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Factors associated with utilization of posyandu lansia in Indonesia: an analysis of nationwide survey data

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ABSTRACT

Background and purpose: The proportion of the older population in the world is increasing, including in Indonesia. The elderlies tend to be more susceptible to infectious diseases and chronic diseases due to decreased anatomical and physiological functions. A model of health services for the elderlies in Indonesia is called posyandu lansia (integrated health village posts for older adults). This study aims to analyse the determinants of the use of health village posts among older adults in Indonesia.

Methods: This study is a secondary data analysis of the 2014 Indonesian Family Life Survey (IFLS-5) data conducted by RAND. The study samples included 4,366 respondents at the age of 50 years and over. The dependent variable is utilization of posyandu lansia and the independent variables consist of age, gender, level of education, work status and activity of daily living. Data analysis was performed using univariate, bivariate and multivariate analysis.

Results: The study results show that the utilization of posyandu lansia was 5.1%. Age ≥60 years, female gender, secondary education, unemployment, region, location, activity of daily living, nutritional status of fat and thin, acute morbidity, and a history of chronic disease have a significant relationship with the utilization of posyandu lansia in Indonesia ($p<0.05$). Females were 3.097 times more likely to utilize posyandu lansia (95%CI: 2.464-3.891) than males.

Conclusion: Women are more likely to use the posyandu lansia than men. The government should increase the effort to expand coverage of posyandu lansia utilization especially among males.

Keywords: elderly, posyandu lansia, utilization, IFLS

INTRODUCTION

Increasing life expectancy of people around the world has an impact on the increasing proportion of elderlies globally. The population of older people around the world is expected to continue to grow up to 2.1 billion people by 2050.[1–3] The population of elderlies in Indonesia in 2017 reached 23.4 million (8.97%). According to the United Nations projection, *World Population Aging 2017 Revision*, the proportion of the older population in Indonesia will reach 10% in 2021, meaning that Indonesia is facing a change in the structure of the aging population to the structure of the old population.[4]

According to the World Health Organization (WHO), older population is divided into four groups, namely middle age (45-59 years old), elderly (60-74 years old), old (75-90 years old) and very old (more than 90 years old). The increasing proportion of the older population in Indonesia is a form of the success of efforts to improve the degree of public health through programs related to health services, but this is also becoming a challenge regarding the productivity of the elderlies, which tends to decline with age. The effect of decreasing anatomical and physiological functions of the body has implications for the increasing burden of the productive age population in supporting the living needs of the non-productive age population.[5]

To fulfill the needs of health care for elderlies, the government established an integrated health services for the elderly groups which is focusing on the efforts to improve, prevent and maintain the health both curative and rehabilitative.[6] One form of community health empowerment efforts that support active aging in Indonesia is the *pos pelayanan terpadu lanjut usia* or commonly called *posyandu lansia* (integrated health village posts for elderlies). This facility is managed by the community in coordination with Public Health Center (*Pusat Kesehatan Masyarakat/Puskesmas*). It is also served as a communication forum which involves active participation of the elderlies, families, community leaders and social organizations in its implementation.[7]

Participation of the elderlies by utilizing the *posyandu lans*ia is the key to gain optimum impact of the program. Evidence shows the utilization of *posyandu lansia* across Indonesian cities was varied ranging from 19.5% to 78.0%, with an average of 50%, compared to the target of 70%.[8,9] This low participation should be explored and it is necessary to understand factors that influence the utilization. This study aims to analyse factors associated with utilization of *posyandu lansia.*

METHODS

This is a quantitative study with a cross sectional design. This study used secondary data from The 2014 Indonesia Family Life Survey (IFLS) which conducted by RAND. Data were taken from the fifth wave of the IFLS (IFLS-5). IFLS is a continuous longitudinal survey that aims to provide a description of the socio-economic and health conditions of households in Indonesia. In the first batch, IFLS-1 was held in 1993-1994, representing 83% of the total population in Indonesia, spread over 13 provinces, namely North Sumatra, West Sumatra, South Sumatra, Lampung, DKI Jakarta, West Java, Central Java, Yogyakarta, East Java, Bali, West Nusa Tenggara, South Kalimantan, and South Sulawesi. Then IFLS-5 was available in 2014-2015 with a *re-contact* rate of 92%. More information about the setup and available data can be found online (https://www.rand.org/well-being/social-and-behavioral-policy/data/FLS/IFLS.html). The samples in this study were elderlies aged 50 years and over, with 4,366 respondents. The flowchart of samples selection can be seen in Figure 1.

