Factors of Intellectual Function Impairment in Older People in South Denpasar, Bali

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Abstract: Global population of older people is reported to grow faster than other groups of age. Along with aging and increase in the life expectancy of older people, the prevalence of intellectual function impairment tends to be higher. This study aimed to determine factors associated with intellectual function impairment in older people in South Denpasar, Bali. The study was a cross-sectional design, and it involved 139 respondents selected through convenience sampling in four primary healthcare centres of South Denpasar. The respondents were interviewed with a structured questionnaire consisting of demographic information and a Short Portable Mental questionnaire. Data were analysed through descriptive statistics using Spearman's Rank Correlation, Chi-Square, and Fisher's Exact test. Severe intellectual function impairment cases were found in 10.8% of respondents (15 respondents). Age, gender, and occupation were not significantly associated with intellectual function impairment ($p > .05$). Whereas education and marital status were significantly associated with intellectual function impairment ($p < .05$). It is necessary for community nurses to actively screen intellectual function impairment cases and develop strategies for enhancing older people 's cognitive functions.

1 BACKGROUND

Changes in the number of older populations are reported to increase in all over the countries, including Indonesia. The World Population Prospects reported that the number of populations aged 60 was 962 million, growing faster than that of all younger groups. The elderly population is projected to be 1.4 billion in 2030 and 2.1 billion in 2050, possibly increasing to 3.1 billion by 2100 (United Nation & Department of Economic and Social Affairs, 2017).

Nowadays, Indonesia is known to experience aging. The Indonesian older population is estimated to be 23.66 million older people (9.03%) in 2017 and to increase to 27.08 million in 2020, 33.69 million in 2025, 40.95 million in 2030, and 48.19 million in 2035 (Ministry of Health, 2017). Bali province is reported to be ranked fourth outside Java for having a high number of older people reaching 10.71% (Indonesian Ministry of Health, 2017)

The life expectancy of older population in Indonesia increased from 70.1 years in 2010-2015 period to 72.2 years in 2030-2035 period (Statistic &

Bappenas, 2018). The number of older people in Denpasar city increased every year from 5.20% in 2017 to 5.36% in 2018 (Statistics Bureau, 2015). Along with aging and the increase in life expectancy of older people, intellectual function impairment is also reported to increase in this age group. The World Health Organization (WHO) reported that about 47.5 million people lived with intellectual function impairment in 2015. A total of 7.7 million new cases of intellectual function impairment are reported annually (Indonesia Statisctic Bureau, 2018).

Denpasar city was divided into 4 sub-districts and has 11 primary healthcare centres in Indonesia called *Puskesmas*. South Denpasar is one of the sub-districts that has four primary healthcare centres and a large number of older people population.

The first study on intellectual function impairment involving a large sample of older population was conducted in Yogyakarta in 2015. A further study shows that the intellectual function impairment was 1.6 times higher in older people in Bali than in Yogyakarta (Suriastini et al., 2016). Various factors that may affect the older people in

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Bali include level of education, age, occupation, and marital status. Even though the prevalence of intellectual function impairment in Bali has been reported, local reporting about this issue still needs to be done by primary healthcare centres to optimize the case management.

Based on a preliminary study in primary healthcare centres of South Denpasar, intellectual function impairment in older people was not well-reported. Therefore, this study aimed to determine factors associated with intellectual function impairment in older people of South Denpasar, Bali.

2 METHODS

This study used a descriptive correlational design with a cross-sectional approach; it was conducted in four primary healthcare centres of South Denpasar. The sample in this study was the older people aged 60 years and over, who visited the primary healthcare centres from April to June 2019 and were willing to be research respondents. With the use of purposive sampling technique, 139 samples were involved based on the inclusion and exclusion criteria.

Data were collected through interview with structured question items in the questionnaire. The Short Portable Mental Questionnaire (SPMSQ) was used to measure intellectual function impairment. It consisted of 10 items about orientation, personal history, a memory of self-care, and calculation skill. The score ranged from 0 to 10. The intellectual function impairment was divided into four classifications according to scores including good (0-3), mild (4-5), moderate (6-8), and severe intellectual function impairment (9-10). For further analysis, the intellectual function impairment was classified into two categories based on the median scores: mild impairment scored ≤ 5 and severe impairment scored > 5. The validity and reliability testing of the questionnaire was conducted by Mursyid and Rahman (Mursyid, S and Rahman, 2017). The validity and reliability test were .443 and .884, respectively.

Data collection was collected by two research assistants who have an education background minimum diploma three in nursing. Before collecting data, they explained to respondents about the objective and procedures of the study. After that, Primary Investigator (PI) asked the respondents to sign a consent form to participate in the study.

Data were analysed by using SPSS 20 version. Characteristics of respondents and categories of intellectual function impairment were analysed using descriptive statistics. Bivariate analysis was used to analyse factors associated with intellectual function impairment. Age in this study was a numerical scale; the relationship between age and intellectual function impairment was tested using the Spearman Signed Rank Test because the assumption of the parametric test was violated. Gender, occupation, education, and marital status were analysed using Chi-Square and Fisher's Exact tests. This study was granted ethical clearance by the Ethics Commission of the Faculty of Medicine, Udayana University/Sanglah Hospital Denpasar with Number 1107/UN.14.2.2.VII. 14/LP/2019 dated 18 April 2019.

3 RESULTS

The findings show demographic characteristics of respondents, classifications of intellectual function impairment, and factors related to intellectual function impairment (see Table 1).

