that around 25.9% of people aged 45-59 are depressed (Singh et al., 2022). The percentages become 30.6% and 30.33 among people aged 70-79 and 80 or above, respectively.

Studies have examined relationships between health status and utility-related health. Andrén (2023) uses life satisfaction to represent utility-related health in Sweden in a cross-sectional study based on 2017 data. It includes depression as a representative of health status. Furthermore, the study estimates the monetary amount of the compensation that individuals are willing to accept to keep their life satisfaction unchanged. Although the amount of compensation needed varies across age groups, it reflects that no individuals are willing to experience lower well-being during their life course. Another study in the Netherlands examines the relationship between depression severity and health-related quality of life, the measurement of utility (Kolovos et al., 2017). Both studies found negative associations between depression and the utility.

Similar to countries in the Southeast Asian region, Indonesia is facing an ageing population (The ASEAN Secretariat, 2023). The number of older adults was nearly 29 million in 2020, or about 10.5% of the total population. It is estimated that the figure will reach 72.6 million, or about 22.7% of the total population in 2050. The estimation is a timepiece for the country to pay attention to issues of older persons, especially mental health issues.

While utility is commonly used in economics, our study offers a connection between economics and well-being by demonstrating a trade-off between advancing age and health status. Mirroring previous studies in utility-related health, this study aims to examine factors associated with the utility. In particular, our study examines the association between health state and utility, represented by depression, in Indonesia over the life course at an advancing age.

2. Theoretical Background

Age and health on indifference curve

An indifference curve describes any combination of two goods that results in the same level of utility or makes a consumer equally well-off (Investopedia, 2026). The basic assumption is that having more goods is good, since the assumption that the goods benefit the consumer is held. Of course, using only two goods is a simplification since many goods or commodities are consumed in real life. It also allows the drawing of curves in two dimensions.

In this study, we put two goods, age and health, on an indifference curve that represents a certain utility level. This study assumes that being older and in good health yields higher utility, meaning that greater age and better health confer positive marginal utility. In other words, individuals at an older age with the same health conditions, e.g., with the same number of morbidities, perceive higher utilities compared to those at a younger age. Older persons may have more time for a social life with less work burden. In Figure 1, there is a shift from point A on a lower indifference curve (IC_1) to point B on a higher indifference curve (IC_2). Meanwhile, individuals of the same age with better health, e.g., with fewer morbidities, perceive greater utility. The higher indifference curve represents a higher utility or lower depression. Conversely, a lower utility, represented by a lower indifference curve, reflects higher depression.

At an advanced age, individuals are more likely to have a poorer health status because of more morbidities. This phenomenon is described by a movement from point D to point E on the indifference curve IC_1 in Figure 2. In other words, individuals may perceive additional utility due to advancing age, as well as decreasing utility due to lower health status or multimorbidity. Thus, in total, the individuals do not perceive a change in their utility. When a reduction in one unit of good compensates for an additional unit of another good, it is named the marginal rate of substitution (Pindyck & Rubinfeld, 2018).

