


# Identification of Depression Among Elderly During COVID-19

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## Abstract

Elderly population is increasing, while the world has been facing the novel coronavirus (COVID-19), which causes a greater adverse impact among older population in various aspects of their lives, such as depression, daily routine disruption, illness, and social and emotional issues. The purpose of this study was to assess the elderly's depression during the COVID-19 pandemic, and the risk factors including socio-demographic, physical and psychosocial conditions, as well as family support. The method used was cross-sectional design, with a total sampling of 457 participants. The measuring instruments used were ADL (Activities of Daily Living Scale) and IADL (Lowton and Brody Instrumental Activities of Daily Living Scale) for physical activities assessment, APGAR (Adaptability, Participation, Growth, Affection, Resolution) for family support function assessment, and Geriatric Depression Scale (GDS) for depression level measurement, with additional questions for psychosocial assessment. 212 elderlies (46.4%) were found with no depression tendency, 183 elderlies (40%) had a tendency of depression, and 62 elderlies (13.6%) had depression. These depression issues were significantly linked to retirement and income among elderly, dependency, fitness and health status, family and social support, and sources of funds. In the presence of depression, control measures for social, health, and psychosocial support must be implemented in order to minimize its impact among the elderly.

## Keywords

elderly, Indonesian, pandemic, COVID-19, depression

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## Introduction

The proportion of elderly (above 60 years old) is the fastest growing population globally compared to other groups.<sup>1</sup> In fact, the number of elderly population will be doubled from 11% to 22% until 2050.<sup>2</sup> Based on the data from the Central Bureau of Statistics (BPS) Indonesia in 2020, currently the percentage of Indonesian elderly is at around 10%, and will grow to around 19.8% in 2045.<sup>3</sup> Moreover, Indonesia has been classified as having the eighth largest elderly population in the world and is ranked the third among Asia-Pacific countries.<sup>4</sup>

Based on UNDESA's 2019 *report*, the population aged over 65 years old would reach 703 million and was predicted to double by 2050, that is, *1.5 billion in which* the proportion of older adult is 16%. It means that 1 of 6 people in the world's population is elderly.<sup>5</sup> Developed countries in the Asia Pacific Region are also experiencing population changes in their social structure, where the population is

aging at a higher-than-average pace.<sup>6</sup> Indonesia as a developing country in the same region, *is also known as having its older population increased* due to advances in health care and social welfare, characterized by increased life expectancy and decreased mortality. Based on the data from *The Statistical bureau, 2017 the proportion of Indonesian older people* within 5 decades had increased more than *two-folds* from 1971 to 2019 period, that is, 4% to 9.6% (25 million).<sup>7,8</sup>

The epidemiological study reported that mental illness problems have become a concern among the older population,

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such as anxiety-related disorders with the presence of physical illness, dementia, functional illnesses *due to* depression.<sup>9</sup> In addition, the study of mental disorders' prevalence amongst seniors in developing countries is limited. A systematic study reported that the prevalence of mental disorders in Nepal ranged from 29.7% to 60.6%.<sup>10</sup>

Depression is the leading cause of ill health and disability worldwide. Globally, depression accounts for one-sixth of Disability Adjusted Life Years (DALY) in elderly.<sup>11</sup> There are many prevalence studies of depression among elderly in developing countries with relatively small sample sizes and considerable heterogeneity. In a major study, Eugenia Alvarado et al<sup>12</sup> found the prevalence of depression identified by Geriatric Depression Scale was 16.5% to 30.1% in elderly women and 11.8% to 19.6% in elderly men in 6 cities in Latin America. At worst, depression can lead to suicide. Moreover, depression is also one of the most serious mental health disorders suffered by adults aged 60 years old and over.<sup>13</sup> Depression is estimated to affect around 350 million people around the world, and it is projected that by 2030 severe depression will be one of the most debilitating conditions of disease in the world.<sup>14</sup> In Indonesia, the prevalence of depression among nursing home population is quite high (42.5%), and this has been attested by the evidence of high demand for nursing home programs that are suitable for accommodating the elderly's physical and mental health.<sup>15</sup> A study conducted by Hanum et al<sup>16</sup> showed a high prevalence of psychological issues among the elderly, where 32.72% of the study sample experienced depression. According to Wahyuningsih et al,<sup>17</sup> the risk of depression rose with the experience of chronic illness, social isolation, and loneliness.

The impact of migration and rapid urbanization in developing countries is significant on the elderly. Changing attitudes toward elderly in these societies have to be understood as explaining the context of emerging mental health problems and their care. The veneration and respect toward elderly were reported to be on the wane in India<sup>18</sup> and more symbolic with negative stereotypes in East Asia.<sup>19</sup> Social isolation, disintegration of the joint family system, increased levels of dependency, and elder abuse are important psychosocial issues that have a huge impact on the wellbeing of the elderly in developing countries.

