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DIFFERENTIAL ASSOCIATIONS OF SEX, AGE, AND MARITAL STATUS WITH DEPRESSIVE SYMPTOMS ACROSS IFLS-4 AND IFLS-5

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ABSTRACT
Previous studies in Indonesia have reported a relatively high prevalence of depressive symptoms, with variations observed based on characteristics and timeframes; consequently, the relationship between these characteristics and depressive symptoms may differ across survey periods. This study aims to analyze the relationship between gender, age, marital status, and depressive symptoms using data from waves 4 and 5 of the Indonesia Family Life Survey (IFLS). Method: This cross-sectional study used data from IFLS-4 (2007) and IFLS-5 (2014). A total of 29,965 respondents from IFLS-4 and 31,441 respondents from IFLS-5 were included in the analysis. Depressive symptoms were categorized as normal or having depressive symptoms. The datasets were merged and analyzed using Stata. Chi-square tests were used for bivariate analysis of categorical variables, and binary logistic regression was used for independent variables with multiple categories. In IFLS-4, sex/gender ($p = 0.458$), age ($p = 0.126$), and marital status ($p = 0.703$) were not significantly associated with depressive symptoms. In contrast, all three variables were significantly associated with depressive symptoms in IFLS-5 ($p < 0.001$). In IFLS-5, females represented a higher proportion of respondents with depressive symptoms than males (55.23% vs. 44.77%), respondents aged 14–20 years represented a higher proportion of those with depressive symptoms than those without symptoms (14.29% vs. 10.67%), and respondents who had never married were more frequently represented among those with depressive symptoms (25.63% vs. 18.18%). The discrepancy between the two survey waves is an important finding.

Keywords: age; depression symptoms; marital status; sex

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INTRODUCTION

Depressive symptoms are an important public health concern and represent a common manifestation of depression, a mental health disorder characterized by persistent low mood or loss of interest or pleasure in activities, often accompanied by fatigue, disturbed sleep or appetite, poor concentration, feelings of guilt or low self-worth, hopelessness, and thoughts of death or suicide (Pastuszak et al. 2024). Depression represents a substantial global health burden, with the World Health Organization estimating that approximately 5.7% of adults worldwide experience depression, equivalent to about 332 million people globally (Cai et al. 2023; Cao et al. 2026). The burden is also considerable in Indonesia, where a national population-based study using IFLS-5 reported that 23.47% of respondents had depressive symptoms based on the Center for Epidemiologic Studies Depression Scale (Alfaqeeh, Alfian, and Abdulah 2025). Another analysis of the IFLS-5 estimated a weighted prevalence of depressive symptoms of 22.6%, with a slightly higher prevalence among females (23.0%) than males (22.2%) (Leung et al. 2021). More recent research using IFLS-5 also identified younger age and unmarried status among factors associated with depressive symptoms in the Indonesian population (Astutik et al. 2021).

Several sociodemographic characteristics may be associated with differences in depressive symptoms, including sex, age, and marital status. Evidence consistently suggests that women experience depressive symptoms more frequently than men; a meta-analysis of nationally representative samples from more than 90 countries found higher odds of depression among

females, with the gender difference particularly pronounced during adolescence (Alfaqeeh, Alfian, and Abdulah 2025). Age may also be related to depression, although the direction and magnitude of the association can vary across populations and stages of life. The relationship between age and depression may reflect differences in developmental stage, social roles, socioeconomic circumstances, and exposure to life stressors (Salk, Hyde, and Abramson 2017).

Marital status has similarly been identified as an important social factor, with previous research indicating that unmarried individuals may have a higher risk of depressive symptoms than married individuals, potentially reflecting differences in social support and social integration. However, the relationships between sex, age, marital status, and depressive symptoms may not be consistent across populations or survey periods. Understanding these patterns is important for identifying population groups that may have a greater burden of depressive symptoms and for informing the development of appropriately targeted mental health screening, prevention, and intervention strategies in Indonesia. This study aimed to analyze the association between sex, age, and marital status with depression symptoms in the Indonesian population in 7 years survey (IFLS 4 and 5).

METHOD

Study Design and Data Source

This cross-sectional study used data from the Indonesia Family Life Survey (IFLS) waves 4 and 5 (IFLS-4 and IFLS-5). The IFLS is a longitudinal household survey that collects information on individual, household, socioeconomic, and health characteristics of the Indonesian population. The present study utilized data from both IFLS-4 in 2007 and IFLS-5 in 2014 to examine the association between sex, age, marital status, and depression symptoms.

