**SOCIOECONOMI, PREVALENCE OF METABOLIC SYNDROME, HANDGRIP STRENGTH ON COMMUNITY-DWELLING OLDER ADULTS**

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***ABSTRACT***

*Handgrip strength is indicative of overall physical health and mobility in the older adults. A reduction in strength below a certain threshold severely increases the risk of mobility limitations and is predictive for adverse outcomes such as dependence in daily activities, mortality. The purpose of study was to analyze the association gender, employed status, metabolic syndrome with handgrip strength among community-dwelling older adults. The study was observasional analytic with cross sectional approach. Data were collected on gender, employed status, metabolic syndrome, handgrip strength*. *102 older adults dwelling-community in Pekanbaru Indonesia selected by cluster sampling. The result showed that low handgrip strength was 60,8 %, females were 66,7 %, unemployed was 70,6 %, prevalence of metabolic syndrome were 20,6 %. Gender was associated with handgrip strength (p=0,000; odds ratio 6,27; 95% confidence interval 2,540-15,493), employed status was associated with handgrip strength (p=0,008; odds ratio 3,4; 95% confidence interval 1,406-8,268),metabolic syndrome were associated with handgrip strength (p=0,045; odds ratio 0,29 ; 95% confidence interval 0,91-0,95). There were many factors which influencing the handgrip strength in older adults such as gender, employed status and metabolic syndrome.*

***Keyword****s: Community-dwelling older adults, Employed, Handgrip strength, Gender,Metabolic syndrome*

**Background**

Population ageing is a global phenomenon. Virtually each country in the world is experiencing growth in the size and proportion of older adults in their population. There were 703 million persons aged 65 years or over in the world in 2019. The number of older adults is projected to double to 1.5 billion in 2050. Globally, the share of the population aged 65 years or over increased from 6 per cent in 1990 to 9 percent in 2019. That proportion is projected to rise further to 16 per cent by 2050, so that one in six people in the world will be aged 65 years or over (Nations, 2019).

 Currently, Indonesia is entering a period of population aging. Indonesia undergoing an increase older adults from 7,56 percent in the 2010 up to 9,7 percent in the 2019 and estimate in the 2035 is 15,77 percent .This can impact for elderly namely positive and negative impact (Sumandar, 2019). The growth and development among older adults occurs continue. This related changes in the body, namely aging process (Sumandar, Yesi Septina Wati, 2020).

The WHO defines active aging as the process of optimizing opportunities for health, participation, and security in order to enhance quality of life as people age including those who are frail, disabled, and in need of care (Halaweh, Dahlin-Ivanoff, Svantesson, & Willén, 2018).Population ageing is a human success story, a reason to celebrate the triumph of public health, medical advancements, and economic and social development over diseases, injuries and early deaths that have limited human life spans throughout history (Nations, 2019)

Healthy People 2030 focuses on reducing health problems and improving quality of life for older adults. Older adults are at higher risk for chronic health problems like diabetes, osteoporosis, and Alzheimer’s disease (HealthyPeople.gov, n.d.). Older adults were at high risk for the development of chronic ilnness and related disabilities (Sumandar, 2018). A total of 818 community‐dwelling older adults were surveyed and the prevalence of high‐need older adults was 24.1% (Wei‐Yun Chang,Kuei‐Min Chen,Meng‐Chin Chen, Li‐Yen Yang, 2020).

Some studies have been done conducted by health disorder to older adults. Metabolic syndrome may all contribute to poor muscle health (Mesinovic et al., 2019). Metabolic syndrome is an accumulation of several disorders, which together raise the risk of an individual developing atherosclerotic cardiovascular disease, insulin resistance, and diabetes mellitus, and vascular and neurological complications such as a cerebrovascular accident (Franke & Suplicy, 2007). Metabolic syndrome, an important healthcare burden worldwide (Kim, Lee, & Kim, 2020).

Handgrip strength is indicative of overall physical health and mobility in the elderly. A reduction in strength below a certain threshold severely increases the risk of mobility limitations and is predictive for adverse outcomes such as dependence in daily activities and mortality (Wearing, Konings, Stokes, & de Bruin, 2018). Handgrip strength is often used as an indicator of overall muscle strength for aging adults (R. P. McGrath, Kraemer, Snih, & Peterson, 2018). In older adults there is a faster decrease in muscle strength than muscle mass. If the decrease in fast-type muscle fibers greater than in slow-type muscle fibers, it will strongly affects the muscle strength (Kristiana, Widajanti, & Satyawati, 2020). Measures of handgrip strength can be used to conveniently assess overall muscle strength capacity (R. McGrath et al., 2020)

Previous studies have evaluate from Wu SW, Wu SF, Liang HW, Wu ZT, Huang S : 2009 for measuring factors affecting grip strength in a Taiwan Chinese population and a comparison with consolidated norms handgrip strength is assessed using hand dynamometer, which has a good and safe results, also with a reasonable price and easy to get and use (Kristiana et al., 2020).

**Objective**

The objectiveof study was to analyze the association gender, employed status, metabolic syndrome with handgrip strength among community-dwelling older adults in the Kulim Distric Pekanbaru Indonesia

**Methods**

Study was observasional analytic with cross sectional approach. There were 102 older adults dwelling-community in Kulim Distric Pekanbaru Indonesia selected by cluster sampling. Study based on inclusion criteria namely being able to cooperations and communication, fit of mental health, had no vision and hearing impairment during data collection processes. All participants were given verbal and written information about the aim of the study and they signed an informed consent form.

The participants were ensured confidentiality and informed that participation was voluntary and that they could drop out of the study at any time. The study received ethical approval from ethical review board for medicine and health research medicine faculty Riau University (**Number.B/13/UN.19.5.1.1.8/UEPKK/2020**). There were measure three parts of measure namely demographic character, clinical characteristics such as prevalence of metabolic syndrome, hand grip strength. For instruments have been translated into Indonesia language.

The procedure measure of metabolic syndrome namely hypertension was measured by sfigmomanometer, glucose was measured by glucose meter (one touch basic monitor) after 8 hours of fasting, while cholesterol level was measured by an automatic lipid pro-meter by inserting blood from peripheral into strips of a blood cholesterol test, central obesity was measured by meter. Furthermore handgrip strength was measured by hand dynamometer. Dominant handgrip strength was assessed, (Handgrip strength <26 kg for men, <18 kg for women) (Makizako et al., 2019) and the tool was using grip 3 times. Highest number was using. Statistical Package for Social Sciences version 22 carry out for process and analysis data. Data were presented by describing proportions of categorical variables. The significance on gender, employed status, prevalence of metabolic syndrome with handgrip strength were used by chi-square with p value less than 0,05.

**Results**

102 older adults in community dwelling in the Kulim Distric Pekanbaru Indonesia show that 66,7 percentange were female, 70,6 percentange were unemployed, prevalence of metabolic syndrome 20,6 percentange were yes, handgrip strength 60,8 percentange were low. More information can be seen in the table 1

**Tabel 1. Gender, Employed status, Metabolic syndrome, handgrip strength amongcommunity-dwelling older adults In Kulim Distric Pekanbaru Indonesia**

|  |  |  |
| --- | --- | --- |
| **Variables** | **F** | **%** |
| **Gender** |
| Female | 68 | 67,7 |
| Male | 34 | 33,3 |
| **Employed status** |
| Unemployed | 72 | 70,6 |
| Employed | 30 | 29,4 |
| **Metabolic syndrome** |  |  |
| No | 81 | 70,4 |
| Yes | 21 | 20,6 |
| **Handgrip Strenght** |
| Low | 62 | 60,8 |
| Normal | 40 | 39,3 |

**Tabel 2. Association af Gender, Employed**

**status, Metabolic syndrome, Handgrip**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variables** | **Handgrip** **strength** | **Total** | **OR** | ***p-value*** |
| **Low** | **Normal** |
| **Gender** |
| Female | 51 | 17 | 68 | 6,27(CI 95% 15,493 – 2,540) | 0,000 |
| Male | 11 | 23 | 34 |
| Total | 62 | 42 | 102 |
| **Employed status** |
| Unemployed | 50 | 22 | 72 | 3,4 (CI 95% ; 8,268-1,406( | 0,008 |
| Employed | 12 | 18 | 30 |
| Total | 62 | 40 | 102 |
| **Metabolic syndrome** |
| No | 45 | 36 | 81 | 0,29 (CI 9)5% 0,95-0,91 | 0,045 |
| Yes | 17 | 4 | 21 |
| Total | 62 | 40 | 102 |

Based on measure of bivariate analysis can be seen table 2 showed that there was difference between female and male toward handgrip strength ( *p* value 0,000). The older adults with female have 6,27 times of chance to be low of handgrip strength in the future ( OR=6,27 CI 95% ; 15,493 – 2,540). There was difference unemployed and employed toward handgrip strength ( p value 0,0008). The older adults with unemployed have 3,4 times of chance to be low of handgrip strength in the future ( OR=3,4 CI 95% ; 8,268-1,406). There was difference between older adult with metabolic syndrome and without metablic syndrome toward handgrip strength ( p value 0,045). The older adults with metabolic syndrome have 0,29 times of chance to be low handgrip strength in the future ( OR=0,29 CI 95% 0,95-0,91).

