Determinants Influencing Own Perception of Senior Citizens' Health in Telangana State – An Exploratory Study Based on NSSO 71st Round Health Data

[1]D. Srikala,   [2] C. Jayalakshmi

[1]Assistant Professor & Head, Dept. of Statistics, St.Ann's College for Women, Mehdipatnam, Hyderabad, India.
[2]Professor, Dept. of Statistics, Osmania University, Hyderabad, India
E- Mail - [1]kalachitti@gmail.com, [2]drjayalakshmi1961@gmail.com

Abstract: **Objectives:** 1) Identify the hidden classes present in senior citizens (age $\geq$ 60 years) and 2) find the determinants and a criterion to classify the senior citizens based on the responses of the outcome variable '*own perception of current state of health*'. **StatisticalMethods:**1)Latent Class Analysis (LCA) with variable selection process was used to find the hidden classes among the senior citizens and 2) Binary logistic regression with Variable Important (VI) scores was used to classify the senior citizens based on *own perception of current state of health*. **Data:** This study is based on the secondary data of 490 senior citizens belonging to Telangana State, collected in NSSO 71st round (2014) - Social Consumption: Health **Findings:** 1) The variable selection process gave six variables as significant *viz., age, general education, suffering from any chronic ailment, physical mobility, living arrangement and person financially supporting the senior citizens* and suggested two class model for LCA. The two classes identified were named as the ***Relatively Privileged group*** (n= 239, 43%) and the ***Under Privileged group*** (n=251, 57%). The senior citizens who were classified as second group, had a higher probability of having age 80 years and above than the first group. Results of statistical analysis says that the first group has relatively higher probabilities than the second group for higher education, better financial support, better living environment, no chronic ailment and better physical mobility. 2) A classification criterion was found with an accuracy of *0.857*.

Keywords: *Senior citizens, Own perception of health, Latent Class Analysis, Variable selection, Variable importance scores, NSSO.*

1. INTRODUCTION:

India is a nation with majorly unorganized work force with lower literacy levels. Also, people are highly ignorant about securing the old age with required financial planning. The changing landscapes of family structures are not permitting people to have old age living secured with proper health care and sufficient financial strength either by themselves or through government welfare schemes. The old age would be comfortable with congenial social-economic, health and support system factors.

1.1 Need of the study: Disaggregated studies were suggested by demographers to facilitate the apt policy framing by policy makers.

Objectives: This study aims to identify the following about the persons with age $\geq$ 60 years (senior citizens) in Telangana State, India.

   i.   Hidden classes present in senior citizens with respect to demographic, health, support system and psychological factors (age $\geq$ 60 years).
   ii. The determinants/variables significantly influencing the variable '*own perception of current state of health*'
   iii. Criterion to classify the senior citizens based on the responses of the outcome variable '*own perception of current state of health*'

2. MATERIALS AND METHODS:

2.1 Data Source

National Sample Survey Organization (NSSO) has conducted a survey on health sector in 2014 as 71st round of NSS - Social Consumption: Health and Education using *schedule 25.0*. This survey adopted a stratified multi-stage design, covering the whole of India [1]. The survey elicited detailed information on various aspects of health and health expenditure incurred. The current study used the data of 490 senior citizens belonging to Telangana State from the blocks 4 and 10 of *schedule 25.0.*

2.2 Indicators of study

From Block 4, the data has been extracted from ten variables - sector (rural, urban), age, sex, marital status, general education, whether hospitalized during last 365 days, suffering from any chronic ailment, suffering from any other ailment during last 15 days, suffering from any other ailment on the day before the survey, covered by any scheme for health expenditure support. From block 10, the data has been taken from seven variables - number of sons living, number of daughters living, state of economic independence, person financially supporting the senior citizens (if dependent), living arrangement, physical mobility, own perception of current state of health. In total, there are seventeen variables.

2.3 Data Editing

Few of the chosen indicator variables with larger number of levels, from blocks 4 and 10 from *Schedule 25.0* were pooled into lesser number of levels, as some levels are having very small cell frequencies.

