*Asian Journal of Social Science and Management Technology*
*ISSN: 2313-7410*
*Volume 2 Issue 5, September-October, 2020*
*Available at www.ajssmt.com*

# Sociological and Psychological Condition of the Inhabitants of Old Age Homes in Dhaka: A Statistical Approach

**Mohammad Ahsan Uddin**
*Associate Professor, Department of Statistics, University of Dhaka, Dhaka, Bangladesh.*

**ABSTRACT :** Rapid growing of modernization in Bangladesh has affected the people in many ways. The traditional combined family in the culture of Bangladeshi society is disappearing slowly and the increase in nuclear families forces the older adults to live in old age homes. This study is intended to know the sociological and psychological condition of the inhabitants of old age homes. Their previous income, disease status, loneliness, and depression status are analyzed with the help of popular statistical models like multiple linear regression, binary logistic regression, Poisson regression, and multinomial logistic regression. The mental illness of the respondents is found associated with, among others, age, gender, whether spouse alive, recreational satisfaction, and morning walking. The study reflects that increase in age is highly associated with disease status, increased loneliness, and depression. So, the caring and support should be increased to them with their increase in age. The habit of smoking needs to be demotivated since it is responsible for occurring diseases. As morning walking is found effective in reducing both loneliness and depression of the respondents, it should be promoted in the old homes. The study suggests to increase quality time passing activities to the male respondents and the inhabitants whose spouses are no more because they feel lonelier than others.

**Keywords:** Old age homes, UCLA Loneliness Scale, Beck Depression Inventory (BDI), Binary logistic regression, Poisson regression, Multinomial logistic regression.

## 1. INTRODUCTION

Ageing is an inevitable and natural process which starts with birth. Like birth is an event through pregnancy process, old age is also an event through ageing process (Khattri, 2006). Ageing causes a person to grow old by gradual change in physical look and mental status (Dubey, Bhasin, Gupta, & Sharma, 2011). The older adults are more prone to mental health problems than other age groups (Ramachandran, Sarada, & Ramamurthy, 1979; Reddy & Chandrashekar, 1998; S. Tiwari, Pandey, & Singh, 2012; S. C. Tiwari, 2000). The mental sufferings of the elderly people throw them to a great challenge for sustenance (Bhanman, 2006). Depression is the most common mental illness that affects overall 11.5 million people or 1 in 20 every year (Subba & Subba, 2015). Previous studies have stated that the prevalence of depressive symptoms increases with the increase in age (Kennedy, Kelman, Thomas, & Chen, 1996).

Family is the main place of care for the elderly people throughout Asia. The Bangladeshi family system is highly renowned for its care, duty, support, and love to the older adults. The responsibility of the children for their parents' wellbeing is socially and morally recognized in the country. Major transformations in the family system have been occurred in the form of structural and behavioral changes due to urbanization, industrialization, globalization, and modernization (Kumar, 1995). Now-a-days, people are believing in nuclear

family rather than combined (Lalan, 2014). Elderly people are forced to move from their own place to old age homes as a consequence of these socio-demographic changes (Doty, 1992; McConnel, 1984; Murtaugh, Kemper, & Spillman, 1990). This forcefully shifted population is more vulnerable to mental health problems. They feel loneliness which may lead to serious health-related consequences. Loneliness is one of the three main determinants of depression and also recognized as a cause of suicide and suicidal attempts (Orbach, 1997).

In Bangladesh, due to advancement of health care facilities, the elderly population as well as the number of inhabitants in old age homes is large and growing. But, only a few research is available on this group of senior citizens living in old age homes. Viewing it, the present study is conducted to investigate the relationships among depression, loneliness, and sociability of these elderly people. Their previous monthly income, disease status, loneliness, and depression status are being modeled through relevant statistical models and obtained results are explained accordingly.

