Assessment of the Level and Determinants of the Health Status of Cardiac Disease Affected Marine Fisher folk in Kerala

Bittu Ann Chacko¹ & Roy Scaria^{2*}

¹Assistant Professor, Department of Economics, St. Aloysius College Edathua, Alappuzha, Kerala, India (Research Scholar, Research Department of Economics, Government College, Nattakom, Kottayam).

²Assistant Professor, Department of Economics, T.M Jacob Memorial Government College, Manimalakunnu, Kerala, India (Research Guide, Research Department of Economics, Government College, Nattakom, Kottayam).

Abstract

Economic development of a nation requires healthy and productive human resource, especially labour force which in turn depends on the healthcare facilities available, accessible and affordable. The best situation is the absence of chronic illnesses of any kind, particularly life style diseases like heart disease, cancer, diabetes etc. But data shows that these kinds of disease are now raging in the developing and underdeveloped nations, which have its catastrophic impacts such as increased financial burden and deteriorated quality of life especially on people belonging to the lower income strata. The present study measures the health status of a marginalized and downtrodden community, the marine fisher folk with regard to heart disease. Fishery is one of the important sectors, which provides nutritional security and export earnings to the nation, India.

Keywords: health status, marine fisherfolk, heart disease

1.1 Introduction

A healthy population can contribute greatly to the overall development of a nation. India, though signed the Alma Ata Declaration in achieving Health For All by the year 2000, is still lagging much behind of realizing this even in the year 2020. Accessibility and approachability of health care services and facilities to all sections of the society are crucial in ensuring good health and improvement in health status. Also, to lead an economically and socially productive life, people should be free from all kinds of chronic disease. But statistics show that the incidence of heart disease, cancer, diabetes etc is proliferating even in developing nations with serious implications on the low and middle income households through increased financial burden and deterioration in the quality of life with its further repercussions on the way of living and pattern of employment.

Kerala state which is situated in the South West corner of Indian peninsula is experiencing highest prevalence of diseases such as heart disease, (Aslesh, et al., 2015) cancer, diabetes, and its associated risk factors (Thankappan, et al., 2010, Shah & Mathur, 2010, Nair, 2017). Around 20 percent of all heart disease in Kerala occurs before the age of 45 years of the patients and the prevalence of heart disease in the age group 20-69 years for 2015 is nearly 10% (Aslesh, et al., 2015) with a serious impact on the labour supply and productivity aspect. Studies all around the world have shown that the prevalence of the risk factors such as the use of tobacco products, harmful intake of alcohol, physical inactivity, unhealthy dietary pattern and obesity are found to be higher among fishermen community (Mendis, Shanthi, Pekka and Norrving, 2011) and thus the mortality rates arising out of cardiovascular disease (Pougnet, et al., 2013, Kaerlev, et al., 2007). Cost of medicines and longer duration of treatment of cardiac ill health; thus, impose a vast financial burden on the patients who belong to the lower income groups (Economic Review, 2018) and thereby pushing them towards impoverishment. As one of the major maritime states in India, Kerala contributes significantly to the nation's total marine fish landing. The marine fishing communities in the state constitutes around 3.03 % of Kerala's total population, with a density of 2168 persons per square kilometer, which is much higher than the state average of 859 (Dept of fisheries, GoK). The fishermen of the state spread over 222 fishing villages in 9 coastal districts of the state and contribute nearly 8.8 percent of the Gross State Domestic Product (GSDP) from the primary sector.

Though, Kerala boasts of the better quality of life in the country as measured by human development indices, the state's fishing community has largely been left out of the development experience in general (Dept. of Fisheries, 2005, Antony & Anilkumar, 2011). Indices such as death and infant mortality rates were once used to measure the well being of a population, which was replaced by measures of morbidity or state of ill health but with a limitation that it cannot take into account individual wellbeing. So in order to measure the health status of individuals especially of those affected by a particular disease, measures which consider the impact of disease and its condition on the behaviour and daily activities of people is needed. Medical care now-a-days is focusing on both the health related quality of life and the increase in life expectancy. When dealing with chronic diseases, quality of life, its improvement or deterioration should be the major factors and it should also cover the different domains of health (Bergner & Rothman, 1987).