In block 4, the variable 'age' (in years) has been classified as 60-64, 65-69, 70-74, 75-79, 80 and above. The various options of the variable 'general education' in block 4were re-grouped into 4 classes as below:

- *Below Primary* - not literate, literate without any schooling, literate without formal schooling: through NFEC, literate TLC/AEC, others, literate with formal schooling: below primary
- *Primary-Higher Secondary* - upper primary/middle, secondary and higher secondary
- *Diploma-Graduate* - diploma/certificate course up to secondary, diploma/certificate course, graduate
- *Above Graduate* - postgraduate and above

In Block 10 of *Schedule 25.0*, the variables state of economic independence and person financially supporting the senior citizens are combined and re-classified as self, spouse, own children, grandchildren and others. The three outcomes excellent/very good, good/fair and poor of the variable *'own perception of current state of health'* have been reclassified as *good* and *poor*. This will facilitate to identify the classes adequately and also perform binary logistic regression analysis. Now, there are s*ixteen* variables in the analysis.

2.4 Statistical Methods

Frequencies and the respective percentages were obtained for all the categorical variables. For the variable, age descriptive statistics – mean, median, mode and standard error were found.

Latent class analysis (LCA) is a statistical procedure used to identify qualitatively different subgroups within the populations that share certain outward characteristics [2]. LCA lets the data to "reveal" itself. It groups the data points (persons) into mutually exclusive and exhaustive classes with homogenous indicators. In LCA, no assumptions are made about the distributions of the indicators and the indicators within each class are considered to be independent [3,4]. LCA gives two types of estimates (i) indicator probabilities, which give the chance of an indicator is associated with the class, obtained for all the variables and the respective outcomes and (ii) the posterior probabilities – predicted class membership probabilities; gives the probability that a chosen individual/data point belongs to a class [3]. LCA is a subset of Structural Equation Modeling (SEM) [5]. LCA is also referred to as Finite Mixture Models (FMM) [5].

In the present study, LCA with variable selection process was performed to identify the hidden classes and classify the respondents depending on socio-economic and health factors. In this method, the set of variables with relevant clustering information will be selected and the variables which are not informative, i.e., redundant variables are

discarded [6]. Redundant variables are not required for a parsimonious modeling [6]. In variable selection process, stepwise backward/forward greedy search with conditional dependence via regression was used. LCA with variable selection method gives us the variables contributing to the model and the number of latent classes that can be formed ideally. Further, Lo-Mendell-Rubin Likelihood Ratio Test, Bayesian Information Criteria (BIC) and Akaike Information Criteria (AIC) were used to establish that the specified model in variable selection process is the best model.

Binary logistic regression was performed with the variable *own perception of current state of health* as dependent variable and all the other variables as independent variables. Post fitting, variable importance scores and Variable Importance Plot (VIP) were used to identify the important variables or determinants in predicting the response variable [7]. Model-specific approach was used in this.

3   STATISTICAL ANALYSES:

3.1 Variable Description
The variables are grouped as below:
Demographic Indicators: sector, age, marital status, general education
Health Indicators: whether hospitalized during last 365 days, suffering with chronic ailment, suffering with any other ailment the day before survey, suffered with any other ailment before 15 days of survey, physical mobility
Support System Indicators: **W**hether covered by any health scheme, number of sons living, number of daughters living, financial support for aged person, and living arrangement for the aged person.
Psychological Indicator: own perception of current state of health.

3.2 Results
This study focuses on 490 individuals with age ≥ 60 years belonging to Telangana State. Proper care is taken while retrieving the data from blocks 4 and 10 by matching the common ID and serial number of person with common ID.

3.2.1   Descriptive Statistics

Table 1 gives the socio-economic, health, and support system profile of the senior citizens.

Table 1: Frequencies and percentages of indicators of the group under study (n =490)

S.No.	Indicator	Level	Number	%
I	**Demographic Indicators**			
1	Sector	Rural	270	55.1
		Urban	220	44.9
2	Age (years) **Mean=67.64** **Median = 65 = Mode** **S.E.= 0.309**	60-64	183	37.3
		65-69	137	28.0
		70-74	82	16.7
		75-79	46	9.4
		80 & above	42	8.6
3	Sex	Female	270	55.1
		Male	220	44.9
4	Marital status	Never married	00	00
		Currently married	291	59.4
		widowed	198	40.4
		Divorced/separated	1	0.2
5	General education	Below Primary	385	78.6
		Primary-Higher Secondary	76	15.5