Study Population and Variables

The study population consisted of IFLS-4 and IFLS-5 respondents for whom information on depression symptoms and the selected sociodemographic characteristics was available. Data on depression symptoms, sex, age, and marital status were obtained from Book 3B of IFLS, including the COV (covariate) section for the relevant sociodemographic variables. The same variables were obtained and analyzed from both IFLS-4 and IFLS-5 to allow comparison between the two survey waves.

The dependent variable was depression symptoms, while the independent variables were sex, age, and marital status. Depression symptoms were categorized into two groups: respondents with normal depression symptom scores and respondents with depression symptoms. Sex was categorized as male or female. Age was categorized into three groups: 14–20 years, 21–60 years, and >60 years. Marital status was categorized as not yet married, married, separated, divorced, widowed, and cohabiting, where available in the respective survey wave.

Data Management and Data Merging

Data preparation was conducted using Stata. The relevant datasets from IFLS-4 and IFLS-5 were first identified and prepared according to the variables required for the analysis. The datasets were subsequently merged using the appropriate individual identification variables to combine information from the relevant IFLS files. Data cleaning was performed before statistical analysis, including checking consistency, identifying, and handling missing values.

Statistical Analysis

Descriptive statistics were used to summarize the characteristics of the study population. Categorical variables were presented as frequencies and percentages, while continuous variables were summarized using the mean, standard deviation, minimum, and maximum values, where appropriate.The chi-square test was used for bivariate analysis of categorical variables. Binary logistic regression was used to examine the association between depression symptoms and

independent variables with multiple categories, such as marital status, with the reference category specified a priori. Statistical significance was determined using a p-value <0.05. The analyses were conducted separately for IFLS-4 and IFLS-5 to identify whether the associations between sex, age, marital status, and depression symptoms were consistent across the two survey waves.

Ethical Clearance

Ethical Clearance / Protocol Number: s0064-06-01-CR01. Issuing Institution in the US: Human Subjects Protection Committee / Institutional Review Board (IRB) of the RAND Corporation. Partner Institution(s) in Indonesia: Universitas Gadjah Mada (UGM) and/or SurveyMeter.

RESULT

Table 1.
Frequency Distribution of The Variable Across IFLS 4 and 5

Variable	f (%)	Mean	SD	Min	Max
IFLS 4	29.965				
Depression Symptoms		4.12	2.53	0	23
Normal	29.119 (97.18%)				
Having Depression Symptoms	846 (2.82%)				
Age					
14 - 20 years	3.451 (11.52%)				
21 - 60 years	23.638 (78.90%)	36.8	15.62	14	100
> 60 years	2.871 (9.58%)				
Sex/Gender					
Male	14.328 (47.82%)				
Female	15.632 (52.18%)				
Marital Status					
Not Yet Married	6.753 (22.54%)				
Married	20.717 (69.15%)				
Separated	162 (0.54%)				
Divorced	570 (1.90%)				
Widowed	1.758 (5.87%)				
IFLS 5	31.441				
Depression Symptoms					
Normal	24.575 (78.15%)	6.22	4.72	0	30
Having Depression Symptoms	6.872 (21.85%)				
Age					
14 - 20 years	3.605 (11.46%)				
21 - 60 years	25.156 (79.99%)				
> 60 years	2.686 (8.54%)				
Sex/Gender					
Male	14.702 (46.76%)				
Female	16.739 (53.24%)				
Marital Status					
Not Yet Married	6.227 (19.81%)				
Married	22.795 (72.50%)				
Separated	151 (0.48%)				
Divorced	654 (2.08%)				
Widowed	1.607 (5.11%)				
Cohabitate	7 (0.02%)				

Table 1, most respondents were classified as having normal depression symptom scores (29,119; 97.18%), while 846 respondents (2.82%) were classified as having depression symptoms. The mean age was 36.8 years (SD = 15.62), with an age range of 14–100 years. Regarding sex/gender, 15,632 respondents (52.18%) were female and 14,328 (47.82%) were male. In IFLS 5, the analysis included 31,441 respondents. The mean depression symptom score increased to 6.22 (SD = 4.72), with scores ranging from 0 to 30. A total of 24,575 respondents (78.15%) were classified as having normal depression symptom scores, whereas 6,872 (21.85%) were classified as having depression symptoms. Most respondents were aged 21–60 years (25,156; 79.99%), followed by those aged 14–

20 years (3,605; 11.46%) and those aged over 60 years (2,686; 8.54%). Females accounted for 16,739 respondents (53.24%), compared with 14,702 males (46.76%). Most respondents were married (22,795; 72.50%), followed by those who had never married (6,227; 19.81%), widowed (1,607; 5.11%), divorced (654; 2.08%), separated (151; 0.48%), and cohabiting (7; 0.02%).

