

# Are Empowered Women Healthier in Their Later Life? Empirical Analysis Using Indonesian Longitudinal Data

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## Abstract

Although empowering women provides advantages for women and their children and family, the long-term advantage is yet to be deeply studied. By utilizing 14 years of longitudinal information, this study investigated the link between empowerment and later life well-being among women. Data from two later rounds of the Indonesian Family Life Survey (IFLS3 [2000] & IFLS5 [2014/2015]) were analyzed using logistic regression with robust standard error. Results showed that unempowered women were more likely to have trouble in activities of daily living (ADL) in older age. When the analysis was specified based on living locations, empowerment among women living on the island of Java had no statistical association with later life well-being. In contrast, empowerment among women living off the island of Java was highly significant in affecting ADL problems with double strength in magnitude as that of the general sample. This finding provided insight into the vital role that empowerment plays in older adults' well-being, especially those living off the island of Java. Moreover, having a chronic disease is associated with having a higher likelihood of difficulties with ADL. Older adults who were involved in paid activities are found to perform better in ADL than older persons not working. Furthermore, having more family members impacts the likelihood of difficulties with women's ADL.

## Keywords

Older age health; well-being; women empowerment

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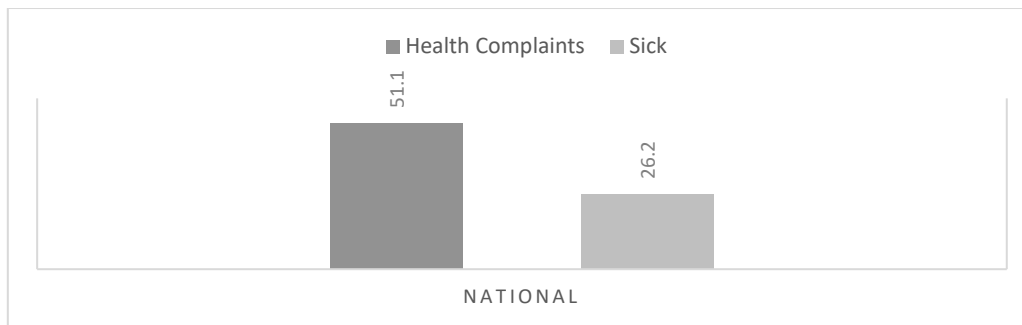
## Introduction

An aging population demonstrates a decrease in consumption or the use of resources (Dantas Guimarães & Ferreira Tiryaki, 2020). Wu et al. (2021) found that an aging population has a relationship with lower performance on export upgrading through less innovation and less qualified human capital. At the national level, an aging trend significantly impacts the GDP of a country (Kim et al., 2016; Uddin et al., 2016). Orlická (2015) also argued that a higher portion of older adults raises significant issues with severe macroeconomic consequences. Chen et al. (2016) provided evidence that an older population is vital in influencing poverty incidence. Conversely, Fermini and Bell (2022) showed that older adults tend to be unhealthy. This finding is detrimental as it implies that supporting healthcare facilities should be adequate in terms of quality and quantity of care for older adults in the future.

Data show that older adults have doubled globally in the past five decades. Take Indonesia, for instance. More than 10% of the population in each expenditure group are older adults. According to BPS - Statistics Indonesia, in 2019, the percentage of the older population in Indonesia reached 9.6% or around 25 million people. Indonesia's dependency ratio for 2025 is estimated to be 47.5, which means that 100 people would assume responsibility for the welfare of almost 50 people. These percentages are stifling, considering that the world's population is expected to reach 8.6 billion in 2030 and as many as 9.8 billion in 2050 (United Nations, 2017).

According to the World Health Organization (2022a, 2022b), Indonesia has an increasing and healthy life expectancy. This means that an individual in good health and self-assessed healthcare was expected to live until 60.3 years old in 2019. These numbers imply that today Indonesia needs to prepare for the longevity of its population in terms of health and quality of life. Regarding inequality, within Java, the cultural, economic, and political center of Indonesia and home to more than half its population, the highest inequality rate can be seen between those living on the island of Java and living off the island of Java. Inequality contributes to the population aging problem through limited access to healthcare facilities that play a crucial role in morbidity and dependency of older adults (BPS - Statistics Indonesia, 2021). This group faces various problems, such as living below the poverty line.

The level of education of older adults is one factor that determines their economic condition. This can be seen in the average length of schooling for the older adults who work in the lowest 40% expenditure group, which is lower than other expenditure groups. Meanwhile, the health of older persons is also problematic in the older group. Half of the older population in Indonesia experience health problems, and a quarter experience chronic illness. As people get older and their physical condition weakens, their risk of health problems and disabilities is greater.

**Figure 1:** Health Condition of Older People in 2019 (Proportion of Older people %)

*Note: National Socio-Economic Survey 2019 (BPS - Statistics Indonesia, 2020)*

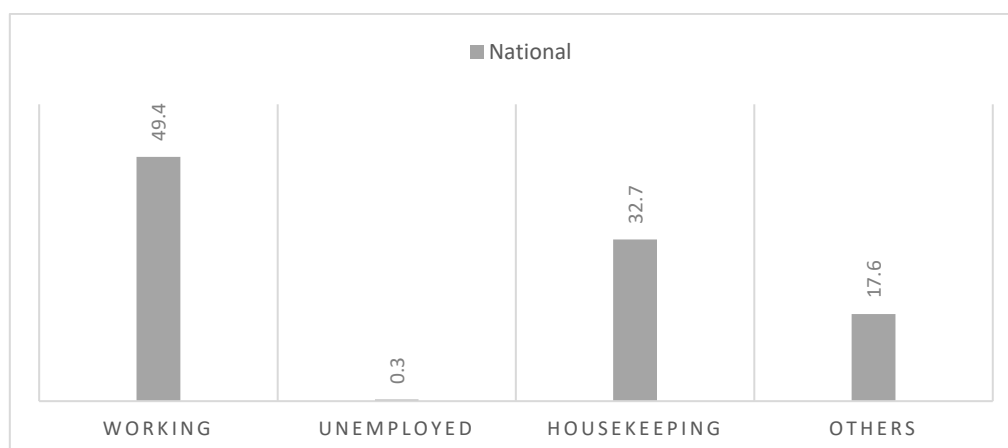
Families with older adult relatives bear a more significant economic burden. The average monthly expenditure of families with older adults is estimated to be 3% higher than that of families without older adult relatives (Tim Nasional Percepatan Penanggulangan Kemiskinan [National Team for the Acceleration of Poverty Reduction] & SMERU Research Institute, 2020). Households with older adults in the lowest 40% expenditure group have a more significant expenditure burden on food than households without older adults.

While the issue of unempowered women still needs to be appropriately addressed, an accelerating number of aging persons worldwide demands more attention from policymakers. A significant reduction in mortality and increased life expectancy rate has fueled population aging to become a pressing global challenge, particularly for older adults' dependency. On a national scale, a significant increase in the senior population rate has an unprecedented impact on national health systems (Feng et al., 2018). Consequently, chronic diseases and functional disabilities decrease productivity and economic performance and increase the healthcare expenditure of older adults (Liu et al., 2016; Sirven et al., 2015). Furthermore, the physical decline is strongly associated with mental resilience among the older population (Feng et al., 2018). These data suggest that the aging issue should be seriously tackled, and better preparation must be made for older individuals.

To achieve healthy aging in a macro context, public health policies should focus not only on promoting health among people who have been entering retirement age but also on empowering pre-aging to prepare for a better quality of longer life (Antonietti et al., 2014; Kayser et al., 2019; Liu et al., 2016; Maas, 2020; Roberts, 2004; World Health Organization, 2021). As most medical workers promote, preventive and curative actions might also be adopted in aging issues. Considering that aging has been found to affect women's quality of life more than men's (Maas, 2020), taking these two issues into account at once might provide new insight into how the relationship between the two developed. Maas (2020) explained that although older females tended to live longer, health issues are typically diagnosed earlier than the males. These facts not only demonstrated how women enjoyed their later life but were also too costly for family, community, and nations.

Conditions and readiness for the care of older adults vary across countries. These factors in developing countries are more complicated due to other issues such as inequality, low economy, and instability. Indonesia, a country with a relatively fast-growing aging population, has an unavoidably high dependency ratio and unresolved inequality issues.

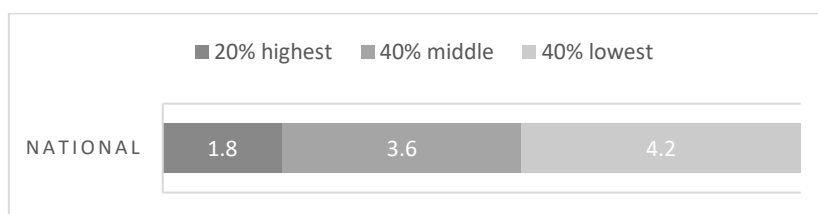
**Figure 2:** Working Status Among Older Adults in 2019



*Note: National Socio-Economic Survey 2019 (BPS - Statistics Indonesia, 2020)*

Data shows that half of Indonesia’s older population is still working. The second highest activity for older adults (32.7%) after work is taking care of a household. Activities carried out by older adults, such as working or taking care of a household, can increase health risks. According to Adjei and Brand (2018), older adults who only do housework are reported to have poorer health conditions. Based on Figure 2, it can be concluded that because of economic factors, older adults in Indonesia work to meet their basic needs. Following the findings of Priebe and Howell (2014), the proportion of older people who work is found more in groups of relatively poor people.

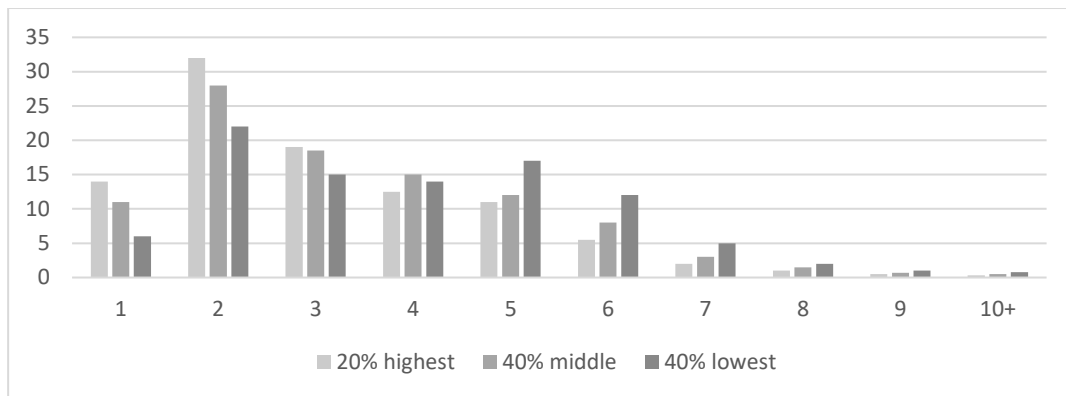
**Figure 3:** Distribution of Older People According to Household Expenditure in 2019 (percentage)



*Note: National Socio-Economic Survey 2019 (BPS - Statistics Indonesia, 2020)*

In general, older adults live in an economically and socially vulnerable state. According to BPS - Statistics Indonesia (2020), older adults live in the 40% lowest group based on their expenditures. Around 4.2% of older adults live in the 40% lowest, 3.6 in the 40% middle group, and 1.8% in the 20% highest expenditures group.

Moreover, 6.3% of older adults live alone. The older adults who live alone need special attention because this group is in a risky position. This risk is because older adults' physical abilities, health conditions, and social and mental changes tend to decrease as they age (Osman et al., 2012). Therefore, older adults need assistance and social support, especially from family members. Kaplan et al. (1994) stated that families could provide adequate healthcare and essential social support for older adults. With an established family support system, the risks faced by older adults can be minimized.