# dISCUSSION

The result further showed that older adults with low handgrip strength was 60,8 %. Older adults were muscle disorder. Based on studies previous that low handgrip Strength was positively associated with age (Confortin et al., 2018), Reductions in muscle strength may lead to mobility limitations in older age (Aartolahti, Lönnroos, Hartikainen, & Häkkinen, 2020), loss of skeletal muscle mass and function is associated with increased arterial stiffness in the elderly population, and the combination of muscle mass reduction and low muscle strength may lead to greater arterial stiffness than each of the individual conditions (Zhang et al., 2020).

Majority of respondents were female. Older adults with female have high spirit for discussion and caring about health condition Based on studies previous that the longer life expectancy in female compared to male, a higher prevalence of females, and was 46.9 % in women in China (Song et al., 2020) (Wagner, Ascenço, & Wibelinger, 2014)(Fitriana et al., 2020)**.** Older adults majority were menopause phase**.** The risk of human maturity in women is being menopause. Menopuase period related by social, psychological, emotional aspects due to physiological changes (Sumandar, Yesi Septina Wati, 2020). 70,6% older adults were unemployed status. This can be seen that older adults low activity. Older adults with unemployed status was more likely to be health at risk (Ng, Luo, & Heng, 2014). Physical workload will being impact on disorder muscle (Utumo, 2019). A decrease spirit for physical activity related to muscles.

Prevalence of metabolic syndrome among older adults could be influenced by age. Some studies have been done explored, Population aging is accompanied by higher prevalence of metabolic syndrome in the Niterói Brazil (Saad, Cardoso, Martins, Velarde, & da Cruz Filho, 2014). A higher Body Mass Index, urban area were predictive and influencing of developing metabolic syndrome(Van Ancum et al., 2018),(Yan et al., 2019). The found of study was higher in female. This study consistent among older adults in the China that risk for metabolic syndrome in women was 1.20 times higher than that in men (Yan et al., 2019). Prevalence of metabolic syndrome in this study were affected by age, gender, living in the urban area.

**Gender related to handgrip strenght**

Gender was correlated by handgrip strength, male was stronger of female. It stated that female who have 6,27 times of chance to be low of handgrip strength in the future. Based on studies have been done explored by Manual grip strength among older adults have effect measures were greater in men and proved to be a good marker (Montes et al., 2020). A study in Singapore also showed that gender was associated with handgrip strength (Ong et al., 2017)**.** Older adults who female with low handgrip strength can plan with other, can make a guidelines at home in maintaining and increasing muscle strength by consistently doing physical activities in accordance with body condition. In addition, considering that have demensia symptom their need support by family.

**Employed status related to handgrip strength**

Older adults with unemployed have 3,4 times of chance to be low of handgrip strength. Study supported the previous research in the Kudus Public health center have been conducted by employed status related to Activity daily (Nurulistyawan Tri Purnanto, 2018)**.** It is mean their with employed status impact to physical activity. Guidelines are just for older adults namely as part of their weekly physical activity, should do multicomponent physical activity that includes balance training as well as muscle-strengthening activities and with chronic conditions should understand whether and how their conditions affect their ability to do regular physical activity safely(II, 2018)**.**

**Metabolic syndrome related to handgrip strength**

Metabolic syndromewas correlated by handgrip strength. Older adults have been occurs disorder namely psysiology disorder or function body disorder. This related by aging. Metabolic syndrome is a group of several symptoms of metabolic disorders, such as hyperglycemia, hypertension, central obesty, dyslipidemia (Christijani, 2019). The prevalence of hypertension among community-dwelling older adults was 35%, (Gray, Sims, & Oh, 2020). Some studies have been done explored by metabolic syndrome namely in the Chinese community-dwelling older adults that aging condition can be occurs Metabolic syndrome was correlated with handgrip strength (Song et al., 2020). However, older adults were ≥65 years old in the Singapore found suggest that handgrip strength had a significant negative association with metabolic syndrome (Merchant, Chan, Lim, & Emorley, 2020).

According to researchers that occurs caused by older adults in the Singapore have been effective health behaviours. Besides that in Singapore have been home nursing in the urban area with good care and government has good concern for the older adults, home nursing have been good quality, Nurses have been given good care. Furthermore, Singapore has a home nursing private well.

# CONCLUSION

The present study demonstrated that gender, employed status , metabolic syndrome were associated with handgrip strength community dwelling older adults in Kulim Distric Pekanbaru Indonesia. This research aims to help geriatric nurse enhance education and health promotion through handgrip strength examination. By getting handgrip strength condition will impact to health behaviors, expecially for low handgrip strength. All these findings highlight the importance of enhance education and motivation their and families, visit Posbindu continuously, establish setting up exercise, given nursing care with holistic care appoach, Collaboration on another sector such as general practitioners, nutritionist, psychologist, religious leader, social worker and decision makers sustainably

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