As a chronic disease, coronary heart disease has now became a major contributor to the disease burden worldwide (Murray & Lopez, 1997) and its treatment should focus on aspects such as increasing the quantity of life and improving the quality of life in which the latter can be assessed using various patient reported health-related quality of life (HRQOL) measures which are commonly known as health status measures (Edelman, Williams, Rothman & Samsa, 1999). Of the two different health status measures available, generic instruments measure the overall well-being and functional status of patients across different age groups, different population and different patient groups whereas the specific health status measures quantify the quality of life of patients affected with a particular condition/disease, but can never be applied across different population groupings (Tullis & Guyatt, 1995) and considered as more accurate than the generic measures (Dempster & Donnelly, 2000).

Different disease specific questionnaires are available to assess the quality of life of patients after the cardiac illness (chest pain, myocardial infarction and other heart related ailments) such as Seattle Angina Questionnaire (Spertus, et al., 1995), Minnesota Living with Heart Failure Questionnaire (Rector, Kubo, & Cohn, 1987), Myocardial Infarction Dimensional Assessment Scale (Thompson, et al., 2002) and Mac New Heart Disease questionnaire (Lim, et al., 1993, Valenti, Lim, Heller, & Knapp, 1996). Since Mac New questionnaire measures the physical, emotional, and social functioning of individuals affected by the disease (Hofer, Lim, Guyatt, & Oldridge, 2004, Abbasi, Momenyan, Eslamimoqadam, Sarvi, & Khaki, 2017), the same has been used for the present study. The developers have freely sent the questionnaire and the scoring mechanism. The questionnaire includes 27 items which cover the three domains of health status such as physical limitations domain, emotional function domain and social function domain. The time frame for the Mac New is the previous two weeks. Scoring of the Mac New is straight-forward in which the maximum possible score in any domain is 7 [high] and the minimum is 1 [poor]. Missing responses do not contribute to the score. The instrument also has a global score which can be calculated as the average of overall scored items (Hofer, Lim, Guyatt, & Oldridge, 2004, Lim, et al., 1993, Valenti, Lim, Heller, & Knapp, 1996)

1.2. Methods

The present study is descriptive cum analytical based on a set of cross sectional data collected during December to May 2019 among marine fisher folks of age above 18 years with heart disease, in Kerala. Marine fisher folk, for the purpose of this study, are a category of population, men and women, who engage in marine fishing directly and indirectly through fish related activities to earn for the daily living of their family and dependents.

Data required for the study have been collected from 400 sample respondents among marine fisher folks, of whom 208 and 192 belong to rural and urban areas of the coastal part of Trivandrum, Ernakulam and Kozhikode districts respectively. Proportional Multistage random sampling has been adopted for selecting the sample respondents. The coastal districts selected contain 98 fishing villages which accounts for 44 percent of total (222) fishing villages all over the state of Kerala. A sample of 25 fishing villages has been proportionately selected randomly from the three districts assigning almost equal weight to rural and urban areas;13 fishing villages from Thiruvananthapuram (7 from rural and 6 from urban), 4 from Ernakulam (2 each from rural and urban) 8 from Kozhikode (4 each from rural and urban). With the help of Church officials and Asha workers, a list of marine fisher folks affected with heart disease in each selected village has been prepared and randomly selected 16 affected persons from each village as the sample.

A pre-tested structured questionnaire which was framed in English, translated into Malayalam and back translated into English administered to capture information on socio economic background and behavioural characteristics of respondents. The data was analyzed using statistical software SPSS version 22.