Unfortunately, nowadays all countries have become concerned with the COVID-19 situation. In fact, the WHO has confirmed that it is characterized as a global pandemic with a detrimental effect on any daily activities.<sup>20</sup> In addition, it has been clearly established that COVID-19 has affected vulnerable groups, particularly older adults. US Center for Disease Control and Prevention states that the risk of COVID-19 disease increases with age, with elderly at the highest risk.<sup>21</sup> Consequently, it has raised concerns about their mental health. Moreover, during the COVID-19 pandemic, information on social media has spread rapidly, particularly those

related to the ferocity of the COVID-19 virus that causes high morbidity and mortality both domestically and overseas, whether hoaxes or facts, which are witnessed by the elderly themselves, that induce stress. In addition, health protocols in order to reduce transmission must be implemented, such as the necessity for everyone to comply with social distancing, crowd reducing, and mobility rules. As a result, the elderly is visited less often, with no more gatherings or parties, and less opportunities to visit medical services in person. Hence, their feelings of loneliness, isolation, and emptiness are increasingly aggravating depressive condition. Further, the impact of COVID-19 toward the elderly's mental health globally is clearly profound.<sup>22</sup> A recent study shows that elderly people as a vulnerable group are feeling anxiety and stress during the pandemic.<sup>23</sup> In addition, 37.1% of elderly people had suffered from depression and anxiety in the COVID-19 situation.<sup>24</sup>

The elderly is the most high-risk group affected by COVID-19, which caused a significant mental health issue. In fact, the study in Indonesia related to those issue was limited. In addition, in the culture perspective, Indonesian has strong family ties such as family gathering and frequent elderly visit. During the pandemic, this cultural was being destroyed and resulting a detrimental impact on older people's life and psychological issues like feeling being banned, loneliness, powerless, helpless, and so on. Based on the above conditions, the study aimed to assess depression among the elderly during the COVID-19 pandemic, and the risk factors including socio-demographic, physical and psychosocial conditions, as well as family support.

## Materials and Methods

The study utilized cross-sectional with quantitative approach by a self-reported questionnaire that was filled-in by a family member who has elderly. The independent variables that is, socio-demographics, the state of both physical and psychosocial issues of the elderly, and also social and financial support toward the level of depression among Indonesian elderly during the pandemic, served as the study's dependent variables.

Other than a self-created questionnaire for socio-demographic, social and financial issues, illnesses and health status, the standard questionnaires were used as measurement tools for some assessments, that is, GDS, ADL, IADL, and APGAR Score.

GDS (Geriatric Depression Scale) was used for depression level measurement. The assessment was based on the answers to GDS's 15 questions (with yes or no answer), with each appropriate answer getting 1 score. The elderly was categorized as having depression if they reached a score of 10 or more, very likely to have a depression if reaching a score of 5 to 9, and not having a depression if the score was below 5 (Yesavage and Sheikh, 1986).<sup>25</sup> In this

study, a category of very likely to have a depression (score 5-9) was combined into depression category. As the consideration that the elderly was very likely to have depression, if they experienced some stressors or problems, they were very vulnerable to falling into depression. Therefore, elderly was divided into depression and no depression groups. An Indonesian version of GDS is available, translated and back translated by Karel Karsten Himawan.<sup>26</sup> The validity and reliability have been tested by Pramesona and Taneepanichskul.<sup>27</sup> The items-total score of Pearson's correlation was significant at .05 level and with Content Validity Index for Items (I-CVI) computation was 1.00, with Cronbach's alpha was .80. ADL (Activities of Daily Living Scale) was used to assess basic physical skills required to independently care for oneself, such as bathing, dressing, mobility, using the toilet, continence, and eating. The assessment was based on the answers to 10 questions, with the total score of 20 (with Likert scale). The elderly was divided into 5 categories as independent with a total score of 20, slightly dependent when reaching a score of 12 to 19, more dependent 9 to 11, highly dependent 5 to 8 and fully dependent if the score was 0 to 4. Simultaneously, IADL (Lowton and Brody Instrumental Activities of Daily Living Scale) was also used to assess more complex activities related to the ability to live independently in the community, that required more complex thinking skills, including organizational skill such as managing finances and medications, food preparation, housekeeping, laundry, or go shopping. We were using 8 questionnaires with the total score of 16 (with Likert scale), 1 was categorized as independent if he reached a total score of 9 to 16, 1 to 8 as independent but needing assistance, and as fully dependent if the score was zero.<sup>28</sup> In addition, Indonesian version ADL and IADL has been tested with Cronbach alpha of .84 and .91 respectively.<sup>29</sup> Furthermore, APGAR (Adaptability, Participation, Growth, Affection, Resolution) was used for family support function assessment, in which we used 5 questionnaires for a total score of 10, with the score of 7 to 10 was categorized as a highly functional family, 4 to 6 as moderate dysfunctional family, and 0 to 3 as severe dysfunctional family.<sup>30</sup> APGAR has been translated and back translated to Indonesia by Sari et al. The reliability was .896 (Cronbach's alpha) with the validity was  $>.182$  (Pearson correlation).<sup>31</sup>