## 2. Methods and Materials

The study is conducted to those areas in Dhaka where old age homes are located. The study area is different old age homes like Apon Nibash, Shanti Nibash, Milton Home Care, Subarta Senior Citizens Care, etc. located around Dhaka. All the individuals living in the old homes are considered as target population of this study. Time and resource constraints cannot be denied in collecting data. To tackle these constraints nearly convenience sampling is considered in this study. A sample of 206 individuals are selected randomly from the study population having 82 males and 124 females.

Regression analysis is a statistical way to investigate the relationships between a dependent variable and a set of covariates (Montgomery, Peck, & Vining, 2012). In the literature, there are different types of regression techniques for making predictions (Draper & Smith, 1998). These techniques depend mostly on three important facts (number of independent variables, type of dependent variables, and shape of regression line) (Fahrmeir, Kneib, Lang, & Marx, 2013). However, four most popular regression models, multiple linear regression, binary logistic regression, Poisson regression, and multinomial regression have been employed in this study. When the number of covariate is more than one and the response variable is of continuous type having linear relation to the covariates and follows some other specific assumptions then multiple linear regression is used to assess the impact of covariates on response variable (Fox, 1997). For the vector of response variable $\boldsymbol{Y}$ and vector of covariates $\boldsymbol{x}$, the functional form of the model in matrix notation becomes (Montgomery et al., 2012)

$$\boldsymbol{Y} = \boldsymbol{x}'\boldsymbol{\beta} + \boldsymbol{\epsilon},$$

where $\boldsymbol{\beta}$ and $\boldsymbol{\epsilon}$ be the vector of regression coefficient and random error term, respectively. Now, if the response vector $\boldsymbol{Y}$ be of binary type i.e., referring to whether an event has occurred or not, binary logistic regression is used for modeling purpose, which has the form (Bender & Grouven, 1998)

$$\pi(\boldsymbol{x}) = \frac{e^{x'\beta}}{1+e^{x'\beta}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

where $\pi(\boldsymbol{x})$ represents the conditional mean of $\boldsymbol{Y}$ given $\boldsymbol{x}$ i.e., $E(\boldsymbol{Y}|\,\boldsymbol{x})$. For both model, the unknown parameters ($\boldsymbol{\beta}$) are estimated by the method of maximum likelihood estimation (McDonald, 1993).

Poisson regression, which is also known as log-linear model, is a popular method used to predict a dependent variable which consists of 'count data' given one or more independent variables (Berk & MacDonald, 2008). Poisson regression assumes the dependent variable *Y* follows a Poisson distribution and the logarithm of expected value of the response variable can be modeled by a linear combination of unknown parameters (Cameron & Trivedi, 1990). If $Y$ be the dependent variable and $\boldsymbol{x}$ be the vector of independent variables, then the Poisson regression takes the form as

$$\log(E(Y|\boldsymbol{x})) = \alpha + \boldsymbol{\beta}'\boldsymbol{x}, \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

where $\alpha$ is the intercept term and $\boldsymbol{\beta}$ be the vector of regression parameters (Gardner, Mulvey, & Shaw, 1995).

Multinomial logistic regression is another common statistical tool to predict the outcome of a categorical dependent variable based on the predictor variable(s) (Starkweather & Moske, 2011). For qualitative response

variable, multinomial logistic regression is used to estimate the empirical values of the unknown parameters. The multinomial logistic regression model can be expressed as

$$E(Y = 1 \mid \boldsymbol{x}) = \frac{1}{1+e^{-(\alpha+\boldsymbol{\beta}'\boldsymbol{x})}}, \quad \text{.....(3)}$$

where the unknown parameters (as stated in binomial logistic model) are estimated by maximum likelihood approach (Albert & Anderson, 1984).

## 3. Results and Discussions

The factors that are related to the previous income of the respondents are shown in Table 1. The variables age, educational status, and occupation are found significant in the model at 5% significance level while place of residence and gender are insignificant. The variable age has significant effect (p-value 0.013) on the model at 5% level of significance and it reveals that for one-year increase in age, the average decrease in monthly income is Tk. 121.056, keeping all other covariates at a fixed level. Education status is significantly related to the previous income of the respondents. The average monthly income of secondary educated respondents is significantly Tk. 3517.045 greater than that of the respondents of no education (illiterate people) having p-value 0.043. Similarly, the respondents having BA (or equivalent), MA (or equivalent), and Doctorate degree have, respectively, Tk. 3589.531, 13799.240, and 114816.700 greater average monthly income than that of the respondents of no education. The result again shows that the expected monthly income of respondents of different occupations like Govt. service (lower, medium, and higher level), private sector (lower and medium level), agriculture (small amount of land), medium business, large business, and doctor is significantly higher than that of the respondents with no occupation.