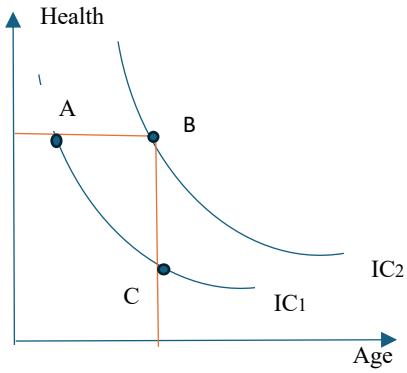

Figure 1. Indifference curve map
Source: drawn by authors, 2026

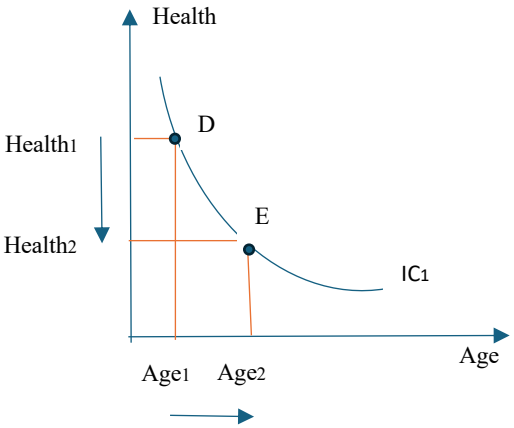

Figure 2. Marginal rate of substitution
Source: drawn by authors, 2026

The indifference curve shows a trade-off between longer life and health status; it does not mean that an individual should choose a longer life with worsening health or living at a younger age with better health to maintain utility. However, the message states that being older is associated with worsening health. When an individual can maintain health as they age, the utility will be higher.

This study's framework adopts studies by Andrén (2023) and Kolovos et al. (2017), stating that well-being is determined by depression and socioeconomic factors. Those two studies use life satisfaction and quality of life to represent well-being. Since those two variables in series are not available in the data source used by our study, we modify the model and use depression to represent well-being. The variable of interest or independent variable is morbidity. The framework is shown in Figure 3 below.

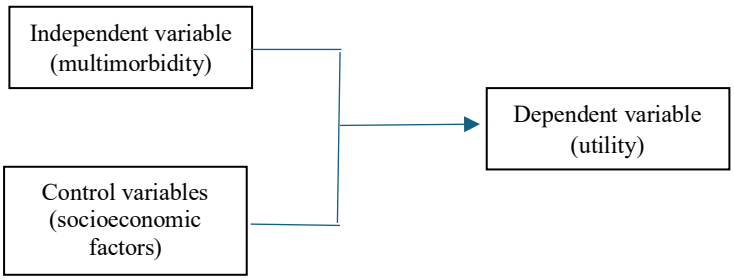

Figure 3. The study's framework
Source: authors

Determinants of health-related utility

Multimorbidity: Individuals with multimorbidity are more likely to experience depression; conversely, those diagnosed with depression tend to have multimorbidity (Triolo et al., 2020). According to the study, there are three ways in which multimorbidity links to depression, while the psychosocial factor is only one of them. First, multimorbidity causes an uncomfortable physical state, such as a metabolic or vascular problem. Second, multimorbidity may cause individuals stress because of low quality of dwelling area, health services, housing, and socioeconomic status. For instance, individuals with low educational attainment may lack health information, disease management, and help-seeking behaviour. Low educational attainment is linked to a low-income level. Third, individuals with multimorbidity feel depressed, which could be caused by limited access to higher-level health services and side effects of medication. Sinaga et al. (2022) also found that Indonesian individuals with multimorbidity are associated with depression. Moreover, the study also found that the proportions of individuals with multimorbidity are increasing in the older age group.

Gender: Hwang et al. (2022) found that the adverse effect of multimorbidity is higher in males than in females. However, the effects of gender differences on depression are different based on the types of comorbidities. For instance, the effects of any comorbidity related to diabetes and heart diseases on depression are significant for Korean older females. Meanwhile, the effects of any comorbidity related to pulmonary problems and osteoporosis are significant for Korean older males. Another study by Shi et al. (2021) found that, in general, the risk of depression for males is higher than for females. The difference could be caused by higher social expectations for males, such as responsibility for the family and success at work.

Age: Although studies have found that advancing age is associated with a higher level of depression, there are differences among them. For instance, among the Korean older females aged 65 or above with morbidity, the younger-old ones experience higher depression compared to the older-old ones (Hwang et al., 2022). For the younger-old females, having morbidity reflects whether they can perform their physical and social functions. Meanwhile, the older-old females can accept the decreasing function. In Indonesia, the older the age, the higher the depression (Sinaga et al., 2022). Age may not be the sole factor in depression. Living with low socio-economic status, such as a lack of income and physical disability, could result in higher depression.