Table 1: Respondents' demographic characteristics (n = 139).

Characteristics	f	%
Median **Age**	66	
Range (years)	(60-81 years)	
Gender		
Male	69	49.6
Female	70	50.4
Education		
No formal education	16	11.5
Elementary school	44	31.7
Junior high school	16	11.5
Senior high school	35	25.2
Diploma/university	28	20.1
Marital status		
Married	126	90.6
Divorce	13	9.4
Occupation		
Unemployed	50	36
Government employee	6	4,3
Entrepreneur	22	15.8
Farmer	5	3.6
Housework	12	8,6
Pension	44	31.7
Religion		
Hinduism	120	86.3
Islam	14	10.1
Christianity	2	1.4
Buddhist	1	0.7
Protestant	2	1.4

Table 1 presents that respondents' age ranges from 60 to 81 years, and the median age is 66 years old. The majority of respondents is female and Hindus. Most of them were married and unemployed. The respondents' latest education is mostly elementary school.

Table 2: Classifications of Intellectual Function Impairment (n = 139).

Classification	f	%
Intellectual function impairment by median score		
Severe	15	10.8
Mild	124	89.2
Intellectual function impairment		
Severe	3	2.2
Moderate	12	8.6
Mild	30	21.6
Good cognitive	94	67.6

Most of the respondents have good cognitive functions (67.6%), and only 10.8% have severe intellectual function impairment as shown in Table 2.

Table 3: Factors related to intellectual function impairment (n = 139).

Variables	Mild Intellectual Function Impairment n (%)	Severe Intellectual Function Impairment n (%)	p-value
Median of age (Range)*	66 (60-81 years)		.343
Gender**			
- Male	4(5.8.)	65(61.61)	.107
- Female	11(15.7)	59(84.3)	
Marital status#			
- Married	11(8.7)	115(91.0)	.035
- Divorced	4(30.8)	9(69.2)	
Education**			
- Lower	15 (19.7)	61(8.3)	.001
- Higher	0 (0.0)	63 (100)	
Occupation**			
- Employee	1 (3.0)	32 (97.0)	.120
- Unemploye	14 (13.2)	92 (86.8)	

*Spearman's Rank; #Fisher's Exact; **Chi-Square
IFI = Intellectual Function Impairment

Table 3 shows that only marital status and education are significantly associated with intellectual function impairment. In contrast, age, gender, and occupation are not significantly correlated with intellectual function impairment.

4 DISCUSSION

This study aimed to determine factors related to intellectual function impairment. Based on the results, 15 older people who suffer from severe intellectual function impairment (10.8%). The result of this study is not in line with research conducted by Nurhasanah in Banda Aceh in 2016 (FahmiAdha, & Nurhasanah, 2016). They reported that of 70 older people, most of them experienced severe intellectual function (FahmiAdha, & Nurhasanah, 2016). This current study found a greater portion of respondents with good cognitive functions.

In terms of education, all respondents with severe intellectual function impairment had low educational background (19.7%). Previous research conducted in Tangerang shows a similar result that a significant relationship exists between education and intellectual function impairment (Fatimah & Lubis, 2018). Being involved in learning activities such as reading or analysing complex situations can improve mental acuity and optimize brain function to reduce the risk of severe intellectual function impairment.

Additionally, this study shows an association between marital status and severe intellectual function impairment. This finding is confirmed by a prior study (Sari et al., 2018). Most of the respondents who suffered from intellectual function impairment had married status. A good marital relationship can be used as family support in one's life to overcome and prevent intellectual function impairment (Kamaryati & Malathum, 2020).

In this study, no relationship emerged between occupation and intellectual function impairment. Another research also found a supporting finding that occupation was not related to dementia; this previous study involved mostly retired respondents from being civil servants who generally used their brain during their work. The prevalence of dementia is influenced not only by working status but also by work history and type of work. Jobs that frequently require the brain function tend to give a low risk of developing dementia (Suriastini et al., 2016).

Although the incidence of intellectual function impairment likely increases with age, the current findings shows that there was no relationship between age and intellectual function impairment (p = .343; r = .81). It means that the younger age groups have higher risk of severe intellectual function impairment than the older age ones. Age was also not related to the incidence of dementia because the proportion of respondents aged 60-70 years is greater than that of respondents aged above 70 years (71.9% vs. 28.1%).

The incidence of dementia in this study was found to be the same in both age groups.

Most of the respondents in this study were female as many as 69 people (50.4%). Although the incidence of dementia possibly increases in female individuals, this study shows no relationship between gender and the incidence of intellectual function impairment (p = .15). This result accords with a study stating that gender had nothing to do with cognitive disorders in elderly in Bali (Rini et al., 2018).

Classifications or categories of intellectual function impairment in older people are essential information that can be a strength of the current study. However, some limitations of this study were found. With limited analysis of variables i.e., respondents' characteristics and intellectual function impairment, this study did not inform deeper findings. Also, the use of cross-sectional approach which only requires single-point data collection results in one-time data. Moreover, a purposive sampling technique used for respondent selection limits the general applicability of the findings to a larger number of other age groups.

5 CONCLUSIONS

This cross-sectional study which involved 139 participants shows that age, gender, and occupation were not significantly associated with intellectual function impairment ($p > .05$), but education and marital status were significantly associated with intellectual function impairment ($p < .05$). According to the findings, nurses have to actively screen intellectual function impairment cases and develop strategies to solve them. Future studies should include other variables using multivariate analysis and take a probability sampling technique into account to obtain a larger number of samples.

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