		Diploma-Graduate	27	5.5
		Above Graduate	02	0.4
II	**Health Indicators**	**Level**	**Number**	**%**
6	Hospitalized during last 365 days	Yes	127	25.9
		No	363	74.1
7	Suffering from any chronic ailment	Yes	167	34.1
		No	323	65.9
8	Suffering from any other ailment during last 15 days	Yes	28	5.7
		No	462	94.3
9	Suffering from any other ailment on the day before the survey	Yes	00	00
		No	490	100
10	Physical mobility	Physically immobile:		
		Confined to bed	17	3.5
		Confined to home	79	16.1
		Able to move outside but only in a wheelchair	3	0.6
		Physically mobile	391	79.8
III	**Support System Indicators**	**Level**	**Number**	**%**
11	Covered by any scheme for health expenditure support	Government funded insurance scheme (e.g. RSBY, Arogyasri, CGHS, ESIS, etc.)	309	63.1
		Employer supported health protection	13	2.7
		Arranged by household with insurance companies	04	0.8
		Others	00	00
		Not covered	164	33.5
12	Number of sons living	0	61	12.4
		1-2	342	69.8
		3-4	76	15.5
		5-6	10	2.04
		7-8	01	0.2
13	Number of daughters living	0	99	20.2
		1-2	290	59.2
		3-4	86	17.6
		5-6	14	2.8
		7-8	00	00
		9-10	01	0.2
14	Person financially supporting the senior citizens	Self	127	25.9
		Spouse	37	7.6
		Own children	303	61.8
		Grandchildren	12	2.4
		Others	11	2.2

15	Living arrangement	Living alone: as an inmate of old age home	1	0.2
		living alone: not as an inmate of old age home	16	3.3
		living with spouse only	64	13.1
		living with spouse and other members	221	45.1
		living without spouse but with: children	188	38.4
		Other relations	00	00
		Non relations	00	00
	Psychological Indicator	**Level**	**Number**	**%**
16	**Own perception of current state of health**	**Good**	367	74.9
		Poor	123	25.1

From table 1 the following interpretations can be given.

Demographic Indicators: There is almost equal representation from rural and urban sectors of the population with 55.1% form rural and 44.9% of the respondents from urban. We found 55.1% are female and 44.9% are male respondents in the study group. Majority (65.3%) of the respondents are below the age 70 years and 34.7% are of age 70 years and above. The mean age is 67.54 years, whereas the median and mode take the same value as 65 years. The age distribution is slightly right skewed, implying that there is more number of respondents with age greater than 65 years. The significant observation is most of the respondents (78%) are with education level of below primary.

Health Indicators: 25.9% of the respondents were hospitalized in last 365 days of survey, more than one-third (34.1%) of the respondents are suffering from chronic ailment, no one was suffering with any illness before the survey date, 3.5% are confined to bed and 16.1% are confined to home.

Support System Indicators: 63.1% are covered by government health insurance schemes and 33.5% are not covered under any scheme. Very minor percentage (2.7%) are having employer supported health scheme and negligible percentage (0.8%) possess the insurance arranged by households. Almost 70% of the respondents have 1-2 sons living, 59.2% have 1-2 daughters living, 61.8% are being financially supported by children and only 25.9% are independent (self-supporting). 45.1% of the subjects are living with spouse and other members, 38.4% are living without spouse but with children.

Psychological Indicator: One-fourth (25.1%) of the respondents were feeling *poor* about their '*current state of health'*.

3.2.2   Latent Class Analysis with Variable Selection Method

The variable selection technique has been performed on all the sixteen variables listed in Table 1 and a 2 class model with six variables was suggested. The selected variables are '*age' & 'general education'* from demographic indicators, '*suffering from any chronic ailment'* and *'physical mobility'* from health indicators, *'person financially supporting the senior citizens' and 'living arrangement'* from support system indicators. LCA has been performed using the selected variables with 2 classes, 3 classes, 4 classes and 5 classes to re-ensure that the latent class model with 2 classes is the best model. Table 2 gives the information about the model fit statistics of the LCA performed for 2 to 5 class models.