Place of residence: Previous studies in Indonesia show different findings in depression between older persons living in urban and rural areas. A study in the province of Yogyakarta by Widagdo et al. (2022) shows that physical mobility is

prominent for lower depression of those in urban areas, whereas independence in activities of daily living is a focus for those in rural areas. Meanwhile, a study in the other area of Indonesia, named Surakarta, by Komalasari et al. (2025) shows that there are no different effects of living in urban and rural areas on depression. The result should be noticed with the consideration that Surakarta is a small city, where the difference between the urban and rural areas is not significant.

After reviewing the literature, we hypothesize that: (1) having more morbidities is associated with lower health-related utility, (2) being older is associated with lower health-related utility.

3. Methodology

This study used data from three waves of the Indonesia Family Life Survey (IFLS): wave 3 in 2000, wave 4 in 2007/2008, and wave 5 in 2014/2015. The observations comprise 253 respondents aged 60 or above who were heads of household or spouses alive from wave 3 through wave 5 among 2,292 heads of household or spouses in wave 3. The purpose of the sample selection is to control for the effects of changes in the households over the three waves. The data was a panel-balanced set with individual and time dimensions.

Pooled ordinary least squares (pooled OLS), fixed effect (FE), and random effect (RE) models were applied. Pooled OLS does not account for the effect of individual unobserved heterogeneity. The FE model assumes that regressors are correlated with individual unobserved time-invariant variables, such as natural ability and culture. The model controls those variables. Meanwhile, the RE model assumes there are no correlations between regressors and individual unobserved time-invariant variables. In general, the models are as follows:

FE model:

$$y_{it} = \alpha_i + \sum_{k=1}^{k} x_{it} \,.\beta_k + \varepsilon_{it}$$

where: i = number of cross-sectional dimensions or individuals, i = 1, …, N
t = number of time dimensions or period, t = 1, …, N
k = covariate k
ε = overall error
α_i = individual-specific effect (observed and unobserved)
β = constant
y = dependent variable

RE model:

$$y_{it} = \alpha + \sum_{k=1}^{k} x_{it} \,.\beta_k + u_i + \varepsilon_{it}$$

where: α = common intercept or average effect
u_i = random individual-specific effect

To represent the health-related utility, this study used depression as the dependent variable. It was a continuous variable derived by summing the scores on five depressive symptoms. The depressive symptoms included in this study are the same as those in the questionnaires across the three waves. They were the conditions during the past 4 weeks: (1) being bothered by things that usually don't bother you; (2) feeling lonely; (3) experiencing fear; (4) having difficulty concentrating; and (5) carrying out normal tasks seemed like an effort. The scales were 1 (never), 3 (sometimes), 5 (often). The Cronbach's alpha was 0.603. The number indicated that the five items of depression symptoms in this study were reliable in representing depression.

The covariates were the number of acute morbidities, age (years old), gender (female and male), and place (rural and urban). Gender and place are time-invariant variables. This current study took only the same morbidities as those in waves 3, 4, and 5. The question was "Did you ever experience this symptom in the last 4 weeks?" There were the same twelve acute morbidities in the three-wave survey. They were having headaches, runny noses, coughs, difficulty in breathing, fever, stomachache, nausea, painful joints, diarrhea 3 times per day minimum, skin infection, eye infection, and toothache. The IFLS provides a list of chronic conditions in wave 4 and wave 5. The list consists of stroke, cancer, arthritis, high cholesterol, prostate illness, kidney disease, and digestive disease. However, the chronic conditions were only available in waves 4 and 5, not in wave 3. Thus, we could not add the list to the health status together with the acute morbidities.

The Hausman test was conducted to decide whether the FE or RE model was better (Jauhari et al., 2019). The null hypothesis (H_0) and alternative hypothesis (H_1) for the Hausman test are:

H_0: The RE model is preferred over the FE model.
H_1: The FE model is chosen rather than the RE model.

The decision would be taken as follows:

If the p-test < 0.05, we will reject H_0. The FE model is better than the RE model.
If the p-test > 0.05, we cannot reject H_0. The RE model is better than the FE model.

R-squared showed the extent to which each type of variation explained the model. Rho or interclass correlation (ICC) explained a serial correlation in the model error or correlation between individual behavior over time. The significance of each variable was based on the p-value. When the p-value was lower than 0.05, the variable was statistically significant. Coefficients of the covariates explained the extent to which the variables influenced the dependent variables. To relax the assumption that all observations are independent and to ensure the robustness of heteroscedasticity, the models with VCE cluster of individual entities were applied.

4. Empirical Findings/Results

Descriptive Statistics

Table 1 shows the characteristics of the respondents. Most of them were males and living in rural areas during the three waves. On average, the number of morbidities and depression scores increased over the same periods. The statistics also showed that the percentage of those living in rural areas was decreasing, whereas the percentage of those living in urban areas was increasing. The figures may indicate the increasing number of older adults in rural areas migrating to urban areas. Older adults may follow their migrating children living in an urban area.

Table 1. The Characteristics of the Respondents

Variable	Wave		
	2000	2007	2014
Gender (%):			
female	36.76	36.76	36.76
male	63.24	63.24	63.24
Age (mean)	64.10	70.89	77.71
Place:			
rural	75.49	66.01	58.50
urban	24.51	33.09	41.50
Morbidity (mean)	2.06	1.85	2.48
Depression (mean)	6.47	6.14	7.09

Source: IFLS waves 3,4, and 5, processed.

Table 2 shows transitions in the number of morbidities over time. For instance, among 180 respondents without morbidities in wave 3, 48.89% of them still had no morbidities, 16.11% had one morbidity, and 1.11% had seven morbidities in wave 4. Among 69 respondents with one morbidity in wave 3, 40.58% still had no morbidities, 13.04% had one morbidity, and none had seven morbidities in wave 4. In general, the proportion of respondents capable of recovery without morbidities decreased in the next wave as the number of morbidities in the previous wave increased.

In addition, the figures showed that respondents with more morbidities in the previous wave were more likely to have more morbidities in the next period. For instance, among 89 respondents with two morbidities in wave 3, 1.12% of them would have nine morbidities in wave 4. Among 40 respondents with four morbidities in wave 4, 2.5% had nine morbidities. Among 15 respondents with six morbidities in wave 3, 6.67% had nine morbidities in wave 4. Among the nine respondents with seven morbidities in wave 3, 22.22% had nine respondents in wave 4. The figures state that having more morbidities at a younger age was related to having more morbidities at an advancing age.

Table 2. The Percentages of Transition in Number of Morbidities from One Period to the Next Period (%)

Previous period	Next period									
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
0 (n=180)	48.89	16.11	13.33	7.22	6.67	4.44	2.22	1.11	0.00	0.00
1 (n=69)	40.58	13.04	24.64	13.04	4.35	1.45	2.90	0.00	0.00	0.00
2 (n=89)	25.84	13.48	26.97	13.48	3.37	4.49	3.37	6.74	1.12	1.12
3 (n=62)	33.87	8.06	8.06	16.13	6.45	12.90	8.06	4.84	1.61	0.00
4 (n=40)	20.00	12.50	20.00	7.50	12.50	12.50	10.00	2.50	0.00	2.50
5 (n=32)	6.25	6.25	9.38	15.63	21.88	9.38	18.75	9.38	3.13	0.00
6 (n=15)	0.00	20.00	20.00	6.67	26.67	6.67	0.00	0.00	13.33	6.67
7 (n=9)	11.11	0.00	11.11	11.11	22.22	11.11	0.00	0.00	11.11	22.22
8 (n=8)	0.00	25.00	0.00	12.50	25.00	25.00	12.50	0.00	0.00	0.00
9 (n=2)	0.00	0.00	0.00	0.00	0.00	50.00	0.00	0.00	50.00	0.00

The number in parentheses is the number of respondents for each number of morbidities.
Source: IFLS waves 3,4, and 5, processed.

