MORBIDITY DUE TO CHRONIC DISEASES IN THE AGED POPULATION

AN URBAN, RURAL AND COASTAL COMPARISION

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CERTIFICATE

This is to certify that the study entitled "MORBIDITY DUE TO CHRONIC DISEASES IN THE AGED POPULATION- *A RURAL URBAN AND COASTAL COMPARISON* " was done by Kalavathy. M. C, under the guidance of Dr. K. R. Thankappan, Dr. N. Krishnaji and Dr. P. S. Sharma , in partial fulfillment of the regulation laid by the Sree Chithira Thirunal Institute for Medical Sciences and Technology for the Master of Public Health Degree Examination.

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Associate Professor,	**Professor,**	**Assistant Professor,**
Guide.	**Co- guide.**	**Co- guide.**

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KALAVATHY.M.C.

MORBIDITY DUE TO CHRONIC DISEASES IN THE AGED POPULATION
-Urban/Rural/Coastal comparison

ABSTRACT

Background: The demographic and epidemiological transitions in Kerala state indicate the growing proportion of elderly in the population and increasing prevalence of morbidity due to chronic diseases. Though these developments have been well documented, there has been no systematic research on the public health consequences of a large aged population in terms of the perceived and observed prevalence of specific diseases in the elderly population.

Objectives: This study examines the prevalence of perceived and observed morbidity due to chronic diseases in rural, urban, and coastal samples of the elderly population.

Methods: Household surveys were conducted with a total of 360 people over the age of 60. Health histories of the last year were collected, specifically for hypertension, diabetes mellitus, chronic arthritis, chronic obstructive pulmonary disease and uterine prolapse. Data regarding treatment and socio-economic background were also collected for analysis. All participants in the study were examined by the researcher, a clinician, for observed signs of each condition, in order to analyze the proportion of unperceived diseases and morbidity perceived but not observed. Finally, focus groups interviews were conducted with people over age 60 and with Ward members to investigate the level of awareness and concern with morbidity due to chronic diseases and aging in health policy.

Results: Hypertension showed the greatest percentage of unperceived disease overall. The percentage of total unperceived disease varied significantly by area with coastal area showing the highest unperceived morbidity: 8.08%, 11.42% and 21.4% in urban, rural and coastal areas respectively, p= .015. The total perceived morbidity of arthritis, COPD, and diabetes mellitus were higher than the total observed morbidity; the difference was largest for arthritis. The rural area showed the most perceived morbidity without observed morbidity. Significant sex differences in prevalence were found for COPD, which is more prevalent in males, and arthritis, which is more prevalent in females. Uterine prolapse was most prevalent in the rural area, though the hysterectomy rate is lower in the rural than the urban sample, and almost nil in the coastal area.

Conclusions: The study results suggest that the greatest percentage of unperceived disease was found for hypertension, while the disease with the highest perceived without observed morbidity was arthritis. Unperceived disease was highest in the coastal region. Perception of disease where none could be detected was more frequently found in the rural sample. Focus groups with planning officials pointed a general lack of awareness regarding the health problems of the elderly, and indicated that this group was not a high priority in current planning. Elderly in the urban area were interested in prevention in policy, while the rural and coastal elderly were more concerned with access to health care free of cost. The study concludes that there is a high degree of morbidity due to chronic diseases in the elderly populations of Kerala. Public awareness and preventive measures are necessary, for example, in the form of screening centers, especially in the case of hypertension.

LIST OF CONTENTS **PAGE No**

MORBIDITY DUE TO CHRONIC DISEASES IN THE AGED POPULATION

-a rural urban and coastal comparison

Dr. Kalavathy.M.C.

PART 1. INTRODUCTION AND BACK GROUND

1.1. ***Aging of population - a world wide phenomenon-*** **The population demography worldwide has been changing dramatically in the past century. As life expectancy is increasing globally, the population of older people is expanding. In 1990, 9.2 % of the world population was aged 60 years or older[1] . Itally, which has the maximum number of elderly according to the latest statistics, is facing severe problems due to the heavy load of dependent population and decreasing proportion of working population [27].**

1.2. ***Aging in India-*** **India is also undergoing a demographic transition. Currently India ranks fourth among the world countries in terms of absolute size of its elderly population. The proportion of aged population to total population increased from 5.7 in 1951 to 6.6 in 1991 [2] . As per the given demographic trends, we can expect this number to increase further in the coming years.**

1.3. ***Aging in Kerala-*** **Kerala, the southernmost state of India, has achieved a very low fertility rate (below replacement level) and is far ahead of the other states of India in the demographic transition stage. Demographic transition, the decrease in birth rate and death rate, encompasses the phenomenon of "population aging,"**

an increase in the proportion of people aged above 60 in the population. The percentage of aged population is higher in Kerala and Punjab than other states.[3] Furthermore, the absolute number of aged in Kerala is higher than in other states. Since 1971 the decrease in Crude Birth Rate (CBR) of Kerala was much more pronounced than the decrease in Crude Death Rate (CDR). In 1961, Kerala had 2.2 million elderly and by 2023 the elderly population is projected to increase to 8.3 million[4] . The proportion of elderly population has been increasing steadily from 5.9% in 1961 to 7.52% in 1981 and 8.77% in 1991 . The median age of the population increased from 19.35 years in 1961 to 23.49 years in 1986. In addition, the old age dependency ratio increased from 11.33% in 1961 to 12.56% in 1990 and 14.4% in 1991[5]. According to one population projection, the old age dependency ratio will be 30.9% in 2026[6] .The life expectancy in Kerala in 1990 was 68 years whereas all-India life expectancy was 55 years

1.4.[7]. Clearly, the elderly represent an increasingly significant segment of Kerala's population. In 1991, the proportion of the old among the voters in Kerala was 12%, about one in eight, a considerable proportion by any standards .

1.4. *Epidemiological transition in Kerala* - Along with the demographic transition, Kerala is also undergoing an epidemiological transition. Kerala is experiencing simultaneous decline of infectious disease and rise in chronic diseases[8]. Kerala has a very well established network of health care system , both government (Govt.) and private.

1.5. ***Morbidity in Kerala -About perceived and observed morbidities-*** **Kerala always ranks first in morbidity rates among the states in India. A 1990 all- India survey reports that the prevalence rate of chronic disease in the general population is 23.5% and 17.1% in Kerala's rural and urban areas respectively (within a reference period of one month)[9] . During the course of mortality decline, age specific incidence rates of morbidity that can be perceived and observed should theoretically decline. However, the opposite has been the case. According to Kumar[8], the high morbidity rate found in Kerala can be explained in three ways:**

*** The high levels of reported morbidity are the result of statistical issues, reflecting problems in data collection.**

*** Morbidity is largely dependent on perception, and chronic morbidity is especially difficult to define; differences in reported morbidity rates implicate differences in perceptions of morbidity.**

*** Large differences in reported morbidity cannot be fully explained by differences in perception or reporting: they suggest real differences in illness burdens in the populations.**

Yet these statements are true in the case of reported (perceived) morbidity only. When we come to objective morbidity the exact situation is unknown[10]. The elderly constitute a high risk group for morbidity related to many diseases; this vulnerability may result from biochemical and morphological changes in the aging brain, a compromised immunity, and unfavorable psycho-social milieu[11] . Furthermore, there are differences in morbidity patterns between rural and

The epidemiology and natural history of many chronic diseases illustrate that chronic illness does appear more in the elderly. In any morbidity study among the elderly, the study of chronic health problems is critical. The mortality data of elderly give a general idea about the diseases that cause fatality among elderly, but they grossly underweigh the conditions which are ambiguous and non fatal, yet still give rise to significant morbidity affecting quality of life.

Morbidity studies have generally been based on the perceived morbidity or morbidity based on clinical examination, but studies rarely look at both [13]. Even in the case of general population morbidity studies, studies giving both perceived and observed morbidity are very rare. Geriatric studies comparing both categories of morbidities are still rarer. Murray [12] defines perceived morbidity as the morbidity which can be self perceived. Levels of perceived morbidity can vary from the levels of morbidity observed by physicians or other health workers. The clear relationship between self perceived and observed morbidity can be clearly identified only by studying both together.

1.6. *Rural, urban & coastal morbidity* -The current study sought to investigate the difference between perceived and observed morbidity as well as the rural, urban & coastal differences in these categories of morbidity. The study hypothesizes that urban elderly, because of their higher educational status, more awareness regarding diseases, and access to health care facilities, are more likely to report more morbidity than the actual morbidity. On the other hand, the rural elderly in spite of disadvantages in education and access may not be reporting much morbidity. Finally, in Kerala, there are also coastal elderly. The

areas of Kerala, which cover a population of around 2 million are characterized by a very low health achievements when compared with the other parts of Kerala [14]. The percentage of people below poverty line is also very high compared to other areas of the state. Though disease prevalence studies have been conducted among the coastal population, no study has reported on the coastal elderly morbidity.

Therefore, the present study chose to examine the perceived and the observed morbidity of the elderly due to diabetes mellitus, hypertension, arthritis, uterine prolapse and COPD in urban ,rural and coastal areas of Kerala.

PART 2.LITERATURE REVIEW

2.1.*The problem of aging & morbidity due to chronic diseases* - Morbidity in India and Kerala especially elderly morbidity - In a 1984 hospital based study, Panikar and Soman[15] reported the high morbidity rate in Kerala. They stated that the morbidity pattern in Kerala may be due to the high life expectancy in Kerala and emergence of diseases that affect a large number of elderly such as diabetes mellitus, hypertension and degenerative diseases. Based on a 1987 study, Kannan et al [16] also reported that the morbidity level in Kerala is much higher than other states. Data from certain studies shows the prevalence of hypertension to be 71.9% in above 50 population, asthma 44% & heart attack 44.6% . There are many studies on the morbidity of the elderly both inside and outside India. A 1972 study in a Rajasthan village found that all the elders in the study were suffering from chronic diseases, and many times multiplicity of diseases were present.[17] The National Sample Survey Organization of India found that the rural and urban elderly are experiencing nearly the same rate of chronic morbidity at 54% [18] .

2.2. ***Morbidity - urban & rural*** **-The lack of difference between rural and urban may be due to the problem of data collection on chronic morbidity through self-reported surveys; many people may not be aware of the fact that they are having the disease. However, according to other authors, the morbidity of the urban and rural elderly differ but the reports vary from one another [17].**

2.3. ***Elderly morbidity a public health problem-*** **Many authors have pointed out the rural/urban differences in the social/health difficulties faced by the elderly in the diverse contexts of Africa and Asia [19, 20] with the more added complexities of aging in the context of health transition[21].**

So it'll be interesting to look into the perceived and observed morbidity due to some chronic diseases in the elderly in the urban, rural and coastal area. And this study is an initial step for such a movement.

PART 3. OBJECTIVES OF THE STUDY

3.1. ***Research questions*** **-**

-How much is the perceived Morbidity and Observed Morbidity due to diabetes mellitus, hypertension, Arthritis, uterine prolapse and chronic obstructive pulmonary disease in elderly ?

-What is the kind of difference between perceived morbidity and observed morbidity in the aged population ?

-Does it differ between the Urban/ Rural / Coastal elderly?

3.2. *Objectives:*

*** To study the pattern of common diseases like diabetes mellitus, hypertension, arthritis, prolapse uterus and chronic obstructive pulmonary disease (COPD) in an urban , rural and coastal areas.**

*** To study the difference in the prevalence of unperceived morbidity due to diabetes mellitus, hypertension, arthritis & COPD in the urban, rural & coastal areas.**

*** To study the health seeking pattern in the urban/rural/coastal elderly (for the above mentioned diseases)**

3.3. Field of application of study results :

The area of HEALTH POLICY AND PLANNING especially with reference to the type and quantity of HEALTH CARE PROVISION FOR THE ELDERLY.

3.4. Out come variables :

*** The perceived prevalence of Diabetes mellitus, Hypertension, Arthritis, COPD and Uterine prolapse in Urban, Rural and Coastal aged population.**

*** The clinical prevalence of these five diseases in these aged population .**

*** The educational status, income status & living arrangements of the elderly.**

*** The system of medical care for these chronic conditions.**

*** The health care seeking pattern of elderly on a qualitative basis.**

*** The prevalence of Hysterectomy in the three aged female populations.**

PART 4. MATERIALS AND METHODS

4.1.Study site :

Sreekanteswaram ward of Trivandrum Corporation, Kerala - Urban sample .

Patharam ward of Sooranadu Panchayath, Quilon District, Kerala- Rural sample.

A unit of Christian Church , called Mampally Parish of Anchuthengu Panchayath, Quilon District, Kerala- Coastal sample.

4.2. Why these sites chosen :

Sreekanteswaram ward was chosen because it is an urban area in the capital of Kerala and also because it was convenient for the investigator to go for field work. It had the fantasy of being the home town of the investigator. The main economy of the area is a service sector economy, and the religious make up is 98% Hindus. The percentage of migrating population is very low (Personal communication with the Ward Councilor) . Another peculiar characteristic of this area is the high percentage of elderly in the population unlike other urban areas, around 9-9.5%.

In the rural area of the study, the percentage of the elderly is 9.5-10% in the population. Patharam ward was chosen because it represented a true rural area and the investigator had some personnel contacts there. The main economy is agricultural and the 40% of the population are below the poverty line (Personal Communication, Panchayath President). Another important characteristic of this area is the presence of a number of Cashew factories and Brick stones factories. The main attraction of the area was the fact that it was not in the Trivandrum district and it was not so far away from the home station of the investigator.

Mampally was chosen because it is a coastal area away from the capital of Kerala and a place which was not so far from the home town of the investigator. It was a typical coastal area with mainly fishing economy and the percentage of people below poverty line to be 70-80%. Out of the 300 households under one unit of the parish, there were 200 households with elderly population with a number of around 320. A separate list of these 200 households was prepared. Of these 50 households were selected covering a population of around 84. The percentage of elderly population comes to be around 123% of total population.

4.3. Type of study:

A cross sectional descriptive study with qualitative explanations also.

4.4. Materials of the study:

* Elderly population of above 60 years taken from the Sreekanteswaram Ward of Trivandrum Corporation . From the 1994 voter's list, a list of 410 house holds with elderly was prepared. From this every fourth house was taken and a list of 100 households was prepared randomly. These 100 Households were surveyed. The definition of urban is Census based.

* Elderly population of above 60 from the Patharam Ward of Sooranadu Panchayath of Quilon District. From the 1994 voter's list, a separate list of 430 Households with the elderly was taken. From this another list of 100 Households was prepared by taking every fourth house. These 100 Households were surveyed. This constituted the rural sample. The definition of the rural is Census based.

In both these cases the list of 100 Households was prepared randomly from the voters list.

*** Elderly population from the coastal area of Mampally, Anchuthengu,, Quilon - The definition of coastal is from the Kerala Government records.**

There were 250 family units under a Parish, which had 200 Households with above 60 population. From the list of this 200 households a separate list of 55 Households was taken randomly and were surveyed.

The total number of subjects in the sample is 360.

4.5. Diseases chosen for the study & Why these five diseases ?

Diabetes mellitus, Hypertension, Uterine prolapse, Arthritis & Chronic obstructive pulmonary diseases are the five diseases chosen for the study.

Hypertension is a disease with very high prevalence among the elderly. Blood pressure is easily obtainable, without any complicated investigations. Diabetes mellitus is another common disease which has to be assessed with blood sugar for accuracy. But in this study, only the Urine Sugar method is adopted, since the cost of field estimation of blood sugar for each subject is beyond the scope of the investigator. The Urine sugar method is easy and less expensive. The prevalence of arthritis is also very high among the elderly and the clinical examination of which doesn't require sophisticated methods. Uterine prolapse is also another condition which many women especially in the rural areas suffer from. The examination for the presence of this condition is also not sophisticated and

expensive. The prevalence of COPD among the elderly is high. The clinical examination of COPD is also easy.

4.6. Instruments used in the study: A questionnaire, sphygmomanometer for blood pressure reading, visual examination for uterine prolapse, auscultation for COPD, & clinical examination for arthritis are the instruments used for the quantitative analysis. In- depth interviews and Focus groups were used for the qualitative analysis.

4.7. *Data collection*

A house to house visit was done. The team consisted of the Doctor (the investigator) and a lady assistant. In the urban area the house identification was very easy, but getting the cooperation of the respondents was a big problem. In the rural area finding out the sample house which generally used to be apart, was a big problem. The field work was very difficult without a vehicle and some kind of male assistance. The MSS (Mahila Swasth Sangh) workers of the area were utilized for doing the field visit. In the coastal area, the services of the priest in the church and the young social activists were made use of. The house to house visit and spotting the sample houses were a real problem, even with the help of the volunteers.

If the proposed sample house is found locked or if the target person has died, then the next house on the right having elderly subject/subjects was taken. A questionnaire covering the socio-demographic and economic factors were taken . Questions on the history of conditions like diabetes mellitus, hypertension, arthritis, chronic obstructive pulmonary disease and prolapse uterus in the past

one year from the January 1997 to January 1998 were noted. These details are taken as the Perceived Morbidity (PM). The perceived morbidity due to diabetes mellitus was obtained by asking the subjects if they were aware of their diabetic status in the last year. All those who perceived themselves as diabetic, were having it diagnosed from some source. The presence of hypertension in the last one year was also obtained. The PM of arthritis was obtained by asking the presence of any joint pain, or any discomfort in any of the joints in the last one year. The perceived morbidity due to uterine prolapse was obtained by asking the question directly. the question was asked in a very confidential way, so that all women who was suffering from it, came out with a positive reply. In obtaining perceived morbidity of COPD, all those who complained of having cough and or wheeze for the whole last six months were included (The reason for taking such a cut off point is simple, because otherwise all who had simple cold and cough for less than one month duration started reporting). Those who were complaining of cough in between or for less than last six months were not included as perceived morbidity positives.

Next was the clinical establishment of these diagnoses. The observed morbidity due to diabetes mellitus was obtained by doing a urine sugar analysis, which was done for all the subjects. Subjects were asked to show the uristrix to the stream after voiding the initial sample All those who had a urine sugar other than blue were taken as positive. Those who had a normal urine sugar but are taking medication for diabetes mellitus are also considered as suffering from diabetes. All the persons who had an abnormal urine sugar were asked to get a blood sugar

check up from any source to confirm the initial reading. Out of 34 persons, fasting blood sugar (FBS) value of 27 people were reported to the investigator.

The Blood Pressure of each subject was measured at two stages, in the sitting position, using a Sphygmomanometer. One at the time of collecting the socio-demographic information (after ensuring 10 minute rest before reading) and the next after the other clinical examinations are over. The lower value of the readings was taken. In cases were the two readings were differed over a wide margin, it was made a point to revisit the persons in another sitting and repeat the recording. In those cases the readings repeated twice or two readings coming to be more or less the same (their average) is taken .The hypertension was defined as either Systolic Blood Pressure (SBP) above or equal to 140 mm of Hg or Diastolic Blood Pressure (DBP) equal or above 90 mm of Hg , or both of them together. Those who do not have a high blood pressure reading, but those who are on medication for hypertension are also included as hypertensives in calculating OM. Those with any one or more findings of joint crepitus, swelling, tenderness, thickening of joint were taken as clinically positive arthritics. Those who were not having any of the above signs, but taking treatment for arthritis were also taken as positive cases of arthritis. The non ambulatory cases due to arthritis were also included, but all of them had some of the above findings also. Every subject was examined for arthritis, in the sitting posture. After this, all of the women subjects (who didn't have a hysterectomy done already) were taken to a private area and were asked to strain to see the prolapse of uterus, if any, by the lady assistant. Those who had a prolapse of uterus were seen by the doctor also. No vaginal examination was done,

except in three cases (not having prolapse uterus). All the cases were third degree prolapse or procidentia. The COPD was examined by auscultatory findings. All those who had crepitations, rhonchi, wheeze or combination of the above were taken as positive cases. After completing these procedures, history of any other major disease in the last year is collected based on Doctors diagnosis, reliable history, treatment taking etc.

All the persons who were in need of some kind of medical intervention, were given advises accordingly. Those who were in need of preventive and promotive advises were also served.

4.8. ***In depth interviews & focus groups*** **- A qualitative type of analysis of health care seeking pattern was also done. In-depth interviews were carried out with some of the subjects who participated in the study and also some who didn't participate in the study. Focus group interviews were done with beneficiaries i.e. elderly population and the people who are supposed to be the decision makers. In the urban area this was the Ward councilor, in the rural and coastal areas were the ward members and Panchayath Presidents.**

4.9. Data analysis :

The data was stored in the Excel software and was analyzed in that and SPSS.

PART 5-RESULTS

5.1.*Sample characteristics* :

The study population consists of 136 subjects from the urban area, 140 subjects from the rural area and 84 subjects from the coastal area. There are 192 females and 168 females.

Figure 1

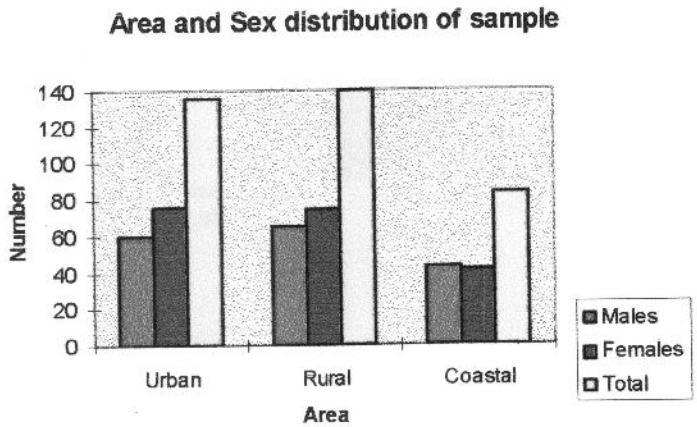
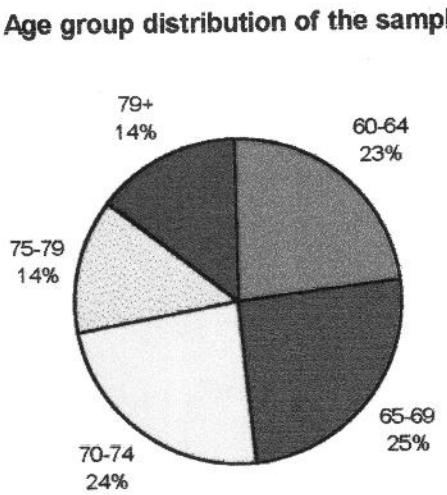


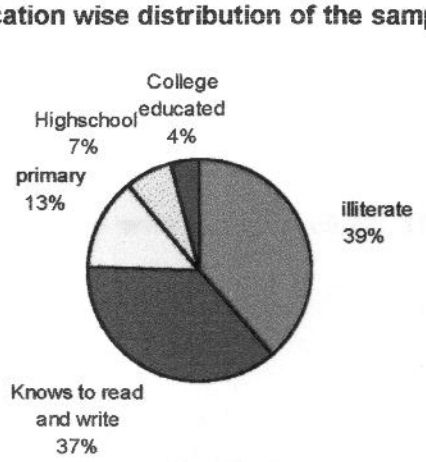
Figure 2



The mean age of the sample was 70.07 years.

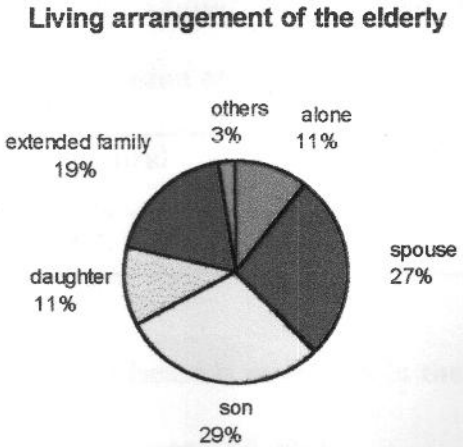
44.4 % of the elderly are having their own house in the given sample. The percentage living with " others " is the least. There is 6.4 % living in rented houses.

Figure 3



38.6 % of the above 60 are illiterate according to this sample. The percentage is decreasing from lower education to higher education.

Figure 4



This figure shows that 27% of the subjects live with their spouse.

25.27 % of the population does not have any monthly income. The largest percentage i.e. 58.05% is having an income of less than 1000.

The family income distribution shows that 63.86 % of the population is having the income of less than 1000 per month.

22.5 % of the sample have 5 living children. 20.6% have only 3children. The percentage is minimum with 1 living child. The mean living children of the sample was 4.03.

5.2. Morbidity:

Morbidity is defined as presence of disease either perceived or clinicall established. The morbidity status in each area was taken in relation with many variable Perceived morbidity is PM and observed morbidity is OM. The total PM due to any the five diseases in the study sample was (247/360= 68.6%) 68.6%. The total OM due t any of the five diseases in the sample was (274/360= 76%) 76%.

Table 1 - Area wise distribution of morbidity due to any of the five diseases (%)

urban		rural		coastal		total	
PM	OM	PM	OM	PM	OM	PM	OM
72	77	71.4	73.5	58.3	78.6	68.6*	76*

The PM due to any disease is minimum in the coastal area, whereas the OM due any disease is maximum in the coastal area.

Table 2 - Area wise distribution of morbidity due to each disease(%)

condition	urban		rural		coastal	
	PM	OM	PM	OM	PM	OM
Diabetes	21.1	17.2	10.9	11.45	7.13*	8.3*
Hypertension	33.3	54.3	17.6	44.6	22.6	52
Arthritis	30	21.8	37.7	22.25	16.8*	8.4*
Uterine prolapse	6.58	6.58	12	12	14.6	14.6
COPD	12.5	11.7	17.6	15.4	26	23.9

Both diabetes mellitus and arthritis show a lower prevalence both by PM and OM in the coastal area.

The total morbidity e.g. the morbidity due to any of the above five diseases in different age group was also taken.

Table 3- Total PM and OM distribution among age groups

age group	PM %	OM %
60-64	48.19	51.81
65-69	46.66	53.34
70-74	50.58	49.42
75-79	69.38	30.62
80+	53.84	46.16

The PM is maximum in the 75-79 age group followed by 80+ group.

5.2.1. Diabetes mellitus:

Table 4-Total PM and OM of Diabetes mellitus

Condition	Number	% prevalence out of 360
PM	49	13.6
OM	46	12.77
Difference	3	.83

This shows that the overall OM for Diabetes mellitus is more than the PM.

Table 5 - Sex & area wise distribution of PM and OM of Diabetes mellitus

condition	U(%)		R(%)		C(%)	
diabetes	m	f	m	f	m	f
PM	15(25)*	13(17.1)	9(13.8)	6(8)	3(6.97)	3(7.3)
OM	12(20)*	11(14.47)	8 (12.3)	8 (10.6)	3(6.97)	4 (9.7)
total	60	76	65	75	43	41

Both the PM & OM of diabetes mellitus was maximum in the urban males. The difference between the two was also maximum in the urban area.

Table 6-The FBS profile of those who had abnormal urine sugar :

FBS value	Number	%
<120	0	0
120-179	21	77.77
180-219	4	14.8
220-259	2	7.4
>259	0	0

The maximum numbers of patients have a FBS in the range of 120-179.

5.2.2.Hypertension:

Table 7- Total PM and OM of Hypertension

Hypertension	Number	% prevalence out of 360
PM	89	24.7
OM	183	50.8
Difference	-94	-26.13

Table 8-Area wise distribution of PM & OM of hypertension

condition	U(%)		R(%)		C(%)	
hypertension	m	f	m	f	m	f
PM	20(33.3)	25(33.3)	9(13.8)*	16(21.3)	11(25.6)	8(19.5)
OM	31(51.66)	45(56.9)	25(38.5)	38(50.66)	26(60.5)*	18(43.9)
total	60	75	65	70	43	40

The PM of hypertension is lower than the OM for hypertension in all the areas. The PM is minimum in the rural males and the OM is maximum in the coastal males.

5.2.3 . Arthritis:

Table 9-Total prevalence of Arthritis

Arthritis	Number	% prevalence out of 360
PM	111	30.8
OM	70	19.4
Difference	41	11.4

The difference of PM and OM is coming to be 11.4 %.

Table 10-Sex & area wise distribution of PM and OM of Arthritis

condition	U(%)		R(%)		C(%)	
arthritis	m	f	m	f	m	f
PM	11 (18.3)	32 (42.1)	17 (26.15)	37 (49.33)	5 (11.62)	9 (21.95)
OM	8 (13.33)	23 (30.26)*	9 (13.84)	23 (30.66)*	2 (4.65)	5 (12.19)*
total	60	76	65	75	43	41

The PM of arthritis is high when compared to the OM in all the three areas. The rates are more for females in all the regions.

5.2.4. Prolapse uterus :

Table 11- Total PM and OM of Prolapse Uterus

Prolapse uterus	Number	% prevalence out of 164*
PM	18	10.9
OM	18	10.9
Difference	0	0

***164 = total females- number of hysterectomies**

Table 12- Area wise distribution of Prolapse Uterus

condition	U(%)	R(%)	C(%)
Prolapse uterus	f	f	f
PM	4(6)	8(12.5)	6(14)
OM	4(6)*	8(12.5)*	6(14)*
out of total	65	64	40

The PM and OM for prolapse uterus were the same in all the areas. But both are high in the rural & coastal areas.

Table13- Area wise distribution of reason for not doing hysterectomy(hyst)

why hyst not done	urban	rural	coastal
financial	1(25)	9(69.23)*	6(100)*
no oneto care for	2(50)	2(15.38)	
do not bother	1(25)		
others	1(25)	2(15.38)	

The main reason for not doing hysterectomy in the rural and coastal areas is financial problems. In the urban area lack of care givers at home was stated as the main reason.

Table 14- Prevalence of hysterectomy in Urban , Rural and Coastal areas

Condition	U(%)	R(%)	C(%)
Hysterectomy done	11 (16.17)	11 (14.67)	1 (.57)
Hysterectomy not done	not 57 (83.8)	64 (85.33)	38 (99.4)

The prevalence does not vary much between the urