6. DETERMINANTS OF WORKING STATUS OF THE ELDERLY POPULATION IN THE BANGKA BELITUNG ISLANDS PROVINCE

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DETERMINANTS OF WORKING STATUS OF THE ELDERLY POPULATION IN THE BANGKA BELITUNG ISLANDS PROVINCE

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ABSTRACT

This study examines the factors influencing employment among the elderly population in the Bangka Belitung Islands, where the elderly population increased by 41,85% from 2010 to 2020, reaching 8,27%. Notably, 45,38% of the elderly were employed in 2020. Using data from the 2020 National Socio-Economic Survey (SUSENAS), this research analyzes individuals aged 60 and above through descriptive analysis and binary logistic regression. The results indicate significant predictors of employment among the elderly include rural residency, being the head of the household, gender, age, and marital status. Specifically, elderly individuals who live in rural areas, are male, currently married, aged 60-69, and are household heads are more likely to be employed. In contrast, poverty status and education level do not significantly impact employment. This study highlights the demographic and social factors that influence the employment tendencies of the elderly, providing insights for policy development to support this population segment.

1. INTRODUCTION

The global increase in the elderly population has emerged as a significant demographic phenomenon, particularly in recent decades . This trend can be traced back to the post-World War II baby boom from 1950 to 1970, a period characterized by a marked increase in birth rates (Cicih & Agung, 2022). As a result, many countries, including Indonesia, are now experiencing a rapid demographic shift towards an aging population. This shift is further driven by advancements in healthcare and improved living standards, leading to longer life expectancies.

In Indonesia, the Life Expectancy Rate (LER) has steadily risen, reaching 71,47 years in 2020. In the Bangka Belitung Islands, the LER is slightly lower at 70,64 years (Badan Pusat Statistik, 2021b). These figures indicate not only an improvement in overall health and welfare but also a profound transformation in the population structure. The demographic transition that Indonesia is undergoing is characterized by a shrinking proportion of the young population and a growing elderly population. This change poses significant challenges and opportunities, particularly in the realms of social security, healthcare, and economic productivity.

The 2020 Population Census (Badan Pusat Statistik, 2021a), provides a clear picture of the demographic transition. Indonesia's total population in 2020 was 270.20 million, with 9,10% (26.43 million) classified as elderly. This represents a 28.85% increase in the elderly population compared to 2010 when the elderly constituted 7.59% of the total population. The Bangka Belitung Islands Province mirrors this trend, albeit with even more pronounced changes. In 2020, the province had a total population of 1.46 million, of which 8.27% (12.07 thousand) were elderly. This marks a significant 42% increase from 2010, when the elderly made up just 5.83% of the population. Such a rapid increase in the elderly population within a decade suggests that the Bangka Belitung Islands Province is on the cusp of entering an era dominated by an aging population.

One of the critical implications of this demographic shift is the changing role of the elderly in the workforce. Data from the 2020 National Labor Force Survey (SAKERNAS) reveals that 45.38% of the elderly in the Bangka Belitung Islands Province are still engaged in employment (Badan Pusat Statistik, 2020). While this high employment rate among the elderly indicates that many remain active and capable of contributing economically, it also highlights the economic pressures faced by this demographic. Many elderly individuals continue to work out of necessity rather than choice, reflecting broader socio-economic challenges.

In this study, the term 'elderly' is defined according to Law Number 13 of 1998 concerning the Welfare of the Elderly, which designates individuals aged 60 and above as elderly (UU Nomor 13 Tahun 1998 Tentang Kesejahteraan Lanjut Usia, 1998). While existing research on the elderly population has predominantly focused on health-related issues, this study seeks to broaden the scope by examining the socio-economic conditions of the elderly in the Bangka Belitung Islands Province. By providing a detailed analysis of the employment status and economic well-being of the elderly, this research aims to contribute valuable insights for policymakers and government agencies in the province. The findings are expected to inform the development of targeted policies that address the specific needs of the elderly population, ensuring their welfare and inclusion in the broader socio-economic framework.

Moreover, this study intends to fill the gap in the current literature by offering a comprehensive overview of the elderly population's socio-economic status in the Bangka Belitung Islands Province. The research will serve as a reference point for future studies and provide a foundation for more nuanced analyses of the elderly population in other regions. By shedding light on the unique challenges faced by the elderly in this province, this study aims to contribute to the broader discourse on aging and its implications for society.

2. RESEARCH METHODS

This study utilizes data from the March 2020 of National Socio-Economic Survey (SUSENAS), focusing on the elderly population, defined as individuals aged 60 years and above in the Bangka Belitung Islands Province. The dependent variable in this study is the working status of the elderly population, which is classified into two categories, working and not working. Working is defined as participation in economic activities for at least one uninterrupted hour within the past week, including unpaid work that contributes to an economic activity. The study examines seven independent variables which are residential classification, household relationships, gender, poverty status, age, marital status, and education level, as outlined in Table 1.

Table 1. Response Variables (Y) and Predictors (X)

Variable	Description	Category	Data Type
Y	Working Status of the Elderly	0 = Doesn't work 1 = Work	Nominal
X1	Residential classification	1 = Urban *) 2 = Rural	Nominal
X2	Relationships in the household	1 = Head of household *) 2 = Apart from the Head of Household	Nominal

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Variable	Description	Category	Data Type
X3	Gender	1 = Man *) 2 = Woman	Nominal
X4	Poverty status	1 = Poor *) 2 = Not Poor	Nominal
X5	Age	1 = 60-69 years old *) 2 = 70-79 years old 3 = >80 years	Nominal
X6	Marital status	1 = Marry *) 2 = Apart from Married (Not Married, Divorced Dead, Divorced Alive)	Nominal
X7	Level of education	1 = Didn't go to school/didn't finish elementary school *) 2 = Completed elementary school/equivalent 3 = Completed junior high school/equivalent 4 = ≥High school/equivalent	Nominal

Source: Processed data (2021)

The analysis in this study is carried out using both descriptive and inferential statistical methods. Descriptive analysis provides an overview of the elderly population's characteristics and their working status, with the results presented in tables and graphs. Inferential analysis is conducted using binary logistic regression to explore the relationships between the binary outcome variable (working status) and multiple predictor variables. According to Hosmer & Lemeshow (2004) binary logistic regression is suitable for modeling dichotomous outcomes. The general logistic regression model used in this study is represented as:

$$ln\left(\frac{\pi}{1-\pi}\right) = \beta_0 + \beta_1 X_1 + \cdots + \beta_p X_p + \varepsilon_i \quad (1)$$

The models in this research are:

$$ln\left(\frac{\hat{\pi}}{1-\hat{\pi}}\right) = \hat{\beta}_0 + \hat{\beta}_1 X_1 + \hat{\beta}_2 X_2 + \hat{\beta}_3 X_3 + \hat{\beta}_4 X_4 + \hat{\beta}_5 X_5 + \hat{\beta}_6 X_6 + \hat{\beta}_7 X_7 \quad (2)$$

From the logistic regression analysis, an odds ratio value will be obtained, which shows the tendency of an elderly person to work based on the predictor variables. The tendency of the elderly population to work is greater if the odds ratio value is greater. The odds calculation formula is as follows:

$$\frac{\hat{\pi}}{1-\hat{\pi}} = e^{\hat{\beta}_0 + \hat{\beta}_1 X_1 + \cdots + \hat{\beta}_7 X_7} \quad (3)$$

To test significance, it is divided into two parts, simultaneous and partial. The simultaneous test is used to assess the overall model (overall model fit) and the feasibility of the model. In contrast, the partial test is used to partially see the influence of the predictor variables. In this study, a significance level of 0.01 (α=10%).