Table 2   Model fit evaluation information

Diagnostic	2 classes	3 classes	4 classes	5 classes
Lo-Mendell-Rubin adjusted LR Test	**P<0.001**	**P<0.001**	P = 0.015	P=0.242
Bayesian Information Criterion (BIC)	**5406.787**	5476.336	5557.445	5652.843
Akaike Information Criterion (AIC)	5243.205	5228.866	5226.087	5237.597

In Table 2, Lo-Mendell-Rubin adjusted LR test is showing significance for 2 and 3 class models (**P<0.001**). BIC value of 2 latent class model is less than that of 3, 4 and 5 classes' models and AIC value of LC model with 2 classes is little higher than that of 3, 4 and 5 classes model. BIC value is considered to be an appropriate criterion to evaluate a model where a false positive is as misleading as a false negative in evaluation of LCA [8], [9]. In this study, false positive is a person stating *'own perception of current health'* as *good* is predicted as *poor and* false negative is a person *'stating own perception of current health'* as *poor* is predicted as *good.* Here both are equally misleading. Hence, LCA 2 class model is considered optimum.

Table 3 below, gives the information about the indicator or class response probabilities of the variables selected to form latent classes. These probabilities indicate how the individuals within a class differ from those in another class.

Table 3 Class response probabilities across all levels of the indicators/variables

Indicator	Level	Class1 Relatively Privileged N=239 (43%)	Class 2 Underprivileged N=251 (57%)
Age	60-64	0.4100	0.3388
	65-69	0.3471	0.2155
	70-74	0.1777	0.1575
	75-80	0.0492	0.1363
	80 & above	0.0160	0.1519*
General education	. Below Primary	0.6500	0.9144*
	. Primary-Higher	0.2344	0.0798
	.Secondary	0.1071	0.0058
	. Diploma-Graduate >Graduate	0.0084	0.0000
Suffering from any chronic ailment	. Yes	0.3379	0.3435*
	. No	0.6621	0.6565
Physical Mobility	Physically immobile: .Confined to bed	0.0064	0.0615*
	Physically immobile: Confined to home	0.0692	0.2485
	. Able to move outside but only in a wheelchair	0.0000	0.0119
	. Physically mobile	0.9244	0.6780*
Person financially supporting the senior citizens	. Self	0.5324	0.0000*
	. Spouse	0.1488	0.0060
	. Own children	0.2726	0.9463
	. Grand children	0.0000	0.0477*
	. Others	0.0461	0.0000
Living Arrangement	. living alone: as an inmate of old age home	0.000	0.004*
	. living alone: not as an inmate of old age home	0.0671	0.0000
	. living with spouse only	0.2379	0.0288
	. living with spouse and other members	0.606	0.304
	. living without spouse but with: children	0.0890	0.6632*
	. Other relations	0.0000	0.0000

Following are the observations made from the class response probabilities (Table3)

- The probability of a person belonging to age groups *75-80 years* and *80 years and more* belonging to Class 2 is higher than that of Class1.
- There is a higher probability of a selected person with *'general education'* as *below primary* belonging to Class 2 than that of Class 1.
- A person *'suffering from any chronic ailment'* was showing higher probability of belonging to Class 2.
- The level *physically immobile: confined to bed* of the variable *'physical mobility'*, has a higher probability in Class 2. Also, it is noticed that the level *physically mobile* has less probability in Class 2.
- The variable *'person financially supporting the aged person'* with the level *supported by grandchildren* is higher in Class 2 and the level *self* has probability 0.000.
- The levels, *living alone: as an inmate of old age home* and *living without spouse but with: children* has relatively higher probability in Class 2 than Class 1.