All of self-created questions were tested using Pearson's Correlation Product Moment for validity with the returned values varying between .412 and .572 in the commonality analysis, and for reliability through Cronbach's alpha, with all of the questions demonstrating reliability with the value of .583 (higher than .5). Thus, the instrument demonstrated validity and reliability.

This online survey using Google Forms was presented to Indonesian families with elderly using snowball technique up to a minimum of 450 respondents. We used a formula for sample size calculation in a proportional descriptive study to calculate the sample size.<sup>32</sup> Using 6.1 prevalence rate,<sup>33</sup>

precision value of 0.05, and a Z-value of 1.96, the formula yielded a minimum sample size of 88 persons. In order to anticipate the weaknesses of snowball technique, the link of questionnaires was distributed through social media. Additionally, we approached colleagues with elderly family members and nursing home managements, to ensure the representativeness of the sample to the general elderly population, and to avoid the possibility of just representing a concentrated population in only 1 region, data was gathered from 34 provinces (all of provinces in Indonesia).

Informed consent was distributed to the participants before completing the main questionnaires. The informed consent has been applied approaching the principle of beneficial, no harm, confidential, justice, as well as voluntary participants. The provided information should be agreed to by participants before data collection. The participant could stop the survey anytime during the data completion. The informed consent had been reported during the Ethics Approval and Consent prior the study. The inclusion criteria of this study were participants who had elderly in their family members. The study was conducted from August 20th to December 27th 2020. This study was reviewed by The Research and Community Engagement Ethical Committee, Faculty of Public Health, Universitas Indonesia, with the ethical approval number 274/UN2.F10.D11/PPM.00.02/2020.

## Results

### Study Participants

With the snowball technique, up to 495 respondents from all over Indonesia filled out the online questionnaire, but 457 completed data that could be analyzed. Most elderly were women, 276 (60.39%), and only 181 men (39.61%), with the average age ranging from minimum 60 to maximum of 97 years old; most of them were well educated, namely 175 (38.29%) undergraduate and 134 (29.32%) high school or equivalent; mostly, that is, 374 (81.84%) were married, but only 181 (39.61%) still had a spouse, with more than half of the elderly, that is, 253 (55.36%) were widowed. The occupation of the elderly varied from government employee, military or police, lawyers, doctors, and businessmen to farmers and casual workers with no permanent jobs; about half of them, that is, 246 (53.83%) were unemployed, and 164 (35.89%), were retirees. The latest income of the elderly was generally low, that is, with 270 (59.08%), below USD 244.3, but many, that is, 91 (19.91%), earned more than USD 349 per month (Table 1).

### The Depression Level of Elderly During the Pandemic

In this study, using the GDS questionnaire, it was found that 245 out of 457 elderly (53.57%) experienced depression and the rest (46.43%) was categorized as no depression.

**Table 1.** Demographic Characteristics (n=457).

Variables	n (%)
Sex	
Male	181 (39.61)
Female	276 (60.39)
Age	
60-69 years old	183 (41.10)
70-79 years old	155 (33.90)
>80 years old	119 (26.00)
Education	
No Education	15 (3.28)
Elementary (not finished)	23 (5.03)
Elementary	72 (15.75)
Junior High school	38 (8.32)
Senior High school	134 (29.32)
University	175 (38.29)
Marital status	
Married	374 (81.84)
Divorced	72 (15.75)
Single	11 (2.41)
Occupation	
Unemployed	246 (53.83)
Government Employee	9 (1.97)
Entrepreneur	16 (3.5)
Private Employee	7 (1.53)
Army/Police	1 (0.22)
Doctor/Lawyer	3 (0.66)
Farmer	8 (1.75)
Labor (not full)	3 (0.66)
Retired	164 (35.89)
Income	
<USD 244.3 IDR 3.5 million)	270 (59.08%)
USD 244.3-349 (IDR. 3.5-5 million)	96 (21.01)
>349 USD (<IDR. 5 million)	91 (19.91)