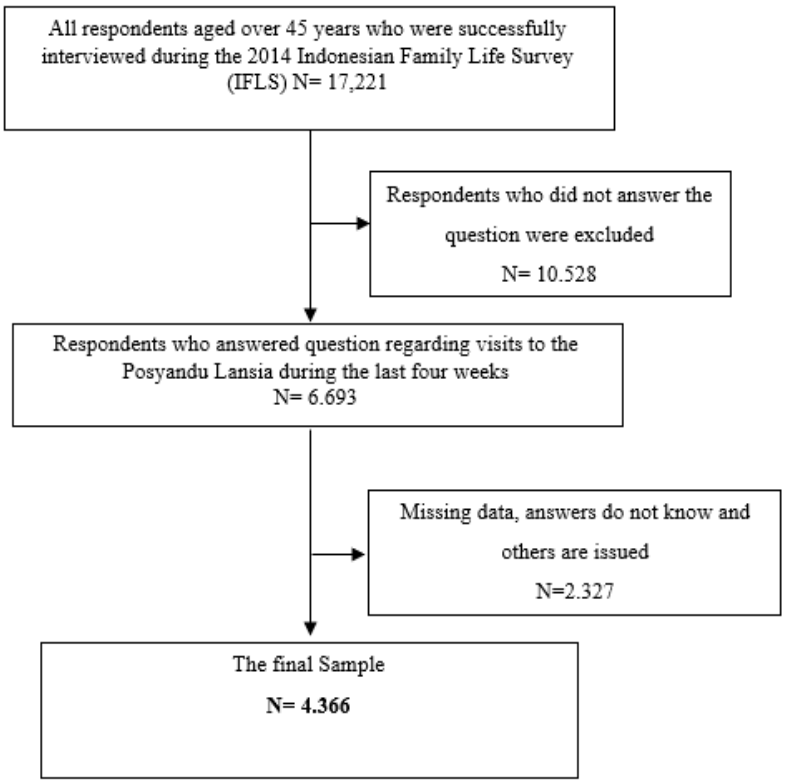

Figure 1. The Flowchart of Samples Selection

This study adopts the Andersen's Behavioural Model of Health Service Utilization. This model consists of predisposing factors, enabling and needs which influence individuals to utilize a health service. The dependent variable in this study is utilization of *posyandu lansia*. The use of the *posyandu lansia* is determined through the question "Did you visit the *posyandu lansia* in the last four weeks?" with "yes" and "no" answers. Independent variables consist of age, gender, level of education, work status and activity of daily living. Age was categorized into three, namely '50 -59 years', '60 -74 years', and '75 years and older'. Gender is categorized into 'male' and 'female'. The level of education is categorized into three levels, namely low, medium and high. Employment status was categorized as 'working' and 'not working'. Activity of daily living is measured by a Likert Scale with questions about a person's ability to perform basic life skills including bathing, dressing, standing alone, eating, toileting and holding back defecation and urination. It was categorized as 'not difficult' if there is no obstacles and 'difficult' if they have one or more difficulties in carrying out activities of daily life.

Enabling factors consist of location and region. The location of respondent is categorized into 'urban' and 'rural'. Regions are categorized into three namely 'Sumatra', 'Java and Bali' and 'East region'. Need factors consist of nutritional status, perception of health, acute morbidity, and a history of chronic disease. Nutritional status is categorized into four, based on body mass index (BMI) calculation, namely 'thin' if BMI<18.5, 'normal' if BMI is between 18.5-22.9, 'fat' if BMI is between 23-25 and 'obese' if BMI>25. Perception of health is categorized into 'healthy' and 'sick', while acute morbidity into 'yes' and 'no'. History of chronic disease is obtained from respondents' self-reported response to question 'Has a doctor ever told you that you have any of the following?' followed by a list of chronic diseases such as hypertension, diabetes mellitus, high cholesterol, and kidney disease. A history of chronic disease was defined as 'yes' if they had one or more chronic diseases and 'no' if respondent has no chronic diseases.