The characteristics of the six selected variables for which the indicator probabilities are higher were identified as the persons are *relatively aged* (>80 years) with lowest levels of education (< primary), suffering with chronic ailment, physically immobile, financially dependent (supported by grandchildren) and living alone as an inmate of old age home/ living without spouse but with children. In view of these, the Class 2 may be termed as **Underprivileged** class and the Class 1 is termed as **Relatively Privileged** class which has higher probabilities for better demographic, health and support system characteristics; 60-74 years of age, education above primary level, not suffering with chronic ailment, physically mobile, financial independence (self) and living with spouse. Figure 1 diagrammatically depicts the profiles, i.e., class probabilities of the characteristics of the two classes identified.
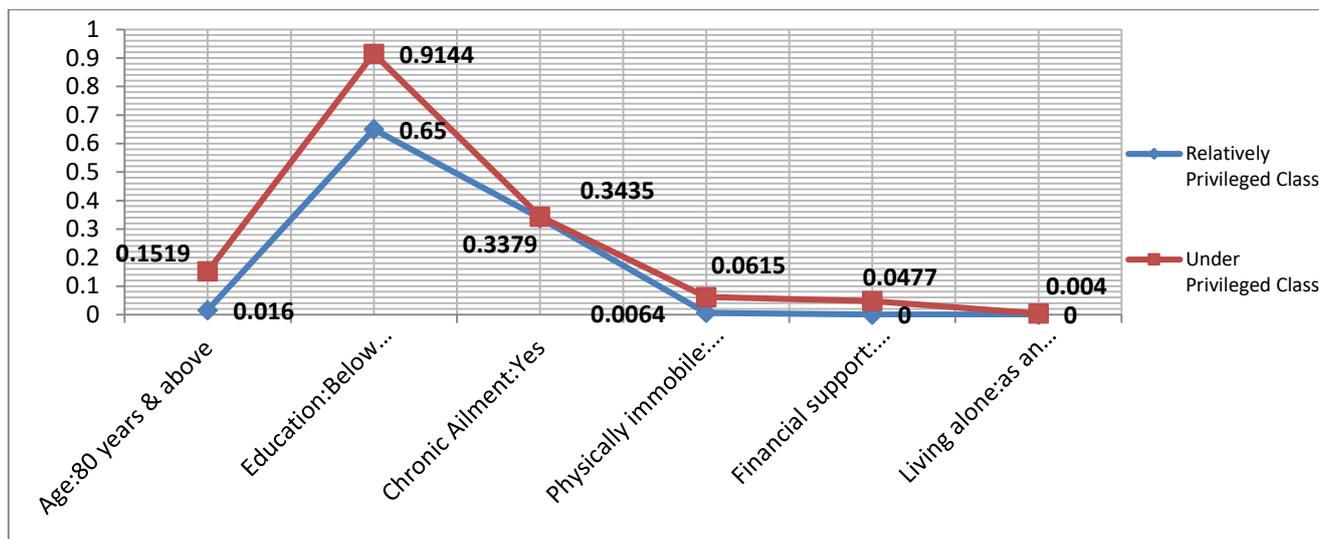

Figure 1 Profiles of underprivileged and relatively privileged classes

3.2.3 Binary Logistic Regression with VIP

Binary logistic regression has been performed and a full logistic model was fit with the variable *'own perception of current health'* as the response variable and all the other variables as independent variables. Further, variable importance scores were obtained using the full model. Table 4 gives the variable importance scores in descending order.

Table 4 Variable importance metrics

S.No.	Variable	Importance	Coefficient Sign
1	Physical mobility	8.94 *	Positive
2	Age	3.61 *	Negative
3	Suffering with chronic ailment	3.23 *	Positive
4	Living arrangement	3.17 *	Positive

5	Person financially supporting the aged person	2.43 *	Negative
6	General education	1.79 *	Positive
7	Number of sons living	1.68	Negative
8	Number of daughters living	1.37	Positive
9	Suffered with any other ailment before 15 days of survey	1.30	Positive
10	whether hospitalized during last 365 days	1.02	Positive
11	Sex	0.635	Positive
12	Sector	0.626	Negative
13	Marital Status	0.171	Negative
14	Covered by any health scheme	0.123	Positive
*Selected variables for final logistic model; Positive and Negative indicate the sign of the logistic regression coefficient variable in the fitted model.			

It was observed in the above table that the six variables selected for LCA are seen in the first six in the descending order of the scores. The highly influencing six variables in descending order are *physical mobility, age, suffering with chronic ailment, living arrangement, person financially supporting the aged person and general education.* Among these, physical mobility is the variable influencing the dependent variable to the maximum level. The same is shown as bar chart below in Figure 2.
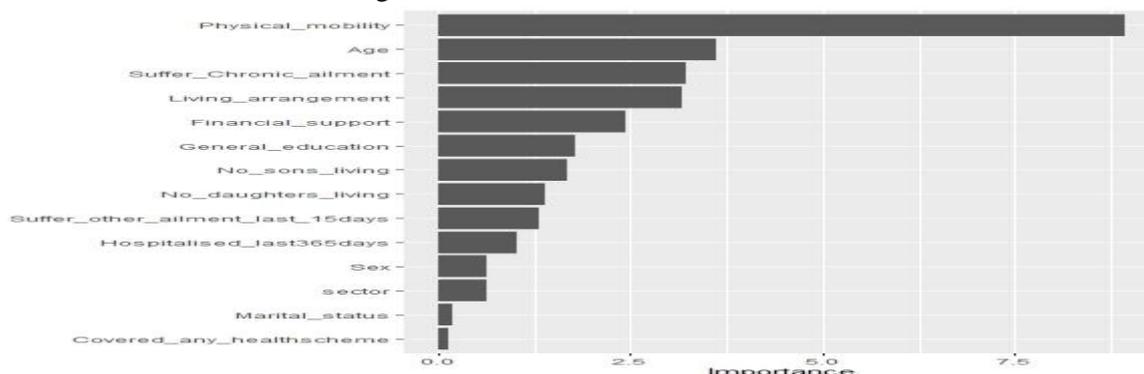