1.3. Results and Discussion

The personal and socioeconomic characteristics such as age, gender, marital status, religion, educational qualification, age at the time diagnosing illness and Monthly Per capita Consumption Expenditure of the respondents have been summarized in table.1

Table 1. Distribution of the Respondents According to the Socio-Economic and

Demographic Characteristics, (n=400)

Sl. No	Variables	Category	No of respondents	Percentage of respondents	
1.	Age	Up-to 40	4	1.0	
		41 - 50	101	25.3	
		51-60	146	36.5	
		61 – 70	127	31.8	
		71 & Above	22	5.5	
2.	Gender	Male	343	85.8	
		Female	57	14.2	
3.	Marital Status	Unmarried	3	0.8	
		Married	352	88.0	
		Separated/ Divorced	1	0.3	
		Widow/ Widower	44	11.0	
4.	Religion	Hindu	103	25.8	
		Christian	205	51.2	
		Muslim	92	23.0	
5.	Educational	Illiterate	31	7.8	
	qualification	Lower Primary	146	36.5	
		Upper Primary	154	38.5	
		High School	66	16.5	
		Higher Secondary	3	0.8	
6.	Age at the time	Up-to 40	26	6.5	
	of diagnosing	41 - 50	131	32.8	
	illness	51 - 60	166	41.5	
		61& Above	77	19.2	
7	MPCE	Up to 1,000	141	35.25	
		1,001 - 1,500	157	39.25	
		1,501 - 2,000	81	20.25	
		2,001 & Above	001 & Above 21 5.25		

Source: Primary Survey Data

One-way ANOVA was carried out to compare the relative level of the physical, emotional and social dimensions of the health status of the marine fisher folks having heart disease in Kerala. Degree of freedom was corrected using *Huynh–Feldt* estimates (ϵ = .877), since there was violation of *sphericity (variance) assumption*, χ^2 (2) = 62.01, p < .001.

Table 2: Summary Statistics of the Dimensions of the Health Status of the

Sl.	Dimensions of	Mean	S D	Minimum	Maximum	N	
No.	Health Status	Score	5.2.	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	- Tritaxilli and		
1	Social	4.7	0.27	3.7	5.3	400	
2	Physical	4.5	0.34	3.4	5.2	400	
3	Emotional	3.6	0.29	2.7	4.1	400	
4	Global	4.2	0.30	3.2	4.7	400	

Marine Fisher Folk Cardiac Patients in Kerala, (N=400)

Source: Primary Survey Data

The results show that the relative level of the three dimensions of the health status of the marine fisher folks having heart disease in Kerala were significantly different, F(1.76, 700.20) = 6374.01, p < .001. Bonfferroni-adjusted pair-wise comparison shows that the level the physical health status of the marine fisher folk heart patients was significantly different from their emotional and social health status; similarly, the emotional health status of the heart patients was significantly different from their social health status. Thus, it is clear that the marine fisher folk heart patients had relatively better status with respect to their social health followed by their physical health, and their emotional health status was relatively weak.

Factors Influencing the Health Status: a Multiple Linear Regression Approach

To identify the factors influencing the health status of the cardiac patients among the marine fisher folk in Kerala, a multiple linear regression approach has been undertaken. The following linear regression model was identified after adequate specification search to examine the determinants of the health status of the cardiac patients among the marine fisher folk in Kerala:

$$Y_i = \alpha + \sum_{i=1}^{14} \beta_i X_i + \sum_{i=1}^{17} \gamma_i D_i + \varepsilon_i$$

where, α is intercept, β s are the slope coefficients for continuous explanatory variables, γ s are the coefficients of dummy independent variables, and ε is the *random disturbance* term. The 'global health status score' was taken as the dependent variable and there were 14 continuous variables and 17 dummy variables used as the independent variables in the model. These explanatory variables were included to measure the influence of 14 quantitative factors and 14 qualitative factors on the health status of the cardiac patients among the marine fisher folk in Kerala.