**Figure 4:** Distribution of Older People According to Household Size in 2019

*Note:* National Socio-Economic Survey 2019 (BPS - Statistics Indonesia, 2020)

Empowerment means the capability of a person to decide about their own life. As a result, women's empowerment means the changes in the capability of women to make their own decisions about their lives. This capability has been ignored or restricted due to the inequality women face as a marginal group. Rowlands (1995) explained that empowerment must bring people into the decision-making process, not only in the economic sphere but also in access to political structures and formal decision-making that maximize the opportunities available to them despite structure constraints. More importantly, empowerment allows women to assert their independence, make choices, and control resources that will assist in challenging and eliminating their subordination (Keller & Mbewe, 1991).

Expanding literature on women's empowerment primarily focuses on the impact of empowerment on the women's current well-being, the spillover effects of empowerment on household prosperity and resilience, and children's well-being outcomes such as health and education attainment (Annan et al., 2021; Astutik et al., 2020; GU & NIE, 2021; Onah, 2021; Rizkianti et al., 2020). A study by Bonis-Profumo et al. (2021) claimed that prioritizing women's empowerment was a valuable investment for the well-being of mothers and children. In broader impact coverage, women's decision-making autonomy, often used as an essential element on empowerment indicators, was found to affect antenatal care services significantly (Rizkianti et al., 2020).

The Global Coalition on Aging (GCA) (2020) suggested policy action on healthy aging could be established by empowering women. The GCA prioritized women according to three roles: women as economic contributors, women as caregivers, and women as family and community leaders. In addition, there are personal determinants to which gender-based policy in aging needs to consider. Biology, genetics, status, and gender-influenced roles determine the health of older adults. For instance, menopause was crucial in women's biological transition and social perspective (Maas, 2020; Salk et al., 2017). The extensive literature on empowering people is dynamic and multifaceted, with dimensions of empowerment developed in the literature. Kabeer's (1999) definition of empowerment included financial or economic resources (income, employment, or assets), human resources (education or learned skills), and social resources (social participation and social support from family).

Regarding gender issues, studies have found that if women are more empowered than men, they tend to have higher health results (Malapit et al., 2015; Ruel & Alderman, 2013) and better economic outcomes (Doss, 2006; Duflo, 2012; Pangaribowo et al., 2019). Studies have also attempted to disentangle women's empowerment and its benefits. Crookston et al. (2021)

reported that women were likelier to have empowerment in productive decisions, group membership, and influence in a social community. In contrast, men were more prone to have empowerment in issues such as family income control and work balance. Another concern that could influence women's empowerment results in the well-being of older adults is by which dimensions or indicators of empowerment were determined (James-Hawkins et al., 2019).

This study, therefore, aims to contribute to the literature on women empowerment to increase women's quality of life during retirement. Using data from the third and fifth Indonesia Family Life Surveys (IFLS3 & IFLS5) (RAND, 2009, 2016), this study constructed the analysis using logistic regression with robust standard error and marginal effects calculation. In general, empowerment was strongly associated with health conditions in later life measured by difficulty in daily living activities. Although this response did not include gender, the calculation of the marginal effects showed that women were twice as affected as men. Moreover, considering the inequality issue among regions, the further analysis compared the magnitude of empowerment effects between older females living on the island of Java and those living off the island of Java.

While the empowerment variable was insignificant in affecting the older adults' physical performance on Java, this variable was highly significant in affecting daily living problems with more than twice the magnitude of the general sample. These data provide insight into the vital role of empowerment concerning the well-being of older adults, especially those living off the island of Java. This study also compared those living on the island of Java and those living off the island of Java regarding inequality in access to health facilities. Consequently, the more women were empowered, the more access they had to healthcare facilities. Amid these ongoing socioeconomic issues, women's rights and personal choices are still limited and dictated by culture and customs. Womanhood practice has been assimilated into traditional law and local customs (Pangaribowo et al., 2019). For instance, Javanese culture sees women as ministers of domestic affairs. In the Batak matrimony system, the bride moves in with her husband's family after marriage. Consequently, women do not have equal rights in many ways and are disadvantaged in the labor market, in addition to their status being further worsened by reproductive constraints (Siegmann, 2007).

## **Indonesia context**

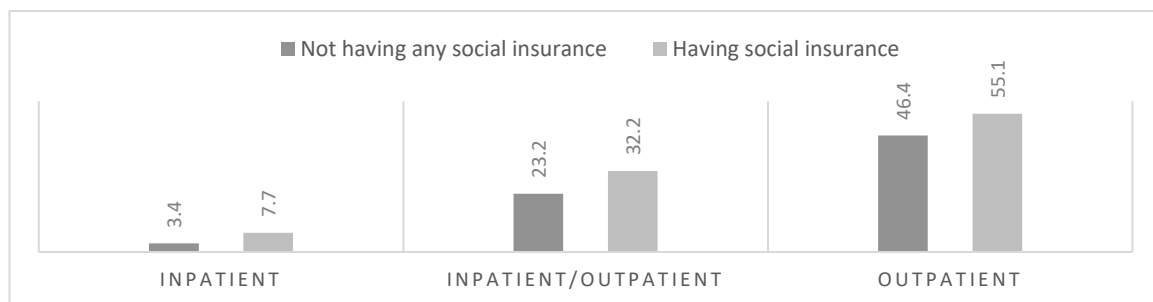
The data on the living status of the older adults also shows that there are still numerous older adults living with their spouses and other family members, allowing them to still have a potential support system in the event of an emergency. However, paying attention to the quality and adequacy of the support system (family) of older adults is also necessary. If it turns out that other family members are also experiencing difficulties, for example, economically, family members cannot be a sound economic support system. Table 1 shows that there are older adults who live alone; therefore, they may need special assistance.