Data were analysed using the SPSS version of 25. We performed univariate, bivariate, multivariate analysis using multiple logistic regression. P value <0.05 was considered to define statistical significance. This study has been approved by the Ethics Review Center of the Faculty of Public Health, Sriwijaya University with number 308/UN9.1.10/KKE/2019.

RESULT

Based on Table 1, number of respondents who visited *posyandu lansia* was 221 (5.1%). More than half respondents were aged 50 to 59 years at 2,316 (53%), female at 2,619 (60%), had a low education level 3,706 (84.9%), employed 2,381 (54.5%), living on the islands of Java & Bali at 3,318 (76 %), and living in urban areas at 2,237 (51.2%). Meanwhile, over a third of the elderlies fell in category of normal nutritional status at 1,574 (36.1%), have no difficulty with daily living activity at 3,684 (84.4%), had a healthy perception at 2,701 (61.9%), had an acute morbidity at 2,483 (56.9%), and had no history of chronic illness of 2,730 (62.5%).

Table 1. Characteristics of respondents and visit to *posyandu lansia*

Variable	Indicator	f n=4,366	%
Visit to *posyandu lansia*	Yes	221	5.1
	No	4,145	94.9
Age	50-59 years old	2,316	53.0
	60-74 years old	1,742	39.9
	≥75 years old	308	7.1
Sex	Female	2,619	60.0
	Male	1,747	40.0
Education	High	245	5.6
	Medium	415	9.5
	Low	3,706	84.9
Working status	Working	1,985	45.5
	Not working	2,381	54.5
Region	Java and Bali	3,318	76.0
	Sumatra	689	15.8
	Kalimantan and east region	359	8.2
Location	Urban	2,237	51.2
	Rural	2,129	48.8
Activity of Daily Living	Not difficult	3,684	84.4
	Difficult	682	15.6
Body Mass index	Thin	584	13.4
	Normal	1,574	36.1
	Fat	674	15.4
	Obese	1,534	35.1
Health Perception	Sick	1,664	38.1
	Healthy	2,701	61.9
Acute comorbidity	Yes	2,483	56.9
	No	1,883	43.1
History of chronic disease	Yes	1,636	37.5
	No	2,730	62.5

The results of the bivariate analysis of independent variables with *posyandu lansia* utilization showed variables that significantly associated with the use of *posyandu lansia* were age 60-74 (p<0.001), age 75 years or older (p<0.001), sex (p<0.001), secondary educational level (p<0.001), working status (p<0.001), location (p<0.001), obesity (p<0.05), being fat (p<0.001), thin (p<0.05), acute morbidity (p<0.05), and a history of chronic disease (p<001). Region, daily living activity and health perceptions are not significantly associated with the use of health village posts.