### The Association Between Elderly's Demographic Issue and Depression

Statistical analysis of this study found that age and education were not significantly correlated with depression in the elderly, but there were some interesting demographic records, namely marital status, work, and income when they were still active. Although there was no statistically significant difference, still married seniors tended to be less depressed (22%) compared to those who were divorced (28%) or single (27%); similarly, the elderly who were unemployed (30%) or had casual work only (33%) were more depressed than those in other occupation groups. Furthermore, it was proven that the elderly who retired were significantly protected from depression compared to other occupation statuses ( $P=.001$ , OR=0.410 [95% CI 0.247-0.679]); it was also proved that those who had a regular income of USD 244.3 to 349 per month ( $P=.007$ , OR=0.415 [95% CI 0.218-0.789]) were at lower risk of depression (Table 2).

### The Association Between Elderly's Physical Issue and Depression

An assessment of the level of depression using the ADL/activities daily living score found that 63% of the elderly who were fully dependent were depressed, whereas only 12% of the elderly who were independent experienced depression. The increasing level of the elderly's dependence was directly proportional to the increasing proportion of the elderly who experienced depression (12% for independent, 23% for slightly dependent, 26% for more dependent, 50% for highly dependent, and 63% for fully dependent). The differences were highly significant ( $P=.0001-.015$ ) except for the fully dependent elderly, which was no longer significant (Table 3).

The IADL assessment also showed that the elderly who were fully dependent (unable) were those (55%) experiencing depression most, compared to the elderly who were independent, where only 12% of them fell into depression. The differences were very significant if the "unable" was compared to the elderly who were still independent ( $P=.0001$ ) or the elderly who were independent but already in need help ( $P=.0006$ ).

It is important to note that in this study, only 10% of elderly who looked fit (according to the general perception of their family) experienced depression compared to those who looked unfit, where almost half (47%) experienced depression; the difference was very significant ( $P=.0001$ ). The association analysis also found that the elderly who looked unfit were more than 8 times being at risk of experiencing depression compared to those who looked fit.

Furthermore, this study found that the elderly with chronic diseases were generally much more depressed than their peers who did not have chronic disease, the differences were very significant ( $P<.05$ ). The chronic diseases referred to stroke, diabetes mellitus, dementia, memory loss, and bowel/urinary incontinence. Meanwhile, the proportion of depression did not differ significantly between elderly with or without hypertension, coronary heart disease, osteoporosis, visual disturbances, loss of hearing, or musculoskeletal disorders.

In fact, the elderly without dementia were more protected than those with dementia, the difference was significant with an OR 0.317 (95% CI 0.157-0.642) compared to the elderly with dementia; Likewise, the elderly without memory loss were less depressed than the elderly with memory loss, also by a significant OR of 0.413 (95% CI 0.241-0.708).

*The association between elderly's psychosocial issue and depression.* APGAR Scale was used to assess the family care function. It was found that only 16% of the elderly who had a well-functioning family experienced depression, compared to the elderly whose family was not functioning well of 61%, the difference was very significant ( $P=.0001$ ).

**Table 2.** Association Between Elderly's Demographic Factors and Depression.

Variables	No depression		Depression		Total		P-value	OR (95% CI)
	n	%	n	%	n	%		
<b>Sex</b>								
Male	145	80	36	20	181	100	.247	1.343 (0.851-2.117)
Female	207	75	69	25	276	100		
<b>Education</b>								
No Education	11	73	4	27	15	100	—	I
Elementary (not finished)	21	91	2	9	23	100	.155	0.262 (0.041-1.662)
Elementary	51	71	21	29	72	100	.846	1.132 (0.324-3.961)
Junior High school	25	66	13	34	38	100	.597	1.430 (0.380-5.386)
Senior High school	104	78	30	22	134	100	.709	0.793 (0.236-2.672)
University	140	80	35	20	175	100	.541	0.688 (0.206-2.289)
<b>Marital status</b>								
Married	292	78	82	22	374	100	—	I
Divorced	52	72	20	28	72	100	.280	1.370 (0.774-2.424)
Single	8	73	3	27	11	100	.674	1.335 (0.346-5.148)
<b>Occupation</b>								
Unemployed	171	70	75	30	246	100	—	I
Government Employee	8	89	1	11	9	100	.241	0.285 (0.035-2.319)
Entrepreneur	14	88	2	13	16	100	.144	0.326 (0.072-1.469)
Private Employee	6	86	1	14	7	100	.374	0.380 (0.045-3.212)
Army/Police	1	100	0	0	1	100	I	—
Doctor/Lawyer	3	100	0	0	3	100	.999	—
Farmer	8	100	0	0	8	100	.999	—
Labor (not full)	2	67	1	33	3	100	.915	1.140 (0.102-12.766)
Retired	139	85	25	15%	164	100%	.001	0.410 (0.247-0.679)
<b>Income</b>								
<USD 244.3	196	73	74	27%	270	100%	—	—
USD 244.3-349	83	86	13	14%	96	100%	.007	0.415 (0.218-0.789)
>USD 349	73	80	18	20%	91	100%	.151	0.653 (0.365-1.168)