The model was estimated using the ordinary least square method (OLS). The model is free from specification bias as per *Ramsey's Regression Specification Error Test* (RESET), F(2, 365) = 1.0227, p=.0610. The *White's test* indicated that the estimation was not affected by the heteroscedasticity problem, LM = 51.675, p = .1456. The *Jarque-Bera* (*JB*) *test* revealed that the error terms was distributed normally, $\chi^2(2) = 3.392$, p = .0573. The *variance inflation factor* (*VIF*) revealed that there was no serious multicollinearity among the regressors. Therefore, valid inferences can be drawn from the estimated model.

The results reported that the model as a whole is statistically significant, F(19, 380) = 13.923, p < .001. The estimated regression model indicated that only three out of the 14 quantitative variables, and five out of the 14 qualitative dimensions had statistically significant influence on the health status of the cardiac patients from the marine fisher folk

in Kerala. To be more specific, the age of the patients and the duration of the heart disease had statistically significant positive effect on the on the health status of the cardiac patients from the marine fisher folk in Kerala.

The effect of the 14 qualitative factors on the health status was captured by incorporating 17 dummy variables into the regression model. The results suggest that the health status of the female patients were better than that of the male members. Similarly, the health statuses of the patients who are the active fisherman were better than that of the others. Likewise, the health statuses of the patients who live their own houses were better than that of the patients who live in rented houses and other places. In the same manner, the health statuses of the patients who were married were better than that of the patients having other marital statuses. Also, religion had significant influence on the health status of the patients in the population. The average health status of the patients belonging to the Hindu religion was significantly higher than that of the patients belonging to the Christian religion, but was lower than that of the patients belonging to the Muslim religion.

It is striking to note that no other socio-economic, demographic, behavioural, and risk related regressors was found to have a statistically significant influence on the health status of the cardiac patients from the marine fisher folk in Kerala.

Table 3: Multiple Linear Regression Results on the Factors Influencing the Health Status of the

Fisher Folk Cardiac Patients in Kerala

Method: Ordinary Least Squares (OLS) using observations 1-326, Dependent Variable: Health Status

Sl. No.	Explanatory variables	Unstandardized Coefficients		Standardized Coefficients	t-ratio	p-value	icance#
		В	Std. Error	Beta			Signif
0	(Constant)	3.644	.258		14.101	<.001	***
1	Age (in years)	.004	.002	.116	1.957	.051	*
2	BMI (Current)	004	.008	034	547	.585	Ns
3	Duration of the Disease (in years)	.054	.008	.859	6.683	<.001	***
4	Duration of Disease ²	002	.000	672	-5.457	<.001	***
5	Per Capita Consumption Expenditure (in Rs.)	3.181E-05	.000	.048	.897	.370	Ns
6	Per capita Income (in Rs.)	1.335E-05	.000	.107	1.577	.116	Ns
7	Household Size	.009	.014	.029	.620	.535	Ns
8	Tobacco Use Risk	045	.046	045	981	.327	Ns
9	Physical Activity Risk	012	.026	028	465	.642	Ns
10	Dietary Pattern Risk	038	.044	074	874	.383	Ns
11	Obesity Risk	047	.040	074	-1.198	.232	Ns
12	Diabetes Risk	.004	.017	.013	.260	.795	Ns
13	Blood Pressure Risk	013	.019	034	722	.470	Ns
14	Cholesterol Risk	004	.019	010	220	.826	Ns

(Table... Continued)

(Table... Continued)

Sl. No.	Explanatory variables	Unstandard Coefficient	dized ts	Standardized Coefficients	t-ratio	p-value	icance#
		В	Std. Error	Beta			Signif
15	Gender (Dummy Variable)	.149	.048	.174	3.064	.002	***
16	Location of Residence (Dummy Variable)	033	.029	056	-1.162	.246	Ns
17	Educational Status (Dummy Variable)	007	.036	008	184	.854	Ns
18	Thiruvananthapuram (Dummy Variable)	051	.046	086	-1.113	.267	Ns
19	Ernakulam (Dummy Variable)	080	.063	099	-1.283	.200	Ns
20	Employment Status (Dummy Variable)	.043	.044	.071	.969	.333	Ns
21	Active Fisherman ((Dummy Variable)	.085	.038	.124	2.222	.027	**
22	Coconut Oil Use (Dummy Variable)	036	.033	059	-1.083	.279	ns
23	Palm Oil Use (Dummy Variable)	002	.038	003	061	.951	ns
24	Oil Consumption Intensity (Dummy Variable)	.035	.041	.048	.857	.392	ns
25	Vegetable Consumption Intensity (Dummy Variable)	.034	.036	.057	.948	.344	ns
26	Fruits Intake Intensity (Dummy Variable)	005	.036	008	135	.892	Ns
27	Extra Salt Intake (Dummy Variable)	050	.034	084	-1.476	.141	Ns
28	House Ownership Status (Dummy Variable)	.188	.078	.108	2.403	.017	**
29	Hindu ((Dummy Variable)	104	.058	153	-1.813	.071	*
30	Christian (Dummy Variable)	159	.049	266	-3.247	.001	***
31	Marital Status (Dummy Variable)	.136	.042	.148	3.246	.001	***

Notes: # *** indicate significant at 01 percent level, ** indicate significant at 05 percent level, * indicates significant at 10 per cent level, and '*ns*' *indicates* not significant.

1.4 Summary and Conclusion

Diseases and its treatment especially that of chronic illnesses affect not only the individual concerned or his/her household but also the economic development of a nation in terms of deteriorated quality of life. Recalling the famous quote health is not just the absence of disease but the provision of physical, social and mental wellbeing of individuals also, efforts should be targeted to raise the quality of life of those who are affected with chronic illnesses. The health status of the marine fisherfolk with cardiac illness interms of social and physical standards appeared to be better than that of the emotional wellbeing. Internally, what is needed is understanding among the household members along with proper care and support. But external factors such as adequate housing facilities, working conditions and encouragement to return to work (if needed but which depends on the health condition) are the major factors that can contribute to the improvement of their health status. Healthy diet followed by discipline in the case of personal behaviours such as avoidance of tobacco use, undertaking regular exercise along with regular healthcare checkups and medication can solve the life style health related problems to a great extent.

References

- Abbasi, M., Momenyan, S., Eslamimoqadam, F., Sarvi, F., & Khaki, I. (2017). 2. Validity and Reliability of the MacNew Heart Disease Health-Related Quality of Life Questionnaire in Patients with Heart Failure: The Persian Version. *International Cardiovascular Research Journal*, 11(4), 137-142.
- Antony, M., & S, A. K. (2011). Communication Parameters In The Marine Fisheries Sector Of Kerala A Study Of Kollam Coastal Villages. CMFRI Bullettin, 14-15.
- Aslesh, O. P., Mayamol, P., Suma, R. K., Usha, K., Sheeba, G., & Jayasree, A. K. (2015, August 14). Level of physical activity in populations Aged 16 to 65 years in rural Kerala, India. Asia Pacific Journal of Public Health, 28. Retrieved from <u>https://doi.org/10.1177/1010539515598835</u>
- Bergner, M., & Rothman, M. L. (1987). Health Status measures: An Overview and Guide for selection. Annual Review of Public Health, 191-210.
- Dempster, M., & Donnelly, M. (2000). Measuring the health related quality of life of people with Ischemic heart disease. *Heart, 83*, 641-644.

Department of Fisheries (2005) Marine fisheries of Kerala at a glance 2005. http://www.fisheries.kerala.gov.in/