**Table 1:** Residence Status

Characteristics	Residence Status				
	Live alone	With Spouse	With Family	Three Generations	Others
Total	9.38	20.03	27.30	40.64	2.66
<b>Gender</b>					
Men	4.98	25.28	32.25	36.04	1.45
Women	13.39	15.24	22.79	44.82	3.76
<b>Residence</b>					
Urban	8.74	18.84	29.97	39.63	1.45
Rural	10.10	21.35	24.31	41.76	3.76

*Note: National Socio-Economic Survey 2019 (BPS - Statistics Indonesia, 2020)*

Let us look at older adults' access to health facilities in the bottom 40% of the expenditure group based on their health social security ownership (Figure 4). Older adults with health social security have a higher probability of accessing health facilities than those who do not have health insurance. This pattern can be seen at the national level and in each study area. Figure 5 presents the utilization of health facilities with and without social insurance among older adults. The figure shows that social insurance is proven to increase health facilities usage in Indonesia.

**Figure 5:** Health Facilities Utilization Based on Social Insurance

*Note: National Socio-Economic Survey 2019 (BPS - Statistics Indonesia, 2020)*

Accordingly, this study hypothesizes that empowered woman or women who have a high empowerment index could significantly decrease their ADL score regardless of living conditions and location.

## Data and methods

### Data and sample selection

This study uses data from the third and fifth Indonesia Family Life Surveys (IFLS3 & IFLS5) conducted by RAND in collaboration with Gadjah Mada University and SurveyMeter Research Institute. The first IFLS fielded in 1993 collected information from 22,000 individuals from 7,200 households living in 13 provinces in Indonesia. It was claimed that the IFLS1 collected national representative data covering 83% of Indonesia's population. As the IFLS is designed to be longitudinal data, respondents in the next wave were the 1993 individuals who were re-contacted, plus their subsequent generations. Thus, the number of respondents

continuously increases from wave to wave. Later waves were fielded in 1997, 2000, 2007/2008, and 2014/2015. Specifically, this study utilizes the third wave fielded in 2000 and the fifth and most recent wave in 2014/2015. The response rate in the IFLS5 2014/2015 was 92% of household respondents who were re-contacted (interviewed or died) (RAND, 2009, 2016).

The IFLSs categorize its respondents into two types based on age: adult respondents 15 years old and above and children under 14 years old. The IFLS5, in 2014/2015, categorized 36,381 respondents as adults. This study used only adult respondents aged 60 and above from IFLS5; therefore, 11.6% of the total respondents or 4,222 older persons were utilized. Since this study investigated respondents' condition in the past 14 years to the current condition (IFLS5), data from IFLS3 in 2000 needed to be paneled with data from IFLS5 in 2014/2015. By back tracing respondents' information in the data fielded in 2000, the respondents' conditions were from when they were seven years old or younger. Attrition between this spanning period made a significant reduction in our data sample. Reasons for attrition were not explicitly explained; however, these were usually caused by the respondent's death or migration, which is impossible to trace. Finally, there were only 1,268 respondents whose complete information was found both in 2000 and in 2014/2015. This amount consists of 450 older females and 818 older males.

Past information in IFLS3 of 1,268 respondents was used to indicate whether, in 2000, they were empowered. This variable was the primary independent variable, while difficulties in activities of daily living (ADL) in IFLS5 became the dependent variable. In addition, covariates included current information on respondents' age, chronic disease experience, working status, per capita expenditure, household size, and living location. Information about empowerment is intentionally chosen as the past (IFLS3) condition to investigate its long-term effect on the respondent's current conditions. As the remaining variables predicted respondents' current health, covariates were collected from the data in IFLS5.

### **Dependent variable: Difficulties in activities of daily living (ADL)**

This study used difficulties in ADL, representing the health condition among older adults as the dependent variable. Older persons were considered to have difficulties with ADL if they had trouble in at least four out of nine daily activities: (1) carrying a heavy load (like a pail of water) for 20 meters, (2) walking for 1 kilometer, (3) bowing, squatting, or kneeling, (4) sweeping the house floor or yard, (5) drawing a pail of water from a well, (6) standing up from sitting on the floor without help, (7) standing up from sitting position in a chair without help, (8) using the toilet without assistance, and (9) dressing without help.

### **Main independent variable: Women empowerment**

This study used Kabeer's (1999) definition to construct the meaning of women's empowerment, by using resources of empowerment in three main categories: (1) financial or economic resources (income, employment, or assets), (2) human capital or resources (education or learned skills), and (3) social resources or social capital (social support from family or others). Various factors that develop empowerment since childhood shape women to make their own decisions about their lives. Instead of using the unidimensional index, this study utilized multidimensional dimensions to obtain women's empowerment. In this study, the ability of women to decide, have self-esteem, social capital, and asset ownership were variables constructed to obtain women's empowerment. The availability of data in the IFLS3 and IFLS5 provided us with four dimensions to construct empowerment variables.



Decision-making was used as the first domain to measure the ability of women to make confident choices in their lives and household decisions. The self-esteem dimension was determined by promoting reflection and analysis and demonstrating alternative thinking and doing. Building skills of analysis and demonstrating alternative ways of thinking could be constructed by education and working status when women were still young adults. Social capital described empowerment because women's leadership in the community determined how much a person felt comfortable speaking out in public. Social capital was often substituted by group membership providing networks and social capital that could empower women and contribute to obtaining essential sources. The last empowerment dimension was asset ownership, allowing women to own and control productive assets. Previous studies presented evidence that household resources owned by women have a better influence on the children than resources in the hands of men.

This study constructed the empowerment index with a multidimensional framework to inform policymaking. Table 2 sums up empowerment construction regarding multidimensional aspects with equal weighting for each dimension. Index weighting is usually used to construct multidimensional variables in socioeconomics aspects because different dimensions build empowerment variables as our variable interest.