Test the entire model to determine which predictor variables simultaneously influence the response variable based on the Likelihood Ratio test value. The test compares the difference between the -2 log-likelihood value when only constants are included with the 2 *log* likelihood value when predictor variables are included in the model (Park, 2013).

The test statistics of Likelihood Ratio are as follows:

$$G = -2log\left(\frac{l_0}{l_1}\right) \quad \text{..... (4)}$$

Where as:
l_0 : Maximum value of the likelihood function for the model under the null hypothesis
l_1 : Maximum value of the likelihood function for the model under the alternative hypothesis
Decision to reject H_0 if the value of $G>\chi^2_{(v,0,01)}$.

Next, to see the model's suitability, use the Hosmer-Lemeshow test, namely the Chi-Square test approach (Abdulqader, 2017). The hypothesis is H_0:$\beta_1=\beta_2=\ldots=\beta_k=0$. The decision to reject H_0 if $\chi^2_{count}>\chi^2_{(k,0,01)}$. The overall test and feasibility of the model in detail can be seen in (Hosmer & Lemeshow, 2004).

A partial test was carried out to see the significance of the predictor variables in the model. The test statistic used is the Wald test. The hypothesis is hypothesis H_0:$\beta i=0$. The decision to reject H_0 if the value $W^2 \geq \chi^2_{(1,0,01)}$. The wald test are as follows:

$$W^2 = \left[\frac{\widehat{\beta}_i}{SE(\widehat{\beta}_i)}\right] \quad \text{..... (5)}$$

3. RESULTS AND DISCUSSION

Binary Logistic Regression Analysis

The model's significance was tested using the G test statistic, yielding a -2 log-likelihood value of 1398.352 and a significance level of 0.01. The Chi-Square value of 18.48 confirms the presence of at least one significant logistic regression coefficient (see Table 2). The logistic regression model explains 31% of the variance in the elderly working status (from the R square).

Table 1. Results of the Hosmer-Lemeshow Test and Overall Significance Test

Chi-square	df	Sig.	-2 Log likelihood	R Square
8.695	8	0.369	1398.352	0.313

Source: Processed data (2021)

Model suitability was assessed using the Hosmer-Lemeshow test, which yielded a Chi-Square value of 8.695 and a significance level of 0.369. This indicates no significant difference between predicted and observed classifications, confirming the model's appropriateness for further analysis.

Table 2. Partial Logistic Regression Test Results

Description	B	S.E	Wald	df	Sig.	Odd Ratio
Residential classification	0,487	0,139	12,333	1	0.000*)	1,627
Relationships in the household	-0,857	0,192	20,010	1	0,000	0.424
Gender	-0,930	0,188	24,473	1	0,000	0.395
Poverty status	-0,038	0,309	0,016	1	0.901	0.962
Age			58,706	2	0,000	
Age 70-79	-0,849	0,152	31,182	1	0,000	0.428
Age≥80	-2,019	0,337	35,935	1	0,000	0.133
Marital status	-0,897	0,161	30,853	1	0,000	0.408

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Description	B	S.E	Wald	df	Sig.	Odd Ratio
Education			3,190	3	0.363	
Elementary/equivalent education	0,144	0,152	0.894	1	0.344	1,155
Middle school education/equivalent	-0,247	0,229	1,169	1	0.280	0.781
Education≥High School/Equivalent	-0,046	0,227	0.041	1	0.840	0.955
Constant	1,010	0,165	37,427	1	0,000	2,745

Source: Processed data (2021)

A partial test was conducted using the Wald test to identify significant predictors. As shown in Table 3, the Chi-Square value (α=0,01) with df=1 is 6,635, df=2 is 9,210, and df=3 is 11,341. Variables with a Wald test value exceeding the Chi-Square table are considered significant. Education level and poverty status were not found to be significant predictors. That the level of education is not substantial on the working status of the elderly population is in line with research Giang & Nguyen (2016) and Long & Pfau (2010). Poverty status is also not significant, and this is thought to be because working for the elderly is not only to fulfill their living needs but is also self-actualization when their physical condition is still capable of carrying out activities.