Table 2.
The Association Between Sex, Age, Marital Status, and Depression Symptoms in IFLS 4 and 5

Variables	IFLS 4 (N= 29.965)			IFLS 5 (N= 31.441)		
	Normal (n= 29.119)	Depression Symptoms (n= 846)	p value	Normal (n=24.575)	Depression Symptoms (n= 6.872)	p value
	f (%)	f (%)		f (%)	f (%)	
Sex/Gender						
Male	13.938 (47.86%)	394 (46.57%)	0.458	11.626 (47.32%)	3.076 (44.77%)	<0.001
Female	15.182 (52.14%)	452 (53.43%)		12.944 (52.68%)	3.795 (55.23%)	
Age						
14 - 20 years	3.336 (11.46%)	115 (13.59%)	0.126	2.623 (10.67%)	982 (14.29%)	<0.001
21 - 60 years	22.992 (78.96%)	646 (76.36%)		19.698 (80.15%)	5.458 (79.42%)	
> 60 years	2.791 (9.58%)	85 (10.05%)		2.254 (9.17%)	432 (6.29%)	
Marital Status						
Not Yet Married	6.520 (22.39%)	233 (27.54%)	0.703	4.466 (18.18%)	1.761 (25.63%)	<0.001
Married	20.191(69.34%)	531(62.77%)		18.232(74.20%)	4.563 (66.41%)	
Separated	159 (0.55%)	3 (0.35%)		103 (0.42%)	48 (0.70%)	
Divorced	548 (1.88%)	22 (2.60%)		470 (1.91%)	184 (2.68%)	
Widowed	1.701 (5.84%)	57 (6.74%)		1.294 (5.27%)	313 (4.56%)	
Cohabitate	-	-	-	5 (0.02%)	2 (0.03%)	

Table 2 shows the association between sex/gender, age, marital status, and depression symptoms in IFLS 4. Among respondents without depression symptoms, 47.86% were male and 52.14% were female. Among respondents with depression symptoms, 46.57% were male and 53.43% were female. The difference in sex distribution between respondents with and without depression symptoms was not statistically significant ($p = 0.458$). Thus, based on the IFLS 4 data, there was no statistically significant association between sex/gender and depression symptoms. The association between age group and depression symptoms was not statistically significant ($p = 0.126$). Therefore, age group was not significantly associated with depression symptoms in IFLS 4. Despite these differences in proportions, the association between marital status and depression symptoms was not statistically significant ($p = 0.703$).

In IFLS 5, the distribution of sex/gender differed significantly between respondents with and without depression symptoms. Among respondents without depression symptoms, 47.32% were male and 52.68% were female, whereas among those with depression symptoms, 44.77% were male and 55.23% were female. This difference was statistically significant ($p < 0.001$), indicating a significant association between sex/gender and depression symptoms in IFLS 5. Female respondents represented a larger proportion of those with depression symptoms than male respondents. Age group was also significantly associated with depression symptoms in IFLS 5 ($p < 0.001$). Thus, younger respondents aged 14–20 years accounted for a larger proportion of respondents with depression symptoms, whereas the proportion of respondents aged over 60 years was lower among those with depression symptoms. Marital status was likewise significantly associated with depression symptoms in IFLS 5 ($p < 0.001$). The proportions of separated, divorced, and widowed respondents also differed between the two depression symptom groups. These findings indicate that marital status was significantly associated with depression symptoms in IFLS 5.

DISCUSSION

The sample composition was relatively similar between IFLS 4 and IFLS 5, with the majority of respondents being 21–60 years old, female, and married. However, the proportion of respondents classified as having depression symptoms increased substantially from 2.82% in IFLS 4 to 21.85% in IFLS 5. Similarly, the mean depression symptom score increased from 4.12 to 6.22. These descriptive findings indicate a notable difference in the distribution of depression symptoms between the two survey waves, although the observed difference should not be interpreted as a causal change without considering differences in measurement, sample composition, and analytical design. Overall, the results demonstrate a different pattern between IFLS 4 and IFLS 5. In IFLS 4, sex/gender, age group, and marital status were not significantly associated with depression symptoms. In contrast, all three variables showed statistically significant associations in IFLS 5 ($p < 0.001$). In IFLS 5, female respondents, younger respondents, particularly those aged 14–20 years, and respondents who had never married represented relatively larger proportions of those with depression symptoms.