Table 2. Odd ratios of visit to *posyandu lansia*

Variable	Description	Visit to *posyandu lansia*				Total	p	OR 95%CI
		Yes		No				
		n	%	n	%			
Age	Middle age	84	3.6	2,232	96.4	2,316		Ref
	Elderly	117	6.7	1,625	93.3	1,742	<0.001	1.894 (1.647-2.177)
	Old	20	6.5	288	93.5	308	<0.001	1.828 (1.508-2.217)
Gender	Female	187	7.1	2,432	92.9	2,619	<0.001	3.707 (3.068-4.478)
	Male	34	1.9	1,713	98.1	1,747		(Ref)
Education Level	High	8	3.2	233	96.8	241	0.195	1.562 (1.793-3.077)
	Middle	66	7.3	840	92.7	906	<0.001	0.594 (0.456-0.773)
	Low	147	4.6	3,072	95.4	3,219		(Ref)
Working Status	No Work	138	7.0	1,847	93.0	1,985	<0.001	2.016 (1.760- 2.311)
	Work	82	3.5	2,299	96.5	2,381		(Ref)
Region	Sumatra	21	3.0	668	97.0	698	0.100	0.698 (0.454-1.073)
	Java & Bali	185	5.6	3,133	94.4	3,318	0.115	1.328 (0.932-1.891)
	East Region	15	4.3	344	95.7	359		(Ref)
Location	Urban	153	6.8	2,084	93.2	2,237	<0.001	2.152 (1.852- 2.501)
	Rural	67	3.2	2,062	96.8	2,129		(Ref)
Activity of Daily Living	Not difficult	190	5.2	3,494	94.8	3,684	0.102	1.164 (0.969– 1.399)
	Difficult	30	4.4	652	95.6	682		(Ref)
Body mass index	Thin	17	2.9	567	97.1	584	0.002	0.640 (0.483–0.847)
	Normal	70	4.4	1,504	95.6	1,574		(Ref)
	Fat	50	5.5	624	94.5	674	<0.001	1.715 (1.413 – 2.083)
	Obesity	84	5.5	1,450	94.5	1,534	0.013	1.249 (1.048 – 1.488)
Health Perception	Sick	92	5.5	1,572	94.5	1,664	0.050	1.215 (0.925 – 1.595)
	Healthy	130	4.8	2,572	95.2	2,702		(Ref)
Acute Morbidity	Yes	139	5.6	2,344	94.4	2,483	0.002	1.280 (1.093– 1.500)
	No	82	4.4	1,801	95.6	1,883		(Ref)
History of chronic illness	Yes	125	7.6	1,511	92.9	1,636	<0.001	2.174 (1.874- 2.523)
	No	96	3.5	2,634	96.5	2,730		(Ref)

Table 3 shows that the final model of the multivariate analysis of the association between independent variables and visit to *posyandu lansia*. Factors significantly associated to the utilization of *posyandu lansia* are variables of age, gender, education, employment status, region, location, daily living activity, body mass index, acute morbidity, and history of chronic disease. Based on the analysis, the variable with the highest prevalence

ratio is gender, after being controlled by variables of age, education, employment status, region, location, daily living activity, BMI, acute morbidity, and chronic disease history. The result showed women are 3,097 (95%CI: 2.464-3.891) times more likely to visit *posyandu lansia* than men.

Table 3. Final model of multivariate analysis

Variable	AOR	95%CI	p
Age			
45-59 years*	Ref		
60-74 years	1.587	1.337-1.884	<0.001
≥75 years	1.825	1.449-2.300	<0.001
Gender			
Female	**3.097**	**2.464-3.891**	**<0.001**
Male*			
Education level			
High	0.453	0.233-0.881	0.020
Middle	1.246	1.048-1.482	0.013
Low*			
Working Status			
Not working	1.407	1.203-1.646	<0.001
Working*			
Region			
Sumatera	0.480	0.325-0.711	<0.001
Java and Bali	0.720	0.538-0.962	0.027
East Region*			
Location			
Urban	1.186	1.034-1.361	0.015
Rural*			
Activity of Daily Living			
Not difficult	1.551	1.260-1.910	<0.001
Difficult*			
Body mass index			
Obese	0.883	0.724-1.078	0.220
Fat	1.628	1.329-1.994	0.001
Normal*			
Thin	0.643	0.473-0.875	0.005
Acute morbidity			
Yes	1.370	1.149-1.634	0.001
No*			
History of chronic diseases			
No*			
Yes	1.700	1.423-2.030	<0.001

**Reference*

DISCUSSION

In Indonesia, one of the implementations of long-term care concept for the elderly is in the form of *posyandu lansia.* Long term health *care* for the elderlies is needed with routine implementation supported both formally and informally for individuals with physical and cognitive impairments.[10] We found that as low as 5.1% of the elderlies in Indonesia utilized *posyandu lansia.* This figure is close to the finding of previous study in Surabaya with utilization at only 3.79%.[11]