**Table 1: Multiple linear regression model estimates of the selected covariates for previous monthly income of the respondents along with standard error (SE) and p-value**

| Covariates | Coefficient | SE | p-value |
|---|---|---|---|
| **Age** | -121.056 | 48.014 | 0.013 |
| **Place of residence** | | | |
| Urban | 465.335 | 964.602 | 0.630 |
| Rural | - | - | - |
| **Education Status** | | | |
| Primary education | -283.726 | 1115.516 | 0.800 |
| Secondary education | 3517.045 | 1719.998 | 0.043 |
| Higher secondary education | -879.831 | 1846.393 | 0.634 |
| BA (or equivalent) | 3589.531 | 1981.991 | 0.072 |
| MA (or equivalent) | 13799.240 | 3633.275 | <0.001 |
| Doctorate | 114916.700 | 5182.756 | <0.001 |
| No education | - | - | - |
| **Gender** | | | |
| Female | -1881.710 | 1183.655 | 0.114 |
| Male | - | - | - |
| **Occupation** | | | |
| Govt. service (lower level) | 8237.382 | 2596.618 | 0.002 |
| Govt. service (medium level) | 15778.800 | 2256.323 | <0.001 |
| Govt. service (higher level) | 34382.300 | 3967.513 | <0.001 |
| Private sector (lower level) | 4262.955 | 2240.643 | 0.059 |
| Private sector (medium level) | 17805.800 | 2452.158 | <0.001 |
| Agriculture (paid worker) | 2913.974 | 3014.832 | 0.335 |
| Agriculture (small amount of land) | 4483.441 | 2257.355 | 0.049 |
| Agriculture (medium amount of land) | 2686.627 | 2822.245 | 0.343 |
| Small business | 2040.196 | 3027.749 | 0.501 |
| Medium business | 12568.010 | 2715.976 | <0.001 |
| Large business | 31313.800 | 5328.410 | <0.001 |

| | | | |
|---|---|---|---|
| Driver (rickshaw, van) | 2043.168 | 2650.153 | 0.442 |
| Driver (leguna, cng, nosimon, etc.) | 5232.297 | 3398.398 | 0.126 |
| Driver (bus, truck) | 4376.894 | 5271.013 | 0.408 |
| Day laborer | 2389.628 | 1697.257 | 0.161 |
| Doctor | 5275.968 | 2657.946 | 0.049 |
| Housewife | -739.931 | 1498.033 | 0.622 |
| No occupation | - | - | - |
| **Constant** | 9865.036 | 3980.213 | 0.014 |

Table 2 reveals the result obtained from the binary logistic regression estimates for the response variable having any disease of the respondents. The result finds the variables age, family type, and smoking status as having significant association with the response variable while place of residence, gender, and morning walk are insignificant in the model. The variable age is significant in the model with p-value less than 0.001. One-year increase in age significantly increases the odds of having disease by 0.257 unit, keeping all other covariates at a fixed level. From the variable family type, it is found that the respondents lived with son have significantly 2.680 times less odds of having disease compared to the respondents lived alone with p-value 0.083, keeping the other factors fixed. Smoking status becomes significant in the result at 5% significance level. The respondents who smoke regularly are 81.503 times as likely to have any disease compared to the respondents who do not smoke, adjusted for the other factors fixed.