Age and Depression Symptoms

The bivariate analysis showed different findings between IFLS 4 and IFLS 5 regarding the association between age and depression symptoms. In IFLS 4, age group was not significantly associated with depression symptoms ($p = 0.126$). The proportion of respondents aged 14–20 years was 11.46% among those without depression symptoms and 13.59% among those with depression symptoms, while the proportion aged 21–60 years was 78.96% and 76.36%, respectively. Among respondents aged >60 years, the proportions were 9.58% and 10.05%, respectively. In contrast, age was significantly associated with depression symptoms in IFLS 5 ($p < 0.001$). Respondents aged 14–20 years represented 14.29% of those with depression symptoms compared with 10.67% of those without depression symptoms, whereas respondents aged >60 years represented 6.29% and 9.17%, respectively. These findings suggest that the relationship between age and depression symptoms was more evident in IFLS 5 than in IFLS 4.

The inconsistent findings between the two IFLS waves are broadly consistent with previous research showing that the relationship between age and depression is not uniform across populations. A systematic review and meta-analysis of depression in older adults found substantial variation in depression prevalence across studies, influenced by factors such as geographic region, sampling characteristics, and assessment instruments (Hu et al. 2022). Similarly, a global meta-analysis found that mean age was significantly associated with depression prevalence, but the association was negative, indicating that higher mean age was not necessarily accompanied by a higher prevalence of depression (Cai et al. 2023). This may help explain why age was significant in IFLS 5 but not in IFLS 4. Therefore, the non-significant finding in IFLS 4 does not necessarily contradict previous evidence, but rather demonstrates that the association between age and depression may vary according to population and study context.

The significant finding in IFLS 5 can be interpreted using the life-course perspective, which proposes that mental health is influenced by changing social(Merino et al. 2024), psychological, and environmental circumstances across different stages of life (Heanoy and Brown 2024; Mastorci et al. 2024). Different age groups experience different developmental challenges, social roles, and exposure to stressors, which may influence vulnerability to depressive symptoms (J. Kim, Park, and Jang 2024). In particular, younger respondents may experience educational, employment, financial, interpersonal, and identity-related pressures, whereas older adults may experience health problems, functional limitations, bereavement, and changes in social roles (Meagher et al. 2026; Psiuk et al. 2026). The present IFLS 5 finding, in which the youngest group represented a larger proportion of respondents with depression symptoms, therefore supports the concept that depression risk can vary across stages of the life course rather than increasing linearly with age. However, because the

present analysis is bivariate, this theoretical interpretation should be considered explanatory rather than evidence of a causal effect of age.

Sex/Gender and Depression Symptoms

The bivariate analysis also demonstrated different results between IFLS 4 and IFLS 5 for sex/gender. In IFLS 4, females represented a slightly larger proportion of respondents with depression symptoms; the difference was not statistically significant. In contrast, in IFLS 5, sex/gender was significantly associated with depression symptoms ($p < 0.001$). Females accounted for 55.23% of respondents with depression symptoms compared with 52.68% of those without depression symptoms, while males accounted for 44.77% and 47.32%, respectively. Thus, the IFLS 5 results indicate that female respondents were disproportionately represented among respondents with depression symptoms, whereas this pattern did not reach statistical significance in IFLS 4.

The significant finding in IFLS 5 is consistent with substantial previous evidence indicating that women generally experience higher levels of depression and depressive symptoms than men. A large meta-analysis involving national samples from more than 90 countries found a significant gender difference in both diagnosed depression and depressive symptoms, with women showing higher odds than men (Salk, Hyde, and Abramson 2017). A systematic review focusing on biological sex differences similarly reported that depression prevalence is approximately twice as high among women as among men and identified differences in biological processes associated with depression (Labaka et al. 2018). Nevertheless, the non-significant finding in IFLS 4 is also plausible because sex differences in depression are not necessarily consistent across all populations or survey waves. Differences in cultural context, age composition, socioeconomic circumstances, measurement instruments, and exposure to psychosocial stressors may influence the magnitude of sex differences (Aragonés, Jiménez-García, and Arias 2025; Farhane-Medina et al. 2022). Thus, the discrepancy between IFLS 4 and IFLS 5 may reflect differences in population characteristics and contextual factors rather than an absence of sex differences in depression generally.