We found several predisposing factors including age, gender, employment status, and education level were significantly associated with the utilization of *posyandu lansia*. The older the elderlies, the higher likelihood of them utilising *posyandu lansia*.[12,13] With the age increase, the burden of diseases that require health services is likely to increase, as well as the chronic nature and health complaints that occur in the elderly may lead to repeated contact with the health service system including *posyandu lansia* to monitor their health condition.[14,15] Other reason is the increased need of social supports and connection among elderlies may influence the utilization.[16]

Female elderlies were three times more likely than males to visit *posyandu lansia*, similar to finding from several studies.[6,17,18] Women usually more concern with health problems they experience, so women often use health facilities to maintain their health.[11] Studies found women are more often to visit health services for general health checks than men. This is understandable because biologically, women have more complex reproductive organs than men, making them more susceptible to various diseases during menopause. These differences lead to different patterns of disease and patterns of access to health services.[19–21] Older women may have a different view of health and psychology than men, and women tend to be more open in group activities. For the female elderlies, coming to *posyandu* may become an opportunity for them to go outside their home, while some of the male elderlies are still working which led to lower utilization.

This study found that the middle level education is associated with higher utilization of *posyandu lansia*. This result is slightly different from other studies which show that the higher level of education is associated with higher utilization of *posyandu lansia*.[20-24] Elderlies with middle education or above should have a sufficient level of knowledge that leads to acceptance of certain behaviours. High education allows individuals to have a good attitude to actively participate in *posyandu lansia*. Meanwhile, elderlies who were working are less likely to utilize *posyandu lansia* which may due to the timing of *posyandu lansia* during working hours, beside employment status may provide access for healthcare similar to *posyandu lansia*.[6,25]

We found that activity of daily living has a significant association with the use of *posyandu lansia*. Another study in Jember among 50 elderly people shows similar result that the ability of individuals using the activity daily living had a significant effect on the utilization of *posyandu lansia*. If the elderlies do not have problems related to the activity daily living, this will allow them to independently visit the *posyandu lansia*.[26]

The results of the analysis show that regions of Sumatra, Java and Bali have a significant relationship with the lower utilization of *posyandu lansia*. There might be some barriers like availability of transportation to *posyandu lansia* and no family to take the elderlies to the *posyandu lansia*. Regional differences can affect differences in the use of health services, due to differences in culture, government policies, differences in disease endemism, population density, and the distribution of available health facilities.[27] The distribution of the number of *posyandu lansia* according to regions in Indonesia tends to be uneven, in which the Java and Bali region amount 72,786 *posyandu lansia*, the Sumatra region totaled 2,458 *posyandu lansia* and the Kalimantan and Eastern Indonesia region 8,000 posyandu lansia.[4] The difference in distribution and unbalanced availability of *posyandu lansia* will also have an impact on the accessibility of *posyandu lansia* for elderlies.

Based on the analysis, it is known that the location of the area has a significant relationship with the utilization of *posyandu lansia*, where elderlies in urban areas have a greater chance of using *posyandu lansia* compared to those living in rural areas. This study is also in line with other studies in the Surabaya and Malang areas. It is known that the availability of *posyandu lansia* is more in urban areas than in rural areas. This means that the availability of each *posyandu lansia* in rural areas is less than in urban areas, so that it will affect the low accessibility of the elderlies.[28]

Our study also finds that being fat or thin has a significant relationship with the utilization of *posyandu lansia* in Indonesia. People with higher BMI are high risk for chronic disease such as high level of cholesterol, coronary heart disease, respiratory problem and even death.[29] Based on the results of other studies, people with higher BMI have a higher risk for type 2 diabetes[30] and cardiovascular.[31] *Posyandu lansia* provides weight and height measurement services to monitor body mass index in the elderlies. The goal is to monitor the nutritional status of the elderly, and if problems are found with their nutritional status, they can be consulted through counselling and providing additional food if needed. Individual nutritional status is known to affect the quality of life of the elderly,[32] especially for elderly with over nutritional status.[33]