**Table 2: Binary logistic regression model estimates of the selected covariates for having any disease of the respondents along with standard error (SE), odds ratio (OR), and p-value.**

| Covariates | Coefficient | SE | OR | p-value |
|---|---|---|---|---|
| **Age** | 0.257 | 0.069 | 1.294 | <0.001 |
| **Place of residence** | | | | |
| Urban | -18.012 | 28420.791 | <0.001 | 0.999 |
| Rural | - | - | - | - |
| **Gender** | | | | |
| Male | -0.890 | 0.999 | 0.411 | 0.373 |
| Female | - | - | - | - |
| **Family type** | | | | |
| Nuclear family | -1.560 | 1.467 | 0.210 | 0.288 |
| Extended family | -0.279 | 1.771 | 0.756 | 0.875 |
| Lived with son | -2.680 | 1.545 | 0.069 | 0.083 |
| Lived alone | - | - | - | - |
| **Smoking status** | | | | |
| Yes | 4.401 | 2.131 | 81.503 | 0.039 |
| No | - | - | - | - |
| **Morning walk** | | | | |
| Regularly | -2.031 | 1.386 | 0.131 | 0.143 |
| Occasionally | -1.726 | 1.077 | 0.178 | 0.109 |
| Never | - | - | - | - |
| **Constant** | 3.336 | 28420.792 | 28.098 | 1.000 |

Table 3 shows the results from Poisson regression model to predict UCLA (total) which is obtained using UCLA loneliness scale (Russell, D., 1996) where 21 self-scored questions had been answered by the respondents and the total scores of these 21 questions had resulted in the final scale total for each respondent. An increase in UCLA score denotes increasing loneliness and vice versa. The significant covariates in the model at 5% significance level are age, gender, husband/wife alive, recreation satisfaction, and morning walk while BDI (total) is insignificant. The variable age is significant in the model at 5% level of significance having p-value 0.048. The log of the mean number of total UCLA score increases by 0.001 units when the age increases one

year. For the variable gender, the log of the mean number of total UCLA score for male is significantly 3.862 units larger than that of female with p-value less than 0.001. Whether husband or wife is alive has turned out significant (p-value 0.032) in the model. The log of the mean number of total UCLA score for respondents with spouse alive is 0.002 unit lesser than that of respondents who are widowed. Recreational satisfaction of the respondents has a significant association with loneliness as it is found from the result that the log of the mean number of total UCLA score for respondents who are very satisfied with the recreational facilities in their old home is significantly 0.057 units larger than that of the respondents who are not satisfied having p-value 0.015. Morning walk becomes significant in the model as the log of the mean number of total UCLA score for regular morning walkers is significantly 0.013 units lesser than that of the respondents who do not walk in the morning having p-value 0.027.

**Table 3: Poisson regression model estimates of the selected covariates for UCLA score of the respondents along with standard error (SE), odds ratio (OR), and p-value**

| Covariates | Coefficient | SE | OR | p-value |
|---|---|---|---|---|
| **Age** | 0.001 | 0.001 | 1.001 | 0.048 |
| **BDI** (total) | -0.001 | 0.001 | 0.999 | 0.195 |
| **Gender** | | | | |
| Male | 3.862 | 0.090 | 47.565 | <.001 |
| Female | - | - | - | - |
| **Husband/Wife alive** | | | | |
| Yes | -0.002 | 0.022 | 0.998 | 0.032 |
| No | - | - | - | - |
| **Recreational satisfaction** | | | | |
| Very satisfied | 0.057 | 0.023 | 1.059 | 0.015 |
| Moderately satisfied | 0.030 | 0.026 | 1.030 | 0.270 |
| Not satisfied | - | - | - | - |
| **Morning walk** | | | | |
| Regularly | -0.013 | 0.027 | 0.987 | 0.027 |
| Occasionally | 0.032 | 0.024 | 1.033 | 0.187 |
| No | - | - | - | - |

Table 4 is showing the results obtained from multinomial logistic regression model and the significant variables are interpreted here. The dependent variable used in this model is depression level of the respondents which is measured and categorized using "Beck Depression Inventory (BDI)" invented by Beck A.T. (1961). The categories of this variable are normal, mild disturbance, borderline, moderate, severe, and extreme where the category normal is considered as the reference category with which the rests are compared. In this model, the depression levels are thought to be related with four covariates: age, total UCLA score, satisfaction with old home, and morning walk. At first, the category mild disturbance is compared to the category normal and found the mentioned covariates significant except satisfaction with old home. For one-year increase in age, the odds of having mild disturbance compared to normal depression significantly increases by (1.130-1)*100% = 13% with p-value 0.001. The variable total UCLA score is significant in this case at 10% significance level having p-value 0.092. It implies that for increasing UCLA score, that is, if a respondent becomes lonelier, the multinomial log-odds of having mild disturbance to normal depression would be -0.077 holding other variables constant. Regular and occasional morning walkers are, respectively, 87% and 79.2% significantly less likely to be mildly disturbed than normal depression compared to those who are not morning walker with respective p-values 0.012 and 0.027. The only variable age is found significant at 1% level of significance when borderline depression is compared to normal depression. For one-year increase in age, the odds of having borderline depression compared to normal depression significantly increases by 13.9% showing p-value 0.001. For the moderate category, the variables age, total UCLA score, and morning walk are found significant. The odds of having moderate depression compared to normal depression significantly increases by 14.6% for one-year

increase in age having p-value less than 0.001. The increasing UCLA score, implying more loneliness of a respondent, makes the multinomial log-odds of having moderate depression to normal depression -0.090 with p-value 0.041. Regular and occasional morning walkers are, respectively, 78.3% and 74.6% significantly less likely to have moderate depression than normal depression compared to those who are not morning walker with respective p-values 0.051 and 0.052. Only age is found significant at 1% significance level for severe category and reveals 13.3% higher odds of having severe depression compared to normal depression for one-year increase in age with p-value 0.004. The last category, extreme depression, is significantly associated with age, satisfaction with old home, and morning walk. Similar to the results obtained from previous categories, one-year increase in age significantly increases the odds of having extreme depression than normal depression by 31.5% with p-value less than 0.001. The variable satisfaction with old home is found significant at 5% level of significance. Very much and overall satisfaction with old home decreases the odds of having extreme depression than normal depression by almost 100%, in both cases, compared to the respondent having no satisfaction with old home with p-value 0.006 and 0.010, respectively. Regular and occasional morning walkers are, respectively, 94.6% and 95.2% significantly less likely to have extreme depression than normal depression compared to those who are not morning walker with respective p-values 0.055 and 0.035.

**Table 4: Multinomial logistic regression model estimates of the selected covariates for depression of the respondents based on BDI along with standard error (SE), odds ratio (OR), and p-value**

| Depression based on BDI | Covariates | Coefficient | SE | OR | p-value |
|---|---|---|---|---|---|
| **Mild** | **Age** | 0.122 | 0.037 | 1.130 | 0.001 |
| | **UCLA** (total) | -0.077 | 0.045 | 0.926 | 0.092 |
| | **Satisfaction with old home** | | | | |
| | Very satisfied | -2.155 | 3.121 | 0.116 | 0.490 |
| | Moderately satisfied | -1.519 | 3.007 | 0.219 | 0.614 |
| | Not satisfied | - | - | - | - |
| | **Morning walk** | | | | |
| | Regularly | -2.039 | 0.810 | 0.130 | 0.012 |
| | Occasionally | -1.572 | 0.713 | 0.208 | 0.027 |
| | No | - | - | - | - |
| **Border line** | **Age** | 0.130 | 0.038 | 1.139 | 0.001 |
| | **UCLA** (total) | -0.063 | 0.046 | 0.939 | 0.173 |
| | **Satisfaction with old home** | | | | |
| | Very satisfied | -4.814 | 3.274 | 0.008 | 0.141 |
| | Moderately satisfied | -3.787 | 3.155 | 0.023 | 0.230 |
| | Not satisfied | - | - | - | - |
| | **Morning walk** | | | | |
| | Regularly | -0.515 | 0.864 | 0.598 | 0.551 |
| | Occasionally | -0.162 | 0.784 | 0.851 | 0.837 |
| | No | - | - | - | - |
| **Moderate** | **Age** | 0.137 | 0.036 | 1.146 | <0.001 |
| | **UCLA** (total) | -0.090 | 0.044 | 0.914 | 0.041 |
| | **Satisfaction with old home** | | | | |
| | Very satisfied | -2.534 | 3.035 | 0.079 | 0.404 |
| | Moderately satisfied | -1.427 | 2.927 | 0.240 | 0.626 |
| | Not satisfied | - | - | - | - |
| | **Morning walk** | | | | |
| | Regularly | -1.526 | 0.783 | 0.217 | 0.051 |
| | Occasionally | -1.372 | 0.706 | 0.254 | 0.052 |
| | No | - | - | - | - |
| | **Age** | 0.125 | 0.044 | 1.133 | 0.004 |
| | **UCLA** (total) | -0.085 | 0.053 | 0.918 | 0.108 |

| | | | | | |
|---|---|---|---|---|---|
| **Severe** | **Satisfaction with old home** | | | | |
| | Very satisfied | -4.517 | 3.894 | 0.011 | 0.246 |
| | Moderately satisfied | -2.582 | 3.725 | 0.076 | 0.488 |
| | Not satisfied | - | - | - | - |
| | **Morning walk** | | | | |
| | Regularly | -0.478 | 1.018 | 0.620 | 0.639 |
| | Occasionally | -0.210 | 0.929 | 0.811 | 0.821 |
| | No | - | - | - | - |
| **Extreme** | **Age** | 0.274 | 0.071 | 1.315 | <0.001 |
| | **UCLA** (total) | 0.106 | .110 | 1.111 | 0.339 |
| | **Satisfaction with old home** | | | | |
| | Very satisfied | -27.184 | 9.859 | <0.001 | 0.006 |
| | Moderately satisfied | -22.646 | 8.814 | <0.001 | 0.010 |
| | Not satisfied | - | - | - | - |
| | **Morning walk** | | | | |
| | Regularly | -2.925 | 1.523 | 0.054 | 0.055 |
| | Occasionally | -3.038 | 1.441 | 0.048 | 0.035 |
| | No | - | - | - | - |

## 4. Conclusions

This study works with the economic, health, and mental condition of the aged people at old homes in Bangladesh. The previous income of the respondents is analyzed through multiple linear regression model and the variables age, educational status, and occupation are found significant in the model. The analysis finds that the monthly income of the respondents was decreasing for increase in age. Also, increase in education level was associated with increasing monthly income. The respondents of different occupations had significantly higher income than that of the respondents with no occupation. The binary logistic regresson estimates for modeling about having any disease of the respondents are significant for the variables age, family type, and smoking status. The result suggests that increase in age increases the risk of having any disease to the rspondents. This result is similar to some previous studies (Kasiske, 1987; Peeters et al., 1996). The analysis also shows that the respondents lived with son have significantly less odds of having disease compared to the respondents lived alone. Again, the smokers are more prone to have any disease compared to the non-smokers (Fleshner et al., 1999). Poisson regression model is involved in this study to analyze UCLA loneliness score (Russell, D., 1996) of the respondents to have idea about their loneliness status. It is evident from the result that respondents become lonelier as they grow older (Hawkley & Cacioppo, 2007). Gender difference is found significant in loneliness status (Borys & Perlman, 1985). Males are slightly lonelier than female according to this analysis. The loneliness level is lesser to the respondents with spouse alive compared to the widowed respondents. The respondents who are very satisfied with the recreational facilities in their old home are lonelier than the respondents who are not satisfied. Recreational facilities may be a key point in dealing with the reduction of loneliness to some extent. That is, the persons who spend more time with the recreational items like television, newspaper, book, etc. may be lonelier than those who interact more with the persons around them. According to the result, morning walkers are slightly less lonely than those who do not walk in the morning. This study uses “Beck Depression Inventory (Beck A.T., 1961) to measure the depression level of the respondents and then multinomial logistic regression model finds the estimates for the selected covariates that influence that depression level. The result finds positive association between age and depression level as increase in age increases the chance of having mild, borderline, moderate, severe, and extreme depression compared to normal depression. This result indicates that depression level may rise with increase in age (Mirowsky & Ross, 1992). An unexpected result is found for the variable UCLA score since it reveals that feeling lonelier decreases the chance of having mild and moderate depression compared to normal depression. The morning walkers are less prone to have mild, moderate, and extreme depression compared to normal depression. This finding suggests that morning walking reduces depression level to a great extent (Goyal,

Bansal, & Saini, 2018). It is also evident from the analysis that the respondents being satisfied with the old home can avoid extreme depression compared to normal depression.

## 5. Recommendations

In Bangladesh, keeping elderly people in old homes is becoming a known phenomenon day by day. To assess the various conditions of the old parents in old homes, this study is performed based on statistical analyses. The study reflects that increase in age is highly associated with disease status, increased loneliness, and depression. So, the caring and support should be increased to them with their increase in age. The habit of smoking needs to be demotivated since it is responsible for occurring diseases. As morning walking is found effective in reducing both loneliness and depression of the respondents, it should be promoted in the old homes. The study suggests to increase quality time passing activities to the male respondents and the inhabitants whose spouses are no more because they feel lonelier than others. Also, overall satisfaction with old home might be emphasized to lessen their depression level so that they can feel, somewhat, at home in the old homes.

## 6. References


1. Albert, A., & Anderson, J. A. (1984). On the existence of maximum likelihood estimates in logistic regression models. *Biometrika, 71*(1), 1-10.
2. Bender, R., & Grouven, U. (1998). Using binary logistic regression models for ordinal data with non proportional odds. *Journal of clinical epidemiology, 51*(10), 809-816.
3. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J (June 1961). "An inventory for measuring depression". Arch. Gen. Psychiatry. **4** (6): 561–*71.*
4. Berk, R., & MacDonald, J. M. (2008). Overdispersion and Poisson regression. *Journal of Quantitative Criminology, 24*(3), 269-284.
5. Bhanman, T. (2006). Promotion of Spiritual Health for the Elderly. *A journal of Ministry of Women, Children and Social Welfare, Government of Nepal, Kathmandu, Nepal, 5*, 36-38.
6. Borys, S., & Perlman, D. (1985). Gender differences in loneliness. *Personality and Social Psychology Bulletin, 11*(1), 63-74.
7. Cameron, A. C., & Trivedi, P. K. (1990). Regression-based tests for overdispersion in the Poisson model. Journal of econometrics, 46(3), 347-364.
8. Doty, P. J. (1992). The oldest old and the use of institutional long-term care from an international perspective. *The Oldest Old. Oxford University Press, New York*, 251-267.
9. Draper, N. R., & Smith, H. (1998). *Applied regression analysis* (Vol. 326): John Wiley & Sons.
10. Dubey, A., Bhasin, S., Gupta, N., & Sharma, N. (2011). A study of elderly living in old age home and within family set-up in Jammu. *Studies on Home and Community Science, 5*(2), 93-98.
11. Fahrmeir, L., Kneib, T., Lang, S., & Marx, B. (2013). Regression models *Regression* (pp. 21-72): Springer.
12. Fleshner, N., Garland, J., Moadel, A., Herr, H., Ostroff, J., Trambert, R., . . . Russo, P. (1999). Influence of smoking status on the disease-related outcomes of patients with tobacco-associated superficial transitional cell carcinoma of the bladder. *Cancer: Interdisciplinary International Journal of the American Cancer Society, 86*(11), 2337-2345.
13. Fox, J. (1997). *Applied regression analysis, linear models, and related methods*: Sage Publications, Inc.
14. Gardner, W., Mulvey, E. P., & Shaw, E. C. (1995). Regression analyses of counts and rates: Poisson, overdispersed Poisson, and negative binomial models. *Psychological bulletin, 118*(3), 392.
15. Goyal, A. K., Bansal, A., & Saini, J. (2018). Nature walk decrease the depression by instigating positive mood. *Social Health and Behavior, 1*(2), 62.
16. Hawkley, L. C., & Cacioppo, J. T. (2007). Aging and loneliness: Downhill quickly? *Current Directions in Psychological Science, 16*(4), 187-191.
17. Kasiske, B. L. (1987). Relationship between vascular disease and age–associated changes in the human kidney. *Kidney international, 31*(5), 1153-1159.
18. Kennedy, G. J., Kelman, H. R., Thomas, C., & Chen, J. (1996). The relation of religious preference and practice to depressive symptoms among 1,855 older adults. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 51*(6), P301-P308.
19. Khattri, J. B. (2006). Study of depression among geriatric population in Nepal. *Nepal Med Coll J, 8*(4), 220-223.
20. Kumar, S. V. (1995). *Challenges Before the Elderly: An Indian Scenrio*: MD Publications Pvt. Ltd.
21. Lalan, Y. (2014). A sociological study of old persons residing in an old age home Delhi, India. *International Research Journal of Social Sciences, 3*(4), 21-23.

22. McConnel, C. E. (1984). A note on the lifetime risk of nursing home residency. *The Gerontologist, 24*(2), 193-198.
23. McDonald, B. W. (1993). Estimating logistic regression parameters for bivariate binary data. *Journal of the Royal Statistical Society: Series B (Methodological), 55*(2), 391-397.
24. Mirowsky, J., & Ross, C. E. (1992). Age and depression. *Journal of health and social behavior*, 187-205.
25. Montgomery, D. C., Peck, E. A., & Vining, G. G. (2012). *Introduction to linear regression analysis* (Vol. 821): John Wiley & Sons.
26. Murtaugh, C. M., Kemper, P., & Spillman, B. C. (1990). The risk of nursing home use in later life. *Medical Care*, 952-962.
27. Orbach, I. (1997). A taxonomy of factors related to suicidal behavior. *Clinical Psychology: Science and Practice, 4*(3), 208-224.
28. Peeters, M., Nevens, H., Baert, F., Hiele, M., De Meyer, A. M., Vlietinck, R., & Rutgeerts, P. (1996). Familial aggregation in Crohn's disease: increased age-adjusted risk and concordance in clinical characteristics. *Gastroenterology, 111*(3), 597-603.
29. Ramachandran, V., Sarada, M., & Ramamurthy, B. (1979). Psychiatric disorders in subjects aged over fifty. *Indian Journal of Psychiatry, 21*(3), 193.
30. Reddy, V. M., & Chandrashekar, C. (1998). Prevalence of mental and behavioural disorders in India: A meta-analysis. *Indian Journal of Psychiatry, 40*(2), 149.
31. Russell, D. (1996). UCLA Loneliness Scale (Version 3): Reliability, validity, and factor structure. Journal of Personality Assessment, 66, 20-40.
32. Starkweather, J., & Moske, A. K. (2011). Multinomial logistic regression. *Consulted page at September 10th: http://www. unt. edu/rss/class/Jon/Benchmarks/MLR_JDS_Aug2011. pdf, 29*, 2825-2830.
33. Subba, R., & Subba, H. (2015). Level of depression among elderly in selected old age homes at Mangalore, India. *Journal of Chitwan Medical College, 5*(1), 28-32.
34. Tiwari, S., Pandey, N. M., & Singh, I. (2012). Mental health problems among inhabitants of old age homes: A preliminary study. *Indian Journal of Psychiatry, 54*(2), 144.
35. Tiwari, S. C. (2000). Geriatric psychiatric morbidity in rural northen India: implications for the future. *International psychogeriatrics, 12*(1), 35.

## ***INFO:-***

***Corresponding Author:*** ***Mohammad Ahsan Uddin, Associate Professor, Department of Statistics, University of Dhaka, Dhaka, Bangladesh.***

***How to cite this article:*** ***Mohammad Ahsan Uddin, Sociological and Psychological Condition of the Inhabitants of Old Age Homes in Dhaka: A Statistical Approach, Asian. Jour. Social. Scie. Mgmt. Tech. 2(5): 156-164, 2020.***