As shown by the trend line of Figure 3, the depression score climbed with the increase in morbidities. It means that older persons with more morbidities tend to have a higher risk of depression.

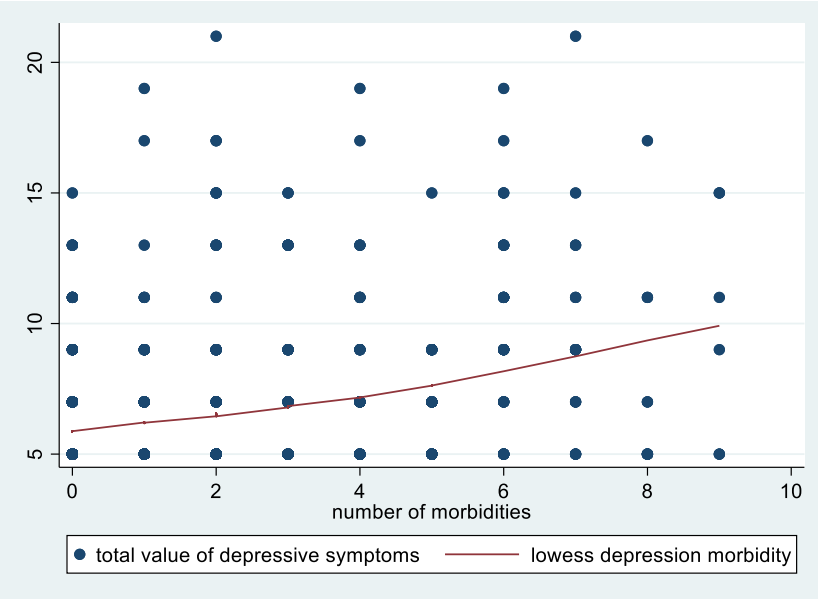

Figure 3. The Trend Line Between the Number of Morbidities and the Depression Score
Source: IFLS waves 3,4, and 5, processed.

Table 3 presents differences between and within variations for the morbidities and depression score. It was shown that the variation of the number of morbidities was mainly driven by between-variation (SD=1.68), although the within variation was also sufficient (SD=1.38). Meanwhile, variation in depression was driven more by within-variation (SD=2.08) than by between-variation (SD=1.75). The figures indicated

diverse morbidities among the respondents, alongside increased depression correlated with their advancing age.

Table 3. The Variance Components for Morbidities and Depression

Variables		Range	Mean	SD	Minimum	Maximum	Observations
Number of morbidities		0-9	2.13				
	overall			2.17	0.00	9.00	N=759
	between			1.68	0.00	7.67	n=253
	within			1.38	-1.87	7.46	T=3
Depression		5-21	6.57				
	overall			2.72	5.00	21.00	N=759
	between			1.75	5.00	14.33	n=253
	within			2.08	-2.77	15.90	T=3

Source: IFLS waves 3,4, and 5, processed.

Multivariate analysis

Table 4 shows the regression results of the pooled OLS, FE, and RE models. The coefficient of gender, the time-invariant variable, was estimated in OLS and RE models, but not in the FE model. There is no significant effect of gender on depression. The three models found that being older and having more morbidities causes higher depression. The pooled OLS and RE models found that older persons living in urban areas had a lower depression.

The FE and RE models had higher robust standard errors than the pooled OLS. The assumption of no correlation between the regressors and error in pooled OLS makes the coefficients of regressors more consistent since pooled OLS is treated as cross-sectional data. The standard errors in FE and RE models were higher because of serial error correlations of each individual over time in the first two models. However, the standard errors of the regressors in the RE model were lower than those in the FE model. The FE model considers only within-variation, whereas the RE model accounts for both within and between variation.

Table 4. Regression Results of the Pooled OLS, FE, and RE Models

	Pooled OLS		FE model		RE model	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
gender	-0.279	0.217	-	-	-0.283	0.217
Age	0.028**	0.012	0.040**	0.019	0.030**	0.013
Urban	-0.536*	0.189	-0.506	0.460	-0.530*	0.189
morbidity	0.362*	0.056	0.287*	0.088	0.355*	0.057
intercept	4.146*	0.838	3.256*	1.260	4.056*	0.861

*Significant at α=0.01, **significant at α=0.05.

Source: IFLS waves 3,4, and 5, processed.

Table 5 shows comparisons between the pooled OLS, RE, and FE models. The sigma_u shows a standard deviation of the individual effect α_i, and the sigma_e shows a standard deviation of the regression idiosyncratic error ε_{it}. The values of sigma_u were lower than sigma_e in the FE and RE models. The figures indicated that individual-specific components were less important than the error. In other words, the variation in depression scores was mainly due not to variation in individual characteristics, but rather to random error. It indicates that there are other factors not

in the models that also influence depression. Furthermore, rho explains serial correlation in the model error. The values of rho in the FE and RE models were much lower than 1. The figures indicate a low correlation of the individual characteristics over time. The θ was 0.100, much lower than 1, indicating that the FE model was less appropriate. Those findings strengthen the possibility of the roles of other characteristics of older persons in determining depression.

The R-squared values for the FE and RE models are similar. The variations in the FE model were explained by changes in individual characteristics over time (R-squared within) and varied characteristics among individuals (R-squared between) by 5.2% and 15.4%, respectively. Meanwhile, the variations in the RE model were explained by changes in the individual characteristics over time and varied characteristics between individuals by 5% and 17%, respectively. The two models indicated that the effect of varied individual characteristics on depression scores was more salient than the changes in characteristics over time.

Table 5. The Comparisons between the Pooled OLS, FE, and RE Models

Comparison	Pooled OLS	FE model	RE model
R-squared overall	0.098	0.092	0.098
R-squared within	-	0.052	0.050
R-squared between	-	0.154	0.170
Sigma_u	-	1.613	0.698
Sigma_e	-	2.492	2.492
Rho	-	0.295	0.073
Observations (person*year)	759	759	759
Correlation (u_i, x)		0.069	0 (assumed no correlation)
Theta (θ)			0.100

Source: IFLS waves 3,4, and 5, processed.

The regressions did not use either cross-sectional or longitudinal weights provided by IFLS since our sampling design does not suit the weights. However, for a robustness check, we internalized an individual cross-sectional weight with the assumption that the respondents in wave 3 were not necessarily present in previous waves. The weight was adjusted to the Indonesian population of 2000. We did not use the individual longitudinal weight in wave 3 since our study did not require the presence of respondents in wave 1. To apply the individual cross-sectional weight, a maximum-likelihood random-effects model was used (StataCorp LLC, 2025). As shown in Table 6, the directions, magnitudes, and significance of the covariates were consistent with those in the RE model.

Table 6. The Regression Results of the Maximum-Likelihood RE Model

Variable	Coefficient	SE
gender	-0.146	0.198
age	0.037*	0.013
urban	-0.325	0.200
morbidity	0.355*	0.042
intercept	3.258*	0.889

*Significant at α=0.01, **significant at α=0.05.
Source: IFLS waves 3,4, and 5, processed.

Robust Hausman Test
The Hausman test resulted in an F-test of 1.00 and a p-value of 0.3903. Thus, we did not reject H_0: The random-effects model is preferred over the fixed-effects model. The RE model is appropriate to explain the associations between the regressors and depression. Based on the results of the RE model regression, the linear regression equation is written as follows:

$$\text{depression score} = 4.056 - 0.283\text{gender}_{it} + 0.030\text{age}_{it} - 0.530\text{urban}_{it} + 0.355\text{morbidity}_{it} + (\alpha_i + \varepsilon_{it})$$

$$\text{depression score} = 4.056 - 0.283\text{gender}_{it} + 0.030*\text{age}_{it} - 0.530*\text{urban}_{it} + 0.355\text{morbidity}_{it} + \mu_{it}$$

where: gender = gender (male or female)
age = age (years old)
urban = place (rural or urban)
morbidity = number of morbidities

5. Discussion

The RE model supports the hypothesis of the association between multimorbidity and depression among older persons. The finding shows that one more morbidity is associated with a higher depression score by 0.355 points. The association is in line with previous studies. For instance, Palmese et al. (2025) synthesize studies from various regions of the world, including China and Taiwan, and conclude that the causal association exists although each study includes a different disease list. A similar result in a more developed country, Canada, also found that multimorbidity is associated with a higher risk of depression, even for those without depression at baseline (Zhang et al., 2022).

This study found statistically significant results of being older and living in an urban area on the depression of older persons. An individual one year older tended to perceive higher depression than the younger one by 0.030 points. Advancing age may be associated with greater dependence on financial support due to lower income or unemployment. Meanwhile, it was found that living in an urban environment contributes to lower depression. Older persons living in urban areas have a lower depression score than those in rural areas by 0.530 points. In general, living in an urban area could be associated with better public health facilities and higher income. The findings regarding the negative effect of stopping working and the positive effect of living in an urban area on older persons' well-being are in line with a study of older persons in Jambi Province, Indonesia (Hardiani et al., 2025).

Referring back to the indifference curve, advancing age and lower health status are substitutes for each other. In other words, the risk of multimorbidity is associated with advancing age. As described by the indifference curve, being older is associated with a worsening health status, or more morbidities. Conversely, younger age is associated

with better health status or fewer morbidities. While being older, together with having a decreasing health status, cannot be hindered, mitigation strategies are needed to maintain the mental health of older persons. It is important to promote the utilization of mental care services for older persons with multimorbidity. In the case of Indonesia, especially, the utilization of national health insurance for mental health care services is feasible (Mahwati & Hasibuan, 2025).

The morbidities transition in Table 2 implicitly shows how the number of morbidities changes as individuals age. It shows that older persons with more morbidities at a younger age are less likely to have no morbidities in the future or at an older age. In addition, older persons with more morbidities at the baseline or at a younger age are more likely to have more morbidities in the future or at an older age. The results underline that maintaining the health of older persons from an early advanced age is noteworthy.

Besides the longitudinal data used as this study's strength, there are several limitations. First, the reverse relationship between depression and multimorbidity has not been assessed. A systematic review by Sekhon et al. (2026) shows that depression makes older persons have a loss of appetite, sleep disorders, and impairment in physical activities that further lead to other morbidities and mortality. Second, this study assesses the direct relationship between multimorbidity and depression. However, research has shown that the mechanism by which multimorbidity affects depression is complex. Factors such as social support, lifestyle, and medical treatment may buffer the impact of multimorbidity on depression (Agustini et al., 2020; Mindlis et al., 2022). Future research should consider the indirect pathways of the association between morbidity and depression among older adults and other sub-populations. In addition, the causal effect of multimorbidity on depression has not been shown. More rigorous studies are needed in the future. Third, the low R-squared indicates that there are unobserved covariates not in the models. Other socioeconomic factors should be included in the models. Lastly, the small sample may affect the result. Having a larger sample may yield more precise regression results.

6. Conclusions

This study shows a significant association between multimorbidity and depression. More morbidities are associated with lower utility, as reflected by higher depression. In line with the indifference curve, people will have more morbidities as they age. The promotion to utilize mental health services at public health facilities is urgent for older persons, although the Indonesian national health insurance ensures access to mental health services. Despite the current finding of the adverse association of multimorbidity on depression, future studies should explore more on socioeconomic factors determining older persons to visit the health service.

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