- Edelman, D., Williams, G. R., Rothman, M., & Samsa, G. P. (1999). A comparison of three health status measures in primary care outpatients. *Journal of general internal medicine*, *14*(12), 759-62 <u>https://doi.org/10.1046/j.1525 1497.1999.09278.x</u>
- Hofer, S., Lim, L., Guyatt, G., & Oldridge, N. (2004, January 8). The MacNew Heart Disease health related quality of life instrument: A summary. *Health and Quality of Life Outcomes*, 2(3). Retrieved July 23, 2019, from http://www.hqlo.com/content/2/1/3
- Hofer, S., Saleem, A., Stone, J., Thomas, R., Tulloch, H., & Oldridge, N. (2012). The MacNew Heart Disease Health-Related Quality of Life Questionnaire in Patients with Angina and Patients with Ischemic Heart Failure. *Value in Health*, 15(1), 143-150. Retrieved from https://doi.org/10.1016/j.jval.2011.07.003
- Kaerlev, L., Dahl, S., Nielsen, P. S., Olsen, J., Hannerz, H., Jensen, A., & Tuchsen, F. (2007, October). Hospital Contacts for Chronic Diseases among Danish Seafarers and Fishermen: A Population-Based Cohort Study. *Scandinavian Journal of Public Health*, 35(5), 481-489. doi:10.1080/14034940701267385
- Lim, L. Y., Valenti, L. A., Knapp, J. C., Dobson, A. J., Plotnikoff, R., Higginbotham, N., & Heller, R. F. (1993). A self-administered quality of life questionnaire after acute myocardial infarction. *Journal of Clinical Epidemiology*, *46*, 1249-1256.
- Mendis, Shanthi., Puska, Pekka., Norrving, B., World Health Organization., World Heart Federation., World Stroke Organization (2011). Global atlas on cardiovascular disease prevention and control / edited by: Shanthi Mendis ... [et al.]. World Health Organization. <u>https://apps.who.int/iris/handle/10665/44701</u>

- Murray, C. J., & Lopez, A. D. (1997). Alternative projections of mortality and disability by cause 1990–2020: Global Burden of Disease Study. *Lancet*, 1498–1504. doi:10.1016/S0140-6736(96)07492-2
- Nair, D. (2017, October). Noncommunicable disease burden in Kerala. *International Journal of Development Research*, 7(10), 15846-15850. Retrieved from <u>http://www.journalijdr.com</u>
- Pougnet, R., Pougnet, L., Lodde, B., Canals-Pol, M. L., Jegaden, D., Lucas, D., & Dewitte, J. D. (2013). Cardiovascular risk factors in seamen and fishermen: review of literature. *International Maritime Health*, 64(3), 107-13.
- Rector, T. S., Kubo, S. H., & Cohn, J. N. (1987). Patients' self-assessment of their congestive heart failure: Content, reliability, and validity of a new measure, the Minnesota Living with Heart Failure questionnaire. *Heart Failure*, *3*, 198-209.
- Shah, B., & Mathur, P. (2010). Surveillance of cardiovascular disease risk factors in India: The need & scope. *The Indian Journal of Medical Research*, *132*(5), 634-642. doi:10.4103/0971-5916.73420.
- Spertus, J. A., Winder, J. A., Dewhurst, T. A., Deyo, R. A., Prodzinski, J., McDonell, M., & Filhn, S. D. (1995). Development and evaluation of the Seattle Angina Questionnaire: A new functional status measure for coronary artery disease. *Journal of the American College of Cardiology*, 25, 333-341.

- Thankappan, K. R., Shah, B., Mathur, P., Sarma, P. S., Srinivas, G., Mini, G. K., . . . Vasan, R. S. (2010). Risk factor profile for Chronic non communicable diseases results of a community based study in Kerala, India. *Indian Journal of Medical Research*, 131(1), 53-63.
- Thompson, D. R., Jenkinson, C., Roebuck, A., Lewin, R. J., Boyle, R. M., & Chandola, T. (2002). Development and validation of a short measure of health status for individuals with acute myocardial infarction: the Myocardial Infarction Dimensional Assessment Scale (MIDAS). *Quality of Life Research*, 11, 535-543. doi:10.1023/A:1016354516168

Tullis, D. E., & Guyatt, G. H. (1995). Quality of life in cystic fibrosis. *Pharmacoeconomics*, 8, 23-33.

Valenti, L., Lim, L., Heller, R. F., & Knapp, J. (1996). An improved questionnaire for assessing quality of life after myocardial infarction. *Quaityl of Life Research*, *5*, 151-161.