After testing the significance of the parameters above, then the logistic regression model obtained can be formed using the estimated parameter values in Table 2. The model formed are as follows:

$$Y = 1.010 + 0.487\ X_1 - 0.857\ X_2 - 0.930\ X_3 - 0.038\ X_4 - 0.849\ X_{5a} - 2.019\ X_{5b} + 0.897\ X_6 + 0.144\ X_{7a} - 0.247\ X_{7b} - 0.046\ X_{7c}$$

Where as:

Y : Working Status of the Elderly
X_1 : Residential classification
X_2 : Relationships in the household
X_3 : Gender
X_4 : Poverty status
X_{5a} : Age (70-79)
X_{5b} : Age (≥80)
X_6 : Marital Status
X_{7a} : Education (Elementary school)
X_{7b} : Education (Junior high school)
X_{7c} : Education (Senior high scholl)

Then an analysis of the odds ratio values was carried out to see how much the elderly population tends to work, namely by looking at the odds ratio values for each variable, as shown in Table 3. The odds ratio for the residential classification variable is 1.627, indicating that elderly individuals in rural areas are more likely to work than their urban counterparts. This finding aligns with previous research by Sun et al. (2011) which suggests that rural work types often allow for solitary tasks.

The odds ratio value for the relationship variable within the household is 0.424, meaning that if the status of an elderly person in the household is the head of the household, the tendency to work is twice as large as an elderly person who is not the head of the household. These results are in line with opinion Sumarsono (2015) which explains that elderly people who have the status of head of household will have a greater tendency to work compared to other household members because it is based on a sense of responsibility as head of the household in meeting the needs of their household.

According to gender, the odds ratio value of 0.395 indicates that male elderly people are twice as likely to work as women. These results align with research by Jamalludin (2020) that shows that elderly men have a greater tendency to work. Backed by research Junaidi et al. (2017), which states that men work because they have the responsibility as head of the household to earn a living. The odds value for the age variable is less than 1 for each category, meaning that the elderly population aged 70-79 is less likely to work than those aged 60-69 years. The tendency decreases with age. This is in line with research by Giang & Nguyen (2016) that shows that the tendency to work decreases with age, and this is also due to the illness suffered by the elderly. Based on marital status, elderly people whose status is married tend to work 2.451 times more than elderly people whose status is other than married (divorced/divorced/unmarried). Responsibility to the family is a driving factor for the elderly population to continue working.

The poverty status variable has an odds ratio of 0.962 or close to 1. This means the tendency for poor and non-poor elderly people to work status is almost the same. Poor elderly who do not work because they receive financial support from their families (Kidd et al., 2018). Meanwhile, non-poor elderly people whose working status is not only for fulfilling economic needs is also for self-actualization (Affandi, 2009). Regarding education, elderly individuals with elementary school or equivalent education are more likely to work compared to those with lower levels of education. However, as education levels increase, the tendency to work decreases.

4. CONCLUSION

This research identifies key factors influencing the working status of the elderly in Bangka Belitung Islands Province, notably residential classification, gender, age, household relationships, and marital status. The elderly in rural areas, particularly male household heads who are married and aged 60-69, are more likely to work. These findings suggest the need for targeted policies that cater to the specific needs of these workers.

As the elderly population grows, it is crucial for policymakers to ensure that employment opportunities are accessible and tailored to this demographic. This involves creating jobs suited to the physical abilities and preferences of older adults. Moreover, investment in infrastructure and public facilities is essential to accommodate the elderly, enhancing their mobility and access to services.

Healthcare remains a vital concern. Comprehensive health insurance for the elderly is necessary to maintain their health and productivity in the workforce. Although education was not found to significantly impact elderly working status, it remains vital to equip future generations with the education and skills needed for better employment and welfare in old age. This study offers initial insights, and future research should explore economic and gender-specific factors to better understand elderly employment dynamics.

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