The results of this study also show that good psychosocial aspects significantly protect the elderly against depression, that is, if the elderly have close friends, have no difficulty in communication, or have a chat group; also if the elderly still have positive behavioral aspects, for example, are still following current issues either through television or other social media, believe that everything has been arranged and determined by God, or are still engaged in routine worship; on the other hand they become more depressed if they are worried and/or embarrassed when their problems are known by others, and also if the elderly are often emotional (Table 4).

### *The Association Between Elderly's Supporting Issue and Depression*

Location and home ownership status of the elderly were not associated with depression and were not statistically significant. However, the elderly who lived in Java and Bali tended to be more depressed (24%) than the elderly who

lived outside Java and Bali (19%), also the elderly who lived in a nursing home tended to be more depressed (34%) than those living in a community dwelling, staying either in their own house or in their family's house (Table 5).

Elderly with health insurance or savings/deposits were the less depressed, 13% and 14%, respectively. On the other hand, older people who still had to find sources of self-financing or family funding were more likely to experience depression, 33% and 27%, respectively; this difference was statistically significant. Apparently, the presence of regular funds also tended to protect the elderly from depression, that is, 22% depression in the elderly who had regular funds compared to 32% depression in the elderly who did not have regular funds (Table 5).

### **Discussion**

In this study, there were 53.57% elderly who was categorized as depressed. The prevalence of depression in 2017 was almost one-quarter of total participants or 24.9%.<sup>34</sup>

**Table 3.** Association Between Elderly's Physical Issue and Depression.

Variables	No depression		Depression		Total		P-value	OR (95% CI)
	n	%	n	%	n	%		
<b>ADL</b>								
Independent	158	88	22	12	180	100	.000	0.084 (0.033-0.214)
Slightly Dependent	150	77	44	23	194	100	.0001	0.176 (0.072-0.429)
More Dependent	17	74	6	26	23	100	.015	0.212 (0.061-0.735)
Highly Dependent	18	50	18	50	36	100	.342	0.600 (0.209-1.721)
Fully Dependent	9	38	15	63	24	100		1
<b>IADL</b>								
Unable/Fully Dependent	17	45	21	55	38	100	—	1
Needs Assistance	121	69	55	31	176	100	.006	0.368 (0.180-0.752)
Independent	214	88	29	12	243	100	.0001	0.110 (0.052-0.232)
<b>Age</b>								
60-69 years old	144	79	39	21	183	100	—	1
70-79 years old	112	72	43	28	155	100	.17	1.418 (0.861-2.334)
>80 years old	96	81	23	19	119	100	.677	0.885 (0.497-1.574)
<b>Fitness</b>								
Looks fit	265	90	28	10	293	100	.0001	8.376 (5.102-13.751)
Looks unfit	87	53	77	47	164	100		
<b>Hypertension</b>								
Yes	176	77	53	23	229	100	1	0.981 (0.634-1.517)
No	176	77	52	23	228	100		
<b>CHD</b>								
Yes	64	78	18	22	82	100	.921	1.074 (0.604-1.909)
No	288	77	87	23	375	100		
<b>Stroke</b>								
Yes	24	44	30	56	54	100	.0001	0.183 (0.101-0.331)
No	328	81	75	19	403	100		
<b>Diabetes mellitus</b>								
Yes	66	69	30	31	96	100	.042	0.577 (0.350-0.952)
No	286	79	75	21	361	100		
<b>Dementia</b>								
Yes	19	54	16	46	35	100	.002	0.317 (0.157-0.642)
No	333	79	89	21	422	100		
<b>Osteoporosis</b>								
Yes	49	71	20	29	69	100	.257	0.687 (0.388-1.219)
No	303	78	85	22	388	100		
<b>Memory loss</b>								
Yes	44	62	27	38	71	100	.002	0.413 (0.241-0.708)
No	308	80	78	20	386	100		
<b>Visual disturbance</b>								
Yes	41	67	20	33	61	100	.073	0.560 (0.312-1.007)
No	311	79	85	21	396	100		
<b>Hearing loss</b>								
Yes	53	70	23	30	76	100	.132	0.632 (0.366-1.092)
No	299	78	82	22	381	100		
<b>Bowel/urinary incontinence</b>								
Yes	19	58	14	42	33	100	.011	0.371 (0.179-0.768)
No	333	79	91	21	424	100		
<b>Musculoskeletal disorder</b>								
Yes	116	74	41	26	157	100	.3	0.767 (0.489-1.204)
No	236	79	64	21	300	100		