**Table 2:** Assigning weights to dimensions of empowerment variable

Dimensions	Variables (coding yes = 1; no = 0)	Assigned Weight
Decision-making (weight: 1/4)	Having at least one contribution to making essential household decisions, including: a. Large, expensive purchases for the household (i.e., refrigerator or television) b. Money for monthly savings c. Whether respondent or spouse works d. Whether respondent or spouse uses contraception	1/4
Self-esteem (weight: 1/4)	Education: having at least six years of schooling Working status: if working in 2000	1/8 1/8
Social capital (weight: 1/4)	Social participation: at least one participant in the community	1/4
Asset ownership (weight: 1/4)	Having at least one of five common household assets: house, land, vehicle, savings in banks, or gold.	1/4

*Note:* Authors interpretation

Equation 1 was used to estimate the empowerment variable.

$$E = [\sum_{i=1}^n DM_i \times w_i] + [\sum_{i=1}^n SE_i \times w_i] + [\sum_{i=1}^n SC_i \times w_i] + [\sum_{i=1}^n AO_i \times w_i]$$

Equation 1

$E$  denoted empowerment from the total of each weighting dimension ( $E$  index ranging from 0 to 1);  $DM_i$  denoted the dimension of decision making;  $SE_i$  showed self-esteem of each sample calculated using education and working status;  $SC_i$  represented social capital; and  $AO_i$  denoted asset ownership to calculate having at least one type of household asset. The empowerment index ranged from 0 to 1 and was constructed from five past and present indicators. The information from IFLS3 data indicated individual empowerment in decision involvement, working status, asset ownership, and education. To enrich the index with the

social capital aspect, the variable of an individual's participation in at least one social gathering in a community was supplemented. As the effect of social participation in the present time is more likely to influence the current older adults' health condition, current information on social participation in IFLS5 was used instead of the data from the IFLS3.

## Covariates

Covariates selection considered the multi-aspects that directly and indirectly affect the health of older adults, including sociodemographic characteristics, economy, health-related factors, and household characteristics. All covariates were information obtained from the respondent's current conditions, such as age, the number of chronic disease(s) experienced by the respondent, whether the respondent was involved in paid working activity, per capita expenditure, the number of household members, and whether the respondent lived in the urban or rural area and whether they lived on or off the island of Java. Table 3 presents the explanation of each variable.

**Table 3:** Variable Explanation

Key variable	Explanation
<b>Endogenous variable</b>	
Difficulties in activities of daily living (ADL)	Dummy of having difficulties in activities of daily living. Recorded as "1" if the respondent experienced difficulties in at least 4 out of 9 activities of daily living; otherwise recorded as "0."
<b>Exogenous variable</b>	
Empowerment index	Jointly constructed from five dummy variables with different weights. Four variables were obtained from past information regarding empowerment-related indicators. The remainder was a current indicator, namely, social participation.
Age	Age of the respondents (above 60 years old)
Number of chronic diseases (s)	Number of chronic diseases (0-6)
Working status in 2014/2015	Dummy of working status: recorded as "1" if the respondent was currently involved in paid working activity.
Household size	Number of household members
Quintile of per capita expenditure (PCE)	Quintile of per capita expenditure, ranging from 1 to 5, indicated the economic status position based on expenditure. The higher quintile showed a higher level of household economy.
Living location (urban or rural)	Dummy variable of living location: valued "1" for the respondent who lived in an urban area; otherwise valued "0."
Living on or off Java	Dummy variable with value "1" if the respondent's residence was on the island of Java and "0" if the respondent's residence was off the island of Java.

*Note: Author's interpretation*

## Statistical methods

This study utilized logistic regression analysis to explain the likelihood of the empowerment variable with the functional ability of older people in Indonesia; experiencing difficulties in

activities of daily living (ADL) was the outcome of this study. This study also involved covariates or variable controls. The variable of age showed the age of the individual from the IFLS fifth wave (2014/2015), while the varying number of chronic diseases provided information on how many chronic diseases were diagnosed with the respondent. Current working status was formed as a dummy variable of whether the respondents currently worked in paid activities. Household size showed how many members were with the respondent within the household. Quintile per capita expenditure, ranging from 1 to 5, indicated the position of economic status based on expenditure. A higher quintile shows a higher level of household economy. The dummy variable of the living location indicated whether respondents live in an urban or rural area. Additionally, as the economic activities in Indonesia were still predominantly centered on the island of Java, we also used a dummy variable of living on or off Java in the model.

Our primary model is demonstrated in Equation 2:

$$ADL_{ij} = Empowerment\ Index_{ij} + Chronic\ Disease_{ij} + Age_{ij} + Working\ Status_{ij} + Quintile\ PCE_{ij} + Household\ Size_{ij} + Urban_{ij} + e_{ij}$$

Equation 2

$ADL_{ij}$  which represented difficulties in activities of daily living on a person  $i$  at the household  $j$ . We recorded 1 if the sample experienced difficulties at least in 4 out of 9 activities of daily living.  $Empowerment\ Index_{ij}$  represented in the empowerment index obtained from Equation 1.  $Chronic\ Disease_{ij}$  representing chronic disease on a person  $i$  at household  $j$ . The last covariate explained a vector of control variables consisting of social, economic, and demographic characteristics.

## Results

### Sociodemographic and economic characteristics of the sample

Based on information from Table 3, a higher mean of difficulties with ADL and the number of chronic diseases among older females living off Java indicated that more older females living off Java experienced issues with ADL and had more chronic diseases than older females living on the island of Java. There were insignificant differences in the mean of empowerment index and age and only slight differences, with more than half of these three categories involved in paid working activities. While a higher mean of quintile per capita expenditure was obtained in the sub-sample living off Java, in which a smaller portion lived in urban areas (Table 4).

**Table 4:** Data Overview Using Mean Value by Sub-Samples

Variable	All women (N = 450)		Older Women Living on Java (N = 284)			Older Women Living off Java (N = 166)	
	Mean /Mode	Std. deviation	Mean /Mode	Std. deviation	Mean /Mode	Std. deviation	
ADL difficulties	0 (no difficulties)	-	0 (no difficulties)	-	0 (no difficulties)	-	

Variable	All women (N = 450)		Older Women Living on Java (N = 284)			Older Women Living off Java (N = 166)	
	Mean /Mode	Std. deviation	Mean /Mode	Std. deviation	Mean /Mode	Std. deviation	
Empowerment index	0.875	0.20	0.625	0.20	0.875	0.20	
Age	65.68	5.22	65.56	4.91	65.89	5.71	
Chronic diseases	0 (have no chronic disease)	-	0 (have no chronic disease)	-	0 (have no chronic disease)	-	
Working status	1 (work)	-	1 (work)	-	1 (work)	-	
Quintile of PCE	1 (20% poorest)	-	1 (20% poorest)	-	1 (20% poorest)	-	
Household size	3.39	1.67	3.37	1.68	3.42	1.65	
Urban	1 (urban)	-	1 (urban)	-	0 (rural)	-	

*Note: Author's calculation*

As shown in Table 4, out of 450 older females in our sample, 284 lived on the island of Java, and 166 lived off the island of Java. As there was a potentially significant difference between the older adults living on Java and off Java, the mean or mode (depending on the type of data) and standard deviation for all samples were calculated, including that of older females who lived on and off the island of Java separately to provide information on rough conditions across sample and sub-samples.

## Empowerment index and its scales

This subsection shows the differences in the empowerment index by gender. As we know, males and females usually have different experiences because of patriarchal cultures in most developing countries (James-Hawkins et al., 2019). Table 5 shows that men had higher average scores on specific scales than women, indicating that gender inequality still exists in Indonesia. The reliability of the empowerment index was assessed (internal consistency) under each dimension. The reliability coefficient value above 0.6 is highly acceptable and represents a strong internal consistency (Goforth, 2015). The empowerment index had a Cronbach's alpha value of more than 0.6 for all dimensions.

**Table 5:** Empowerment Index and Scores of its Dimensions by Gender

Scales	Cronbach's Alpha $\alpha$	Women		Men	
	All samples	Mean	Std. Error	Mean	Std. Error
Decision making	0.65	0.93	0.012	0.95	0.008
Self-esteem	0.63	0.14	0.004	0.19	0.002
Working status		0.75	0.021	0.95	0.008
Education		0.38	0.023	0.56	0.017
Social capital	0.62	0.20	0.005	0.21	0.003
Asset ownership	0.62	0.17	0.005	0.17	0.004

*Note: Author's calculation*

## Decision making

Decision-making, as demonstrated in several studies, is the ability of women to decide confident choices in someone's life and household decisions (Alkire et al., 2012; Annan et al., 2021; Astutik et al., 2020; Hussain & Jullandhry, 2020; Mahmud et al., 2012). The decision-making variable is defined by having at least one contribution to household essential decisions. This study used four questions of households to decide their choices. The decision-making score between men and women was not significantly different, implying that gender did not affect household choices. In Indonesia, it is known that decision-making is better if made democratically (Colfer et al., 2015), which was also evident at the household level. The value of reliability coefficient " $\alpha$ " for the decision-making dimension was 0.64 to indicate having at least contributed to making household decisions related to expensive purchases for the household (i.e., refrigerator or television), money for monthly savings, working status, and using contraception form.

## Self-esteem

The self-esteem dimension was used to promote reflection, analysis, and demonstration of alternative ways of thinking and doing (Mahmud et al., 2012). Building skills of analysis and demonstrating alternative ways of thinking could be constructed by education and working status when men or women are still young adults. The value of the reliability coefficient " $\alpha$ " for the self-esteem dimension was 0.62. The self-esteem scale was defined by two variables: working status and education level with the same weight. The significant difference between the two genders was the working status, with 94% of men working when the survey was conducted. However, only 74% of women worked outside the home.

Moreover, the education scale also showed a significant difference between women and men, with 56% of men at least graduating from elementary school. In comparison, only 38% of women had the same education level. This finding implied that among Indonesian women, women's self-esteem was neglected and deprived. To some researchers, self-esteem is related to decision-making since typical decision-making processes such as household budget, wife working outside the home, children's education, children's health, family planning methods, purchase of clothes, jewelry, and acquisition of major assets have been researched in various countries (Kabeer, 1999).

## Social capital

Social capital describes empowerment since women's leadership in the community has been determined to show how comfortable a person feels speaking out in public (Alkire et al., 2012). Social capital was often substituted by group membership that provided networks and social capital to empower themselves and contribute to obtaining important sources (Meizen-Dick et al., 2014). The value of the reliability coefficient " $\alpha$ " for the social capital dimension was 0.61. Men had higher social capital scores in this study, demonstrating that men made more considerable contributions to society than women.

## Asset ownership

Asset ownership allows women or men to own and control productivity. The value of the reliability coefficient " $\alpha$ " for the asset ownership dimension was 0.62. The scale asset ownership had different behavior in our sub-samples. On average, women had more

household assets as compared to men. It is evident that in Indonesia, household assets are registered by wives' names supporting the stereotype that women are trusted as house ministers in a family (Pangaribowo et al., 2019).

## The effects of the empowerment index on activities of daily living for older people

Spearman's rank correlation coefficient finds the correlation test among empowerment index variable and ADL, which 0 states that variable of women empowerment and difficulties in ADL are independent.