Figure 2 Variable Importance Plot – VIP

Table 5 gives the output of binary logistic regression analysis

Table 5: Binary Logistic Regression Analysis for selected 6 variables

Variable	Estimate	Std. Error	z value	P-Value
(Intercept)	-6.3240	1.2618	5.012	5.39e-07 ***
Physical mobility	1.4339	0.1534	9.348	< 2e-16 ***
Age	-0.3559	0.1065	-3.342	0.000831 ***
Suffering from any chronic ailment	0.9037	0.2805	3.222	0.001274 **
Living Arrangement	0.5568	0.1747	3.186	0.001440 **
Person financially supporting the senior citizens	-0.4307	0.1609	-2.677	0.007427 **
General education	0.5841	0.2878	2.030	0.042365 *
Significance	* significant at 5% and less than 5% los			

From Table 5, it is clear that the variables *physical mobility, age, suffering with chronic ailment, living arrangement, person financially supporting the aged person and general education* are significantly contributing to the outcome variable *own perception of current state of health* of a respondent, who is a senior citizen. A study based on NSSO 75th round Health data also indicated that place of residence, gender, social group (caste), marital status, living arrangements, surviving children, and economic dependence increases the vulnerability of the senior citizens in India [10]).
The Table 6 displays Wald's test and LR-test results.

Table 6 Adjusted Odds Ratios (OR), CI, Wald's test and LR-test of Logistic Regression

Indicator	Adjusted OR	95% CI	P(Wald's test)	P(LR-test)
Physical mobility	4.19	(3.11, 5.67)	< 0.001	< 0.001
Age	0.7	(0.57, 0.86)	< 0.001	< 0.001
Suffering from any chronic ailment	2.47	(1.42, 4.28)	0.001*	0.001 *
Living Arrangement	1.75	(1.24, 2.46)	0.001 *	0.001 *
Person financially supporting the senior citizens	0.65	(0.47, 0.89)	0.007 *	0.007 *
General education	1.79	(1.02, 3.15)	0.042*	0.032
Log-likelihood	-180.2792			
AIC	374.5584			
Null deviance	552.18 (489 d.f.)			
Residual deviance	360.56 (483 d.f.); P-value = 0.999>0			
*Significant at 5% los and less d.f. – degrees of freedom				

From Table 6, it can be observed that the adjusted ORs of all the variables are significant at 5% and less than 5% level of significance (los). The P-value of residual deviance is 0.999>0, shows that the fitted logistic model provides an adequate fit for the data.

Interpretation of ORs
- The positive OR of 4.19 and the 95% CI as (3.11, 5.67) for the indicator *'physical mobility'* signifies that there is 319% chance that higher the physical mobility of a person, higher the chance of belonging to the class of *good* of the variable *'own perception of current health'*.
- OR of 0.7 for the variable '*age*' indicates that as the age increases there are lesser chances for a person to belong to the class of *good.*
- The variable '*chronic ailment*' has an OR 2.47, indicating that when the person is not having any chronic ailment, there is 147% chance of feeling *good* about *'own perception of current health'*.
- The variable '*living arrangement*' has an OR of 1.75, indicating that there is 75% of chance that an aged person staying without spouse but with children feels *good* about his/her state of health.
- The OR of '*person financially supporting the senior citizens*' is 0.65 signifies that when the senior citizen is not independent, there is only 6.5% chance for feeling *good* about '*own perception of current state of health*'.
- General education has an OR of 1.79, and it can be inferred that there is only 7.9% chance of feeling *good* about '*own perception of current state of health*' when education level decreases.

Table 7 below gives the values of confusion matrix of the fitted logistic model.