**Table 4.** Association Between Elderly's Psychosocial Issue and Depression.

Variables	No depression		Depression		Total		P-value	OR (95% CI)
	n	%	n	%	n	%		
<b>APGAR</b>								
Dysfunction of the family	7	39	11	61	18	100	—	—
Slight dysfunction of the family	52	57	39	43	91	100	.161	0.477 (0.170-1.343)
Family is functioning well	293	84	55	16	348	100	.0001*	0.119 (0.044-0.322)
<b>Have close friend</b>								
Yes	305	80	75	20	380	100	.0001*	2.596 (1.539-4.380)
No	47	61	30	39	77	100		
<b>Communication difficulty</b>								
Yes	43	49	45	51	88	100	.0001*	0.186 (0.112-0.306)
Not	309	84	60	16	369	100		
<b>Sharing problem with others</b>								
Yes	230	77	68	23	298	100	1	1.026 (0.650-1.619)
No	122	77	37	23	159	100		
<b>Have a chatting group</b>								
Yes	187	86	31	14	218	100	.0001*	2.705 (1.693-4.323)
No	165	69	74	31	239	100		
<b>Cognitive aspect</b>								
<b>Following ongoing issues</b>								
Yes	274	82	62	18	336	100	.0001*	2.436 (1.533-3.872)
No	78	64	43	36	121	100		
<b>Behavioral aspect</b>								
<b>Conflict with others</b>								
Yes	43	57	32	43	75	100	.0001*	0.317 (0.188-0.536)
No	309	81	73	19	382	100		
<b>Believe that all are God's will</b>								
Yes	342	79	91	21	432	100	.0001*	4.769 (2.095-10.860)
No	11	44	14	56	25	100		
<b>Routine worship</b>								
Yes	315	82	68	18	383	100	.0001*	4.632 (2.738-7.836)
No	37	50	37	50	74	100		
<b>Worry of problem disclosure</b>								
Yes	97	67	48	38	145	100	.001*	0.452 (0.288-0.708)
No	255	82	57	18	312	100		
<b>Shame over problem disclosure</b>								
Yes	125	71	51	29	176	100	.021*	0.583 (0.375-0.906)
No	227	81	54	19	281	100		
<b>Emotional</b>								
Never	40	87	6	13	46	100	—	1
Sometimes	245	85	44	15	289	100	.7	1.197 (0.479-2.993)
Often	52	57	40	43	92	100	.001*	5.128 (1.979-13.286)
Very often	15	50	15	50	30	100	.001*	6.667 (2.181-20.378)

\*significant correlation  $P < .05$ .

Madyaningrum et al<sup>34</sup> found that before pandemic, the likelihood of depression was associated with low life satisfaction, low economic status, worse self-rated health, worse physical function, low level of exercise, and sleep impairment. But in pandemic era, this study found that the sociodemographic issues significantly related to depression

were occupation, that is, the elderly who were retired, and those who had income. This is because the elderly feel they can still independently finance their lives, so they are less depressed than those who do not have a pension or income of their own. We also know that the mobilization restriction policy in Indonesia to reduce transmission of COVID-19

**Table 5.** Association Between Elderly Supporting Issues and Depression.

Variables	No depression		Depression		Total		P-value	OR (95% CI)
	n	%	n	%	N	%		
<b>Dwelling location</b>								
Java-Bali	293	76	91	24	384	100		1
Outside Java-Bali	59	81	14	19	73	100	.49	0.764 (0.408-1.432)
<b>Dwelling status</b>								
Family owned house	198	77	58	23	256	100	—	1
Nursing home	21	66	11	34	32	100	.147	1.788 (0.815-3.924)
Self-owned house	133	79	36	21	169	100	.742	0.924 (0.577-1.479)
<b>Source of funds</b>								
Health insurance	68	87	10	13	78	100	—	1
Self-financed	31	67	15	33	46	100	.01	3.290 (1.330-8.141)
Family	185	73	69	27	254	100	.011	2.536 (1.236-5.206)
Savings/Deposit	68	86	11	14	79	100	.839	1.100 (0.438-2.760)
<b>Routine funds</b>								
Yes	322	78	91	22	413	100	.201	1.651 (0.840-3.245)
No	30	68	14	32	44	100		1

made the elderly being visited less often, with no more gatherings or parties with family or friends, less opportunities to visit medical services directly, and less entertainment because elderly is very worry to go anywhere such as cinema or shopping center.