The significant IFLS 5 finding can be explained through the biopsychosocial theory of depression, which conceptualizes depressive symptoms as the result of interactions among biological, psychological, and social factors. From a biological perspective, sex-related differences in hormonal and neurobiological processes may contribute to differential vulnerability to depression (Hodes et al. 2024; da Silva et al. 2025). From a psychosocial perspective, women may experience greater exposure to certain forms of social stress, caregiving responsibilities, interpersonal difficulties, and socioeconomic disadvantage, which can increase vulnerability to depressive symptoms (Ebong et al. 2024; Meagher et al. 2026). The higher proportion of women experiencing depressive symptoms in IFLS 5 is therefore consistent with the biopsychosocial framework, in which biological susceptibility interacts with social and psychological stressors. Importantly, this interpretation does not imply that being female directly causes depression; rather, sex/gender may function as a marker associated with different exposures and vulnerabilities.

Marital Status and Depression Symptoms

The bivariate analysis showed that marital status was **not significantly associated with depression symptoms in IFLS 4 ($p = 0.703$). Among respondents without depression symptoms, 69.34% were married, 22.39% had never married, 5.84% were widowed, 1.88% were divorced, and 0.55% were separated. Among respondents with depression symptoms, the corresponding proportions were 62.77%, 27.54%, 6.74%, 2.60%, and 0.35%. In contrast, marital status was significantly associated with depression symptoms in IFLS 5 ($p < 0.001$). The proportion of respondents who had never married was higher among those with depression symptoms than among those without depression symptoms (25.63% vs. 18.18%), whereas the proportion of married respondents was lower among those with depression symptoms (66.41% vs. 74.20%). The proportions of divorced and widowed respondents also differed between the two groups. These findings indicate that marital status

showed a statistically significant relationship with depression symptoms in IFLS 5 but not in IFLS 4.

The significant finding in IFLS 5 is strongly supported by previous research. A meta-analysis of studies involving adults aged 55 years and older found that unmarried older adults had a higher risk of depression than married older adults, with particularly elevated risks among widowed, divorced, and never-married individuals (Ebong et al. 2024). More recently, a large cross-national study involving seven countries, including Indonesia, found that unmarried individuals had a significantly higher risk of depressive symptoms than married individuals (pooled OR = 1.86, 95% CI 1.61–2.14) (Yan et al. 2011). Previous research has also reported that married women were less likely to report depressive symptoms than unmarried women (Earle et al. 1998; Hu et al. 2022). However, the absence of a significant association in IFLS 4 is not inconsistent with all previous research. For example, a meta-analysis among patients with myocardial infarction found no statistically significant association between being married/partnered and lower risk of depression (Labaka et al. 2018; Zhu et al. 2023). These contrasting findings suggest that the relationship between marital status and depression may depend on population characteristics, social support, relationship quality, economic circumstances, and cultural context.

The significant association observed in IFLS 5 can be interpreted through the social support and stress-buffering theory. Marriage can provide emotional support, companionship, practical assistance, financial resources, and social integration, which may reduce the psychological impact of stressful life events(Awaliah, Adenika, and Kaloeti 2023; Munawar et al. 2024). Conversely, individuals who are unmarried may have fewer sources of consistent emotional or instrumental support, potentially increasing vulnerability to depressive symptoms. This interpretation is consistent with evidence that the association between marital status and depression can operate through social and economic resources; previous longitudinal research, for example, identified household income and social integration as important pathways linking marital status with subsequent depressive symptoms (E. Kim et al. 2026; Nicolaou et al. 2025). Therefore, the lower proportion of married respondents among those with depressive symptoms in IFLS 5 is consistent with the stress-buffering perspective, in which supportive social relationships may protect against psychological distress. Nevertheless, marital status itself should not be regarded as a direct cause of depression, because the observed association may also reflect differences in socioeconomic status, social support, health status, and other unmeasured factors.

CONCLUSION

The findings should be interpreted as associations rather than causal relationships, because the analysis presented is bivariate. The discrepancy between IFLS 4 and IFLS 5 underscores the importance of accounting for differences across survey waves, population characteristics, and contextual factors when examining sociodemographic determinants of depression. Further multivariable and longitudinal analyses are recommended to determine whether age, sex/gender, and marital status remain independently associated with depression symptoms after controlling for potential confounding factors and to better understand why the associations observed in IFLS 5 were not present in IFLS 4

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