Table 7 Confusion Matrix

Parameter	Value
Number of correct predictions	420
Accuracy & 95% CI	0.857 (0.823, 0.8869)
Apparent Error Rate	0.142 (14.2%)

No Information Rate	0.749
P-Value [Acc > NIR]	3.420e-09*
Kappa	0.5766
Mcnemar's Test P-Value	9.764e-06*
Sensitivity	0.5610
Specificity	0.9564
Positive Predicted Value	0.8118
Negative Predicted Value	0.8667
Prevalence	0.2510
Detection Rate	0.1408
Detection Prevalence	0.1735
Balanced Accuracy	0.7587
*significant at 5% los and lesser levels of significance	

Interpretation of Confusion Matrix

- This logistic model has an accuracy of 0.857 (85.7%) with 95% CI as (0.823, 0.8869).
- No Information Rate (NIR) is 0.749, indicates the ratio of own perception of health as good to poor and the P-value for accuracy to be greater than NIR was found to be significant.
- The Kappa value is 0.5776, indicating the agreement rate of the model fit is more than 57%.
- Further, the sensitivity is 0.5610 and specificity 0.9564, implying that the model can detect the class'0' class 56% of the times and identify '1' as '1' 95.6% cases.
- Balanced Accuracy is 0.7587, which is fairly high, indicating the robustness of the model fit.

As a diagnostic for the logit fit, the ROC curve with Area Under Curve (AUC) was drawn and is represented by Figure 3.
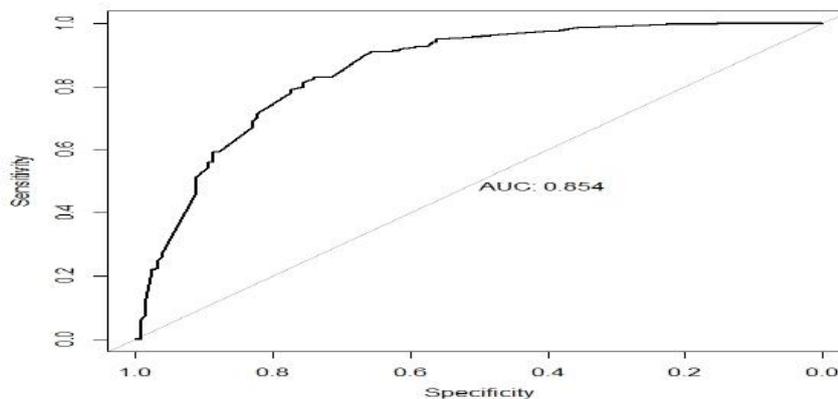

Figure 3 ROC curve with AUC

It can be observed in the above figure that the area under the curve (AUC) is 0.854 is very high[11], indicating that the fitted model is pretty good.

4. DISCUSSION :

In the present study, the outcome variable *own perception of current state of health* was observed to be significantly influenced by health factors such as physical mobility, presence of chronic diseases, living arrangements, financial support and education level. A study on the health status on the same set of data; NSSO 71st round data, also indicated that the with the increase of senior citizens, the proportion of poor health status is also on rise [12]. Yet, another study using Latent Class Analysis of Mexican nationally representative sample of older adults with distinct physical, social, psychological, economic and sociodemographic characteristics suggested that the single-indicator paradigm does not seem to fit the majority of persons with more than one dependency condition. Future efforts should focus on the underlying mechanisms of these multidimensional dependency clusters (physical, social, psychological, economic) and determine targets for prevention and intervention [13] .

5. CONCLUSIONS:

The following are the conclusions of the study:

- The factors/determinants significantly contributing to the *own perception of the health status* were identified as *age, general education* (demographic indicators), *suffering from chronic ailments and physical disabiltiy* (health indicators), *financial support and living arrangement* (support system indicators). Two different latent classes were identified using these factors.
- The two diverse latent classes of senior citizens identified with LCA are named as *'Relatively Privileged Class'* and *'Under Privileged Class'*. These two classes were distinguished based on the factors - older age   (>80 years), lower levels of general education, suffering from chronic ailments, physical disabiltiy, financial dependency and living away from the family (living in old age homes) relate to *Under Privileged Class*.
- Logistic regression has revealed that the six factors - age, general education, suffering from chronic ailments, physical disability, financial support, living arrangement are predominant in classifying the '*own perception of current state of health*' into *good* and *poor* of a senior citizen.
- Given a data set of the above description, the fitted binary logistic regression model can classify a senior citizen's *own perception of current state of health* as *good* or *poor.*

6. SUGGESTIONS FOR IMPROVING PUBLIC HEALTH :

The factors significantly affecting the *own perception of current state of health* need to be addressed by providing education opportunities to all, increasing the awareness among the public about healthy lifestyle habits to avoid or delay the on set of many chronic ailments, creating sufficient pension funds to the senior citizens and establishing rehabilitation centres to imporve the physical mobility. Hence, an effcient social security system to the people aged 60+ years can make them feel *good* about their *'own perception of current state of health'*.