This finding is in accordance with a study by Mirkena et al,<sup>35</sup> with 800 respondents from Oromia, Ethiopia, in which it was found that the prevalence of depression in the elderly was 41.8%, which was identified to be high, particularly retired older adult and female elderly that has strongly association with depression. In addition, Bakhtiyari et al<sup>36</sup> pointed out that there were a negative association between social support and depression, which means that high social support has an integral part in reducing the risk of depression among elderly.<sup>37</sup>

As far as physical issues and depression were concerned, under normal circumstances the elderly as a vulnerable group became more prone to depression. During the pandemic, this research found that the high prevalence of depression in the elderly was not solely due to aging, but was more related to the decline in their physical and mental capacities. The results of statistical analysis found that the elderly aged 70 to 79 years old were more depressed than the elderly aged 60 to 69 years old; however, the prevalence of depression was lowest in the elderly aged 80 years old or older, and none of these differences were significant; presumably this was related to a sense of satisfaction that reaching 80 years was a boon when compared to younger people who died from COVID-19. In addition, our study also found that older adults who looked fit were 8 times less likely to develop depression than those who looked unfit.

Keeping the fitness of the elderly is very important. The elderly still needs to maintain a healthy lifestyle in order to

achieve good health, like every adult, but of course at levels that match their physical abilities. Exercise can lower blood pressure and blood sugar, improve lipid profile, maintain hearts and lung's health, improve muscular and skeletal strength, and increase endorphins that play a role in making you feel happy. Moreover, it should be emphasized to get enough sleep for a minimum of 7 to 8 h a day, relaxing, taking a shower and dressing up or applying make-up, according to one's preference, every morning to stay confident, are some necessary activities in order to maintain physical and mental fitness.<sup>38</sup>

Another important contributor to depression is the level of dependency in life. In this study, we started by assessing the physical function impairment using basic ADL (activities of daily living) scale, for example, eating, bathing, toilet; and it was found that the higher the elderly's dependency, the greater the proportion of elderlies experiencing depression, and the differences were highly significant. Then, we assessed the more complex activities impairment, namely the capabilities needed to function in community settings, for example, shopping, cooking, managing finances, which were measured by IADL (instrumental activities of daily living) scales. The IADL assessment also showed that the elderly who were fully unable were experiencing depression the most, compared to the elderly who were independent; which was also significantly different.

Furthermore, during this pandemic, our data showed that not all elderly with chronic illnesses were more depressed than those who were healthier without such chronic disease. This study found that the elderly whose lives were significantly disrupted by chronic diseases were indeed more depressed, such as by stroke, diabetes, dementia, memory disorders, urine incontinence, and/or inability to hold bowel



movement. This finding is accordance with Fiest et al<sup>39</sup> study which, using the data from Canadian Community Health Survey, found that chronic illnesses were related to major depression in the community-dwelling elderly. Seo et al study<sup>40</sup> in Korea Community health survey of 156 747 participants, found that multiple chronic diseases were closely associated with depressive symptoms in both middle-aged (40-59 years old) and elderly ( $\geq 60$  years old) populations; the prevalence and risk ratios of depression increased in the presence of multiple chronic diseases and with the number of comorbidities. Several studies also provided evidence of a close relationship between diabetes and depression.<sup>41-43</sup> A systematic review of 21 papers published between 2010 and 2017 by Maresova et al<sup>44</sup> found that chronic diseases could result in impairment to ADLs dependency especially in the elderly, and this had been confirmed as a major cause of disability.

Assessments related to social, cognitive, emotional, and behavioral aspects of elderly respondents were carried out using the APGAR Scale instrument. The results were also strengthened by the finding that the elderly group who had good family functions generally had low levels of depression, while the elderly group who had poor family functions generally had high levels of depression. This indicates that the role or contribution of a well-functioning family in the form of attention and harmonious relationships between family members who live at home with the elderly is very significant and positive for lowering the level of depression experienced by the elderly. This is in accordance with a research conducted by Naveen et al<sup>45</sup> showing that poor relationships with family had a significant correlation to stress in the elderly. An elderly who has close friends, good communication, group chats, and likes to share stories with others, will be significantly protected against high levels of depression experienced. This is in accordance with a research conducted by Bai et al<sup>46</sup> stating that emotional support had a significant effect on mental health.