The results of the studies in Southern Europe indicate that the pattern of decreasing number of acute illnesses occur with increasing age.[34] Based on the results of statistical tests, it is known that there is a significant relationship between acute morbidity and the *posyandu lansia*. One of the services available at the *posyandu lansia* is the provision of simple medical treatment by primary health care officers to the elderlies. Because the main objective of *posyandu lansia* is preventive and promotive action, curative efforts, namely the treatment of acute, are not as complete as curative health facilities.[35]

The emergence of chronic disease is a common health condition in the elderly.[36] The results of the study in Switzerland showed that the problem associated with the high prevalence of chronic disease in the elderly is the high uncontrolled chronic disease condition in the elderly. The results showed that about 50% of hypertensive patients did not take action and were not controlled.[37] *Posyandu lansia* is one of the vanguards in efforts to screen and monitor the condition of the elderly routinely every month related to chronic diseases, through health checks and counselling to keep it under control. In this study, it is known that chronic disease history affects the utilization of *posyandu lansia*.

Limitation

The study only examined the age, gender, education level, employment status, daily living activity, location of the region, the region, nutritional status, health perception, morbidity of acute and chronic disease history. Variables regarding enabling factors such as the availability of *posyandu lansia,* distance travelled, and coverage of services provided by each *posyandu lansia* could not be studied due to limited data in the IFLS-5 household questionnaire. Another limitation is that the age used in this study is at least 50 years old, while the target of *posyandu lansia* starts from the 45-year-old groups. This is because there is a minimum age requirement of 50 years for respondents to be able to answer questions about visits to the *posyandu lansia*.

CONCLUSION

The variables that were significantly associated with the utilization of the health village posts were age, gender, secondary education, employment status, region, location, activity of daily living, nutritional status, acute morbidity, and history of chronic disease. The variable that most influences the utilization of the *posyandu lansia* is gender (female) after controlling all independent variables. The policy makers need to use the results of this study for expanding coverage utilization in *posyandu lansia* among males.

COMPETING INTEREST

The authors declare that they have no competing interest.

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AUTHOR CONTRIBUTION

IHT conceptualized the study design, acquired the raw data for analysis: HI conceptualized for the article then prepared the original draft of the manuscript.

REFERENCES

1. United Nations. World population ageing 2017 - highlights. Department of Economic and Social Affairs Population Division. 2017.
2. Beard JR, Officer AM, Cassels AK. The World Report on Ageing and Health. Gerontologist. 2016.
3. WHO. What is healthy ageing? [Internet]. WHO. 2018 [cited 2019 Feb 15]. Available from: https://www.who.int/ageing/healthy-ageing/en/
4. National Statistics Bureau. Statistik penduduk lanjut usia 2017 (Statistics of Elderlies 2017) [Internet]. Susilo D, Harahap IE, Sinang R, editors. Jakarta: National Statistics Bureau; 2017. 258 p. Available from: http://bps.go.id
5. The Ministry of Health of Indonesia. Analisis lansia di Indonesia [The Analysis of Elderlies in Indonesia]. Jakarta: The Ministry of Health of Indonesia. 2017.
6. Intarti WD. Faktor-faktor yang mempengaruhi pemanfaatan posyandu lansia [Factors influencing the utilization of *posyandu lansia*]. *Journal of Health Studies*. 2018;2(1):110–22.
7. Sulistyorini, Pebriyanti C, Proverawati S. Posyandu dan desa siaga [*Posyandu* and *Desa Siaga*]. Yogyakarta: *Nuha Medika*; 2010. 67 p.
8. Masruroh N, Ika S, Saputri AA. The quality of health care service and the elderly's attendance in posyandu (integrated health care service unit): a correlational study. In: Professional Nursing Practice in Free Trade Era: Threat and Challenge. Surabaya: Universitas Muhammadiyah Surabaya; 2016. p. 405–13.
9. Sumiati, Suriah, Ramdan I. Pemanfaatan posyandu lansia di wilayah kerja puskesmas Wonorejo Samarinda tahun 2012. *E-Journal Program Pascasarjana Universitas Hasanuddin* [Internet]. 2013; 58:1–11.
10. Broyles IH, Sperber NR, Voils CI, Konetzka RT, Coe NB, Houtven CH Van. Understanding the context for long-term care planning. *Medical Care Research and Review*. 2016;73(3):349–68.
11. Putri M. Faktor-faktor yang berpengaruh terhadap niat keaktifan lansia dalam mengikuti posyandu lansia [Factors influencing the intention of elderlies' participation in *posyandu lansia*]. *Jurnal Promkes* [Internet]. 2018;6(2):213–25.
12. Kasiman S, Siregar AR. Faktor-faktor yang Mempengaruhi Pemanfaatan Pelayanan Posyandu Lanjut Usia di Wilayah Kerja Puskesmas Kabupaten Aceh Timur [Tesis] (Factors influencing the use of the services provided by posyandu lansia in the working area of public health centers in East Aceh District [Postgraduate Thesis]). Medan: Universitas Sumatera Utara; 2008.
13. Yustina L, Balqis, Darmawansyah. Faktor yang berhubungan dengan pemanfaatan pelayanan kesehatan oleh pemulung di TPA Tamangapa [Factors associated with the use of health sevices by scavengers at the Tamangapa Landfills]. *Jurnal Kesehatan Masyarakat Universitas Hasanudin* [Internet]. 2015;1–12. Available from: http://repository.unhas.ac.id/handle/123456789/14461.

14. Maryam RS, Ekasari MF, Rosidawati, Jubaedi A, Batubara I . Mengenal usia lanjut dan perawatannya [Understanding elderlies and the health care]. Jakarta: Salemba Medika Padila; 2008.
15. Lestari P, Hadisaputro S, Pranarka K. Beberapa faktor yang berperan terhadap keaktifan kunjungan lansia ke posyandu: Studi kasus di Desa Tamantirto Kecamatan Kasihan Kabupaten Bantul Provinsi DIY [Several factors influencing the visit of elderlies to posyandu: A case study in Tamantirto Village, Kasihan Subdistrict, Bantul District, Yogyakarta]. *Media Medika Indonesiana* [Internet]. 2011;45(5). Available from: https://ejournal.undip.ac.id/index.php/mmi
16. Liu T, Hao X, Zhang Z. Identifying community healthcare supports for the elderly and the factors affecting their aging care model preference: evidence from three districts of Beijing. *BMC Health Services Research* [Internet]. 2016;16(Suppl 7)
17. Notoatmodjo S. Pengantar ilmu kesehatan masyarakat [Introduction to the public health]. Jakarta: Rineka Cipta. 2005.
18. Hulka BS, Wheat JR. Patterns of utilization: The patient perspective. *Medical Care*. 1985; 23(5):438-60.
19. Kim HK, Lee M. Factors associated with health services utilization between the years 2010 and 2012 in Korea: Using Andersen's Behavioral model. *Osong Public Health and Research Perspectives*. 2016; 7(1):18-25.
20. Hidayati S, Baequni A, Inayah M. Analisis determinan yang mempengaruhi keaktifan lanjut usia pada pelaksanaan posyandu lansia [Analysis of determinants influencing participation of elderlies at posyandu lansia]. *Jurnal Litbang Kota Pekalongan* [Internet]. 2018; 14:59–70.
21. Chang HT, Lin MH, Hwang IH, Lai HY, Ho MM, Lin CH, et al. Utilization and patterns of community healthcare services for senior residents in long-term care facilities in Taiwan: A nationwide study. *Journal of the Chinese Medical Association* [Internet]. 2013;76(1):42–7.
22. Schellhorn M, Stuck AE, Minder CE, Beck JC. Health services utilization of elderly swiss: Evidence from panel data. *Health Economics* [Internet]. 2000;9(6):533–45.
23. Jiang M, Yang G, Fang L, Wan J, Yang Y, Wang Y. Factors associated with healthcare utilization among community-dwelling elderly in Shanghai, China. *PLoS ONE* [Internet]. 2018;13(12):1–22.
24. Susanti N, Mitra M. Faktor-faktor yang berhubungan dengan pemanfaatan pelayanan posyandu lansia [Factors associated with the use of posyandu lansia services]. *Jurnal Kesehatan Komunitas* [Internet]. 2011;1(3):155–62.
25. Sulistiyawati I. Hubungan antara pekerjaan, pendapatan, pengetahuan sikap lansia dengan kunjungan ke posyandu lansia [The association between employment, income, knowledge and attitude of elderlies with visit to *posyandu lansia*]. *STRADA Jurnal Ilmiah Kesehatan* [Internet]. 2012;1(2):14–20.
26. Primadayanti S. Perbedaan tingkat kemandirian activity of daily living (ADL) pada lansia yang mengikuti dan tidak mengikuti posyandu di wilayah kerja Puskesmas Sumbersari Kabupaten Jember [tesis] (The differences of activity of daily living among elderlies participating and not participating in posyandu in the working area of Sumbersari Public Health Center, Jember District [Postgraduate Thesis]). Jember: Universitas Jember; 2011.
27. Thabrany H. Tinjauan akademis tentang asuransi kesehatan nasional [Academic review of national health insurance]. Pusat Kajian Ekonomi Kesehatan, Universitas Indonesia. 2003;135.
28. Pratono AH, Maharani A. Long-Term Care in Indonesia: The Role of Integrated Service Post for Elderly. *Journal of Aging and Health* [Internet]. 2018;30(10):1556–73.
29. Bhaskaran K, Douglas I, Forbes H, dos-Santos-Silva I, Leon DA, Smeeth L. Body-mass index and risk of 22 specific cancers: a population-based cohort study of 5·24 million UK adults. *Lancet* (London, England) [Internet]. 2014;384(9945):755–65.
30. Abdullah A, Peeters A, de Courten M, Stoelwinder J. The magnitude of association between overweight and obesity and the risk of diabetes: A meta-analysis of prospective cohort studies. *Diabetes Research and Clinical Practice* [Internet]. 2010;89(3):309–19.
31. Wormser D, Kaptoge S, Di Angelantonio E, Wood AM, Pennells L, Thompson A, et al. Separate and combined associations of body-mass index and abdominal adiposity with cardiovascular disease: Collaborative analysis of 58 prospective studies. *The Lancet* [Internet]. 2011;377(9771):1085–95.
32. Rohmah AIN, Purwaningsih, Bariyah K. Kualitas hidup lanjut usia [The quality of life among elderlies]. *Keperawatan*. 2012;3(2):120–32.
33. Han TS, Tajar A, Lean MEJ. Obesity and weight management in the elderly. *British Medical Bulletin* [Internet]. 2011;97(1):169–96.
34. Foguet-Boreu Q, Violan C, Roso-Llorach A, Rodriguez-Blanco T, Pons-Vigués M, Muñoz-Pérez MA, et al.

Impact of multimorbidity: Acute morbidity, area of residency and use of health services across the life span in a region of South Europe. *BMC Family Practice.* 2014;15(1).

35. Nilasari MG, Prabawati I. Evaluasi Peraturan Daerah Kota Surabaya No. 3 2014 tentang Kesejahteraan Lanjut Usia (Studi pada Posyandu Lansia Sekar Melati di RW II Kelurahan Baratjaya Kecamatan Gubeng Kota Surabaya) [Evaluation of Surabaya City Regulation No. 3 Year 2014 on the wellness of elderlies (A study at Sekar Melati *Posyandu Lansia* in RW II Baratjaya Village, Gubeng Subdistrict, Surabaya City)]. *Publika* [Internet]. 2014;6(4).
36. Kok RM, Reynolds CF. Management of depression in older adults: A review. *JAMA - Journal of the American Medical Association*. 2017;317(20):2114–22.
37. Guessous I, Bochud M, Theler JM, Gaspoz JM, Pechère-Bertschi A. 1999-2009 trends in prevalence, unawareness, treatment and control of hypertension in Geneva, Switzerland. *PLoS ONE*. 2012;7(6).