**Table 6:** Result of Spearman's Correlation Test

	Female	Female Living on Java	Female Living off Java
<b>Number of observations</b>	450	284	166
<b>Spearman's rho</b>	-0.1198	-0.0129	-0.2630
<b>Prob &gt;   t  </b>	0.0110	0.8293	0.0006

*Note: Author's calculation*

Table 6 shows a comparison result of Spearman's rank correlation coefficient between past women empowerment variables and current experience of difficulties in ADL among three schemes of samples: older females, older females living on Java, and older females living off. The findings indicate that, in general, there is a significant correlation between past women empowerment variables and the current experience of difficulties in ADL among older females. The prob > | t | of 0.0110 leads to the conclusion that there was a correlation as it declines the Ho where these two variables are independent. However, when the sample is separated based on living location (on Java and off Java), it gives an insight that empowerment matters more among females living off Java than those living on Java. Results show that prob > | t | was 0.8293 in the sample of females living on Java, which leads to the conclusion that our two concerned variables are independent. Meanwhile, the result using the sample of females living off the island of Java is consistent with the overall female sample, where there is a significant correlation between past empowerment and current condition in ADL.

In addition, a correlation matrix is presented in Table 7 to investigate the collinearity between the different explanatory variables included in the models. Table 7 shows that there are no explanatory variables with high collinearity.

**Table 7:** Correlation Matrix

	Age	Chronic	Working status	PCE	Household size	Urban	Java
<b>Age</b>	1.000						
<b>Chronic</b>	-0.0427	1.000					
<b>Working status</b>	-0.1429	-0.2179	1.000				
<b>PCE</b>	-0.1557	0.2229	-0.0997	1.000			
<b>Household size</b>	-0.1170	-0.0112	0.0019	-0.1929	1.000		
<b>Urban</b>	-0.0850	0.1392	-0.1869	0.2221	0.0557	1.000	
<b>Java</b>	-0.0198	-0.0234	0.0163	-0.0925	-0.0174	0.1509	1.000

*Note: Author's calculation*

Table 8 shows the main estimated values in this study using logistic regression to predict ADL of older women and men from IFLS5 in 2014/2015. Using Equation 2, six different models were constructed using logistic regressions with a robust standard error. The first two models used all the samples (total of on Java and off Java), while the Java sample used a sample from those living on Java only, and the rest were for those living off Java only.

**Table 8:** Results Using Logistic Regressions Predict Difficulties in Activities of Daily Living in Later Life

Variables	All sample	Java sample	Off Java sample
Empowerment index	-0.24** (0.08)	-0.03 (0.10)	-0.59*** (0.14)
Age	0.010*** (0.003)	0.006 (0.004)	0.02*** (0.005)
Chronic	0.04** (0.01)	0.04** (0.01)	0.04 (0.03)
Working Status in 2014/2015	-0.04 (0.04)	-0.04 (0.04)	-0.02 (0.07)
Quintile_pce (base = 1)			
Quintile 2	0.01 (0.04)	0.005 (0.06)	0.07 (0.08)
Quintile 3	-0.02 (0.043)	-0.05 (0.04)	0.05 (0.08)
Quintile 4	0.03 (0.05)	-0.01 (0.07)	0.09 (0.08)
Quintile 5	0.12 (0.063)	0.002 (0.07)	0.25* (0.11)
Household Size	0.02** (0.008)	0.02 (0.01)	0.03* (0.015)
Urban	-0.03 (0.04)	-0.03 (0.04)	-0.007 (0.07)
Java	-0.07*(0.03)		
N	450	284	166

*Note:* Marginal effects and significances \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ ; standard errors in parenthesis

This study demonstrated the effect of our concerned variable on physical weakening among older adults. Empowered women had lower difficulties in activities of daily living than the men, with a  $p$  value less than .01. In addition, the sub-sample of those living on Java shows that empowerment variables did not significantly affect the difficulties in ADL. However, sub-samples of those living off Java had different behavior in difficulties of ADL.

Chronic disease variable was a significant variable, especially in older persons. We hypothesized that older adults with chronic disease had a higher likelihood of difficulties with ADL. The results of this study showed that having chronic disease had a higher likelihood of having difficulties with ADL across all models. The next covariate was the working status of older persons in 2014/2015. The results showed that older adults currently working had a better quality of activity in daily living than older persons not working. Based on Figure 2, most of the older adults in Indonesia are still working or helping to gain income for their families in retirement age.

The per capita expenditure (PCE) was treated as a proxy for household welfare indicators. The PCE was used in quintile form for a more straightforward interpretation. The poorest 20% was used as the basis for calculation. The results showed various patterns in our sample, and we found that the wealthiest group of our samples significantly increased their ADL, specifically in the sample living off Java. On the other hand, the remaining groups did not considerably increase ADL among older women.

Household size, representing the number of household members, significantly impacted the likelihood of difficulties with women's ADL in all sample models. The significance of household size suggested that the larger the household, the more likely the women had

difficulties with ADL. The finding showed that living in urban or rural areas did not affect the likelihood of having difficulties with ADL having a  $p$  value greater than .05.

## Discussion and conclusion

In general, empowerment negatively affected the difficulties with ADL in a female's later life. However, empowerment among samples living on Java had no statistical association with the analysis outcome when the analysis was specified based on living locations. Among the sample living off Java, empowerment was strongly significant in affecting ADL problems with double strength in magnitude as in the general sample. This finding has provided insight that empowerment plays a vital role in the well-being of older adults, especially those living off the island of Java. The logic behind these results is the availability of external support that is more pronounced among the older adults living on the island of Java.

Generally, the unempowered older females benefited from relatively more accessible public facilities on Java. These arguments have been supported by BPS - Statistics Indonesia, which found that the percentage of unmet healthcare services needs on Java is significantly below the national average from 2018 to 2020. In addition, Prima and Khoirunurrofik (2019) found that the provision of public goods affected the flow of people living in less developed areas. Consequently, this causes productive-age adults to move to the more concentrated area either for work or to gain better educational access. As Java still dominates especially economic activities in Indonesia, it implies that older Java adults live in a relatively dense area that might help them deal better with life.

Considering the different characteristics in socio-geographic aspects, older females living off the island of Java were forced to rely on themselves and their family/relatives when available. Data from BPS - Statistics Indonesia also provided information that percentages of self-treatment off Java remain above the national average. Because unmet needs for healthcare services for people living in off Java were high, self-treatment became the most feasible solution; thus, its rate was also higher for the population living off Java than that for those living on Java. Therefore, the empowered older females were stronger than the unempowered ones indicating that being empowered significantly affected well-being in later life among the older females living off Java.

In addition, age and household size variables had similar behavior, which was only significant in all samples and samples living off Java. According to Figure 5, most older adults live for three generations. The older respondents and the increased number of household members caused a higher probability of ADL issues. Living with more members within a household increased the probability of difficulties in daily living among older females living off Java. This finding is in line with the result of Liu et al. (2016), who found that family size increased the ADL index in older adults in China.

However, this relationship between household size and ADL did not apply to samples living on Java. The availability of care providers, such as daycare for children and employing household assistance, was more common on Java than off Java in general. Thus, there were many options for households on Java to take care of their members without overburdening the older members. The condition would be different if there were limited services of this kind. Outside Java, where infrastructures were still highly unequal, the older adults still had more household management responsibilities, such as assisting in raising their grandchildren



and doing domestic work.

However, the chronic disease had dynamic and multifaceted impacts on ADL in specific categories in our sample study. The number of chronic diseases was positively associated with ADL issues among all Java samples. This finding implies that the more chronic diseases, the older adults have ever been diagnosed with, the bigger the probability it will be for them to experience difficulties in their daily activities. Women also have double burdens due to being morbid and unempowered because non-communicable diseases and risk factors are much higher in women than men (Maas, 2020; Naghavi et al., 2017). Thus, preventing and detecting chronic conditions is one of the optimization programs from the World Health Organization for older people, including in Indonesia (World Health Organization, 2021).

The unequal distribution of healthcare facilities between on and off Java is the variable of morbidity that only affected all samples and the sample living on Java, but did not affect the sample living off Java. In the sample living off Java, having more chronic diseases had no impact on ADL issues as the long-distance healthcare facilities were sometimes out of reach. Therefore, having one more chronic disease had nothing to do with their daily activities. This finding is similar to Indonesia's statistics of older adults reported by BPS - Statistics Indonesia (2021) that self-treatment during sickness is due to having no money and the inability to access health facilities. This result is similar to Roberts (2004), who reported that older women assert that their needs are usually unmet in healthcare facilities.

In contrast, data show that healthcare facilities are more accessible on Java. According to the Ministry of Health (2021), the total number of clinics on Java and off Java is unequal. In 2020, the total number of clinics on Java was 5,245, while on other islands (Sulawesi, Sumatera, Kalimantan, Bali, Papua, and others), there were only 4,993 clinics. This condition implies that chronic diseases are strongly associated with activities of daily living because older persons can quickly diagnose their morbidity (EMPATiE Consortium, 2014). Lack of health facilities and lack of active participation is indeed pivotal factors. Having less morbidity allows older persons to do more without dependence on others, while having more morbidity causes them to be less active and have difficulties with ADL. The reasons behind those explanations are that older adults can immediately visit healthcare facilities and receive treatment if they have chronic diseases. After being treated and taking some medicine, the older adults will become healthier, and can manage their physical capacity to do simple daily activities. For sick older adults living off the island of Java, hardly accessing healthcare facilities forced them to live miserably. They are sick, but life must go on. This finding was meaningful because the number of chronic diseases was insignificant among the sub-samples living off Java. The number of chronic diseases was positively associated with ADL issues among all Java samples.

The unequal distribution of healthcare facilities between on and off Java was why the variable of this morbidity aspect only affected all samples and samples living on Java, but was not practical for samples living off Java. In the sample living off Java, having more chronic diseases had no impact on ADL issues as the long-distance healthcare facilities were sometimes out of reach. Having one or more chronic diseases did not worsen ADL problems, as the hope of being treated for chronic disease has nothing to do with daily activities. Measurement of empowerment is generally associated with components of activities of daily living. The more active women are in the decision-making process, society, working place, and asset ownership, the healthier the women are in their retirement age.

However, this study presents several limitations. First, longitudinal data analysis is prone to high attrition rates among respondents. Although, in general, IFLS data are popular due to

their low dropout rate, utilizing the oldest respondents in the last wave implies working with the most-dropped number among all age categories. Thus, the limited number of observations in this analysis is one of its limitations. Second, the construction of the women's empowerment index might exhibit several weaknesses due to the availability of information mobility among samples.

In conclusion, population aging has become a global challenge, particularly on how the dependency of older adults affects their performance and to what extent it determines their quality of life. This study investigates the issue of how women's empowerment increases their quality of life during retirement age. While the empowerment variable is insignificant in affecting the older adults' physical performance of those who live on Java, this variable is strongly significant in affecting daily living problems with more than twice the magnitude of the general sample. The finding also suggests that empowerment plays a pivotal role in the well-being of older adults, especially those living off the island of Java. This study also evaluates the inequality of health facilities accessible to people living on and off the island of Java. When access to public facilities is limited and immediate help from others is scarce due to socio-geographical aspects, the more empowered older adults find it easier to manage their lives.

In addition, age and household size variables show similar behavior, which is significant in all samples and samples living off Java. These findings might be explained by the availability of commercial care providers and household assistance which are more common on Java than off Java in general. While there are many options for households on Java to take care of their members without overburdening the older members, the older adults living off Java still have more household management responsibilities, such as assisting in raising their grandchildren and doing domestic work. Furthermore, the number of chronic diseases is positively associated with ADL issues among all Java samples. When healthcare facilities are more accessible, like those on Java, chronic diseases strongly relate to activity in daily living. After being treated and taking some medicines, people will get healthier, and they can manage their physical capacity to do simple daily activities. For sick older adults in the sample living off Java, hardly accessed healthcare facilities force them to live their lives in poor conditions. Even though they are sick, they know that life must go on. Not surprisingly, the number of chronic diseases is not a factor among the sub-sample living off Java.

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