In addition, the cognitive aspect also has a positive influence on the elderly. This study obtained results that the elderly with good behavioral aspects, such as actively following the development of the situation, changes, and events occurring in the surrounding environment through available information media, had a tendency to lower levels of depression. This shows that maintaining the function of brain or cognitive aspects in the elderly makes the elderly mentally healthier, because the boredom that occurs in the elderly subsides with the elderly's engagement in the continued use of cognitive abilities. These results are in accordance with a research conducted by de Souza Caparrol et al<sup>47</sup> and Sun et al,<sup>48</sup> which provided interventions on the cognitive function of the elderly so that they could reduce stress and depression.

Behavioral aspects also have a positive impact on the elderly's mental health. Elderly people who always avoid

conflict with others, believe that everything has been arranged and determined by God, and still carry out routine worship in their daily lives, tend to have low levels of depression compared to the elderly who have a lot of conflicts with other people, blame their current situation, and do not have daily routines. The positive behavioral aspects of the elderly will have an impact on maintaining the activities that used to be carried out by the elderly before retiring from work. This is consistent with a research conducted by Choi et al<sup>49</sup> showing that depression was less prevalent among those individuals who were employed or self-employed and those who participated in formal volunteering or informal helping, whereas caregiving was associated with a higher risk of depression.

On the emotional aspect, this study found that the elderly who had concerns or were embarrassed if a problem was known by others had a higher level of depression. The feeling of worry or shame in the elderly is related to emotional problems. This emotional condition can trigger and increase the level of depression experienced by the elderly. This is in accordance with previous researches that the accumulation of negative life events is related to depression in the elderly.<sup>50-52</sup>

Regarding the supporting issues, those who are funded by self-financing or fully supported by their families tend to be more depressed than those who have health insurance or savings. The expenses that should be provided by the elderly themselves, for either treatment or daily life, will increase the mental burden, coupled with the condition of their families. Older adults felt to evade from being bothered by their children. On the other hand, the elderly sometimes had a feeling of being unable to support their families, particularly in a difficult financial situation that is prone to induce anxiety and depression. According to Zelekha and Zelekha<sup>53</sup> those with sources of income support from the relatives' families were likely to report less depressive symptoms compared to others who did not have such support. It is clearly seen that funding sources are not only fundamental in a financial sense, but also in psychological aspects among elderly.<sup>54,55</sup> Our finding was also supported by a study conducted by Maulik and Dasgupta<sup>56</sup> that an elderly in need of financial expenses was a remarkable risk factor for depression.

Overall, this present study has an integral part in providing supporting information regarding the elderly issue, particularly in Indonesia. In the COVID-19 situation, most countries have been struggling to be back to normal activity. Hence, close family, home nursing services, and government must work hand in hand to provide social and emotional support for the elderly in order to provide better health care and a happy older population. However, this study comes with several limitations. Firstly, the survey was conducted through an online questionnaire which could affect the results, particularly a potential bias due to the

self-assessment approach. Secondly, the elderly was not a main participant since the limitation of the use of technology, as the anticipated alloanamnesis approach was conducted. Thirdly, since the COVID-19 pandemic, any data couldn't be validated through direct observation and interview. Therefore, further investigations are strongly recommended by considering the following aspects, including conducting offline surveys after the pandemic, recruiting elderly as main subject participants, utilizing a triangulation data and adding other variables such as general health status (physics), emotional expression, and stimulus.

## Conclusions

The present study underlines that the COVID-19 pandemic has an implication to senior people as a vulnerable group for mental health problems, such as depression. Senior people who are dependent tend to be depressed, which is aggravated by physical and psychosocial issues such as chronic disease, illness, family and close friends support, and behavioral aspects. The prevalence of depression in this study indicates that some necessary actions need to be implemented, such as mental health support management. Moreover, policy makers need to strengthen their regulations, particularly in providing guidelines and practices related to maintaining the mental health in elderly population.

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## Author Contributions

Conceptualization, M.K., D.E, I.H.S, A.K; methodology, M.K., D.E, I.H.S, A.K., B.P.H, R.A.G; formal analysis; R.A.G, B.P.J; investigation, M.K., A.K., B.P.H, R.A.G.; resources, M.K., D.E, I.H.S, A.K, R.A.G, B.P.; data curation, A.K. B.P.H, writing—original draft preparation, M.K., D.E, I.H.S, A.K, R.A.G, B.P; supervision, M.K., D.E, I.H.S. All authors have read and agreed to the published version of the manuscript.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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## Institutional Review Board Statement

The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Research and Community Engagement Ethical Committee of Faculty of Public Health Universitas Indonesia under approval letter number Ket-274/UN2.F10.D11/PPM.00.02/2020.

## Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

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## Data Availability Statement

Data presented in this study are available upon request from the corresponding author.

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