7. FUTURE SCOPE OF THE STUDY:

Similar analysis can be made for the data of the other states too and check what they reveal and comparisons can be made.

Data Source: NSSO 71st Round (2014)-Social Consumption: Health data was bought from NSSO, MOSPI, Government of India.

Software packages used for statistical analyses: MS Excel Windows 10, IBM SPSS 25.0, R x64 4.1.0 and R Studio.

Conflict of Interest: No conflict of interest was reported by all the authors

REFERENCES:

1. *Health in India NSS 71st Round, (January – June 2014)*, National Sample Survey Office, Ministry of Statistics and Programme Implementation, Government of India
2. Bridget E. Weller1, Natasha K. Bowen2, and Sarah J. Faubert3 (2020); *Latent Class Analysis: A Guide to Best Practice,* Journal of Black Psychology 2020, Vol. 46(4) 287–311.
3. Charis W. L. Ng, Nan Luo and Bee Hoon Heng, (2014), *Health status profiles in community-dwelling elderly using self-reported health indicators: a latent class analysis*, Quality of Life Research, Vol. 23, No. 10 December, 2014, pp. 2889-2898, Published by: Springer.
4. Stephanie T. Lanza, Linda M. Collins, David R. Lemmon and Joseph L. Schafer (2007), *PROC LCA: A SAS Procedure for Latent Class Analysis*, Struct Equ Modelling; 14(4): 671–694.
5. *Latent   Class   Analysis: https://www.statisticssolutions.com/free-resources/directory-of-statistical-analyses/latent-class-analysis/.*
6. Michael Fop and Thomas Brendan Murphy, University College Dublin, (2018), *Variable selection methods for model-based clustering*, Statistics Surveys, Vol. 12 (2018) 18–65, ISSN: 1935-7516, https://doi.org/10.1214/18-SS119.
7. Brandon M. Greenwell, Bradley C. Boehmke (2020), *Contributed Research Article-Variable Importance Plots—An Introduction to the vip Package*, The R Journal Vol. XX/YY, AAAA ISSN 2073-4859.

8. John J. Dziak, Donna L. Coffman, Stephanie T. Lanza, Runze Li and Lars S. Jermiin (2020), *Sensitivity and specificity of information criteria*, Briefings in Bioinformatics, 21(2), 2020, 553–565 doi: 10.1093/bib/bbz016 Advance Access Publication Date: 20 March 2019 Review article.

9. Nema Dean and Adrian E. Raftery (2010)*, Latent Class Analysis Variable Selection,* Published in final edited form as: *Ann Inst Stat Math*. 2010 February 1; 62(1): 11–35. doi:10.1007/s10463-009-0258-9.

10. Ranjan, A., Muraleedharan, V.R. (2020), *Equity and elderly health in India: reflections from 75th round National Sample Survey, 2017–18, amidst the COVID-19 pandemic.* Global Health 16, 93 (2020). https://doi.org/10.1186/s12992-020-00619-7.

11. Jayawant N.Mandrekar Ph.D. (2010), *Receiver Operating Characteristic Curve in Diagnostic Test Assessment,* Journal of Thoracic Oncology, Volume 5, Issue 9, September 2010, pages 1315-1316.

12. Kumar, S., Kumar, K.A. (2021), *Socio-economic and Demographic Correlates of the Health Status of Older Adults in India: An Analysis of NSS 71st Round Data.* Ageing Int (2021). https://doi.org/10.1007/s12126-020-09407-5.

13. Rely Kely, Vargas-Chanes Delfino, García-Peña Carmen, Salinas-Escudero Guillermo, Gutiérrez-Robledo Luis-Miguel, Wong Rebeca (2020), Multidimensional dependency subgroups in community-dwelling older adults: A latent class analysis. Rev. Univ. Ind. Santander. Salud [Internet]. 2020 June [cited 2021 Oct 17]; 52(2):101-109. https://doi.org/10.18273/revsal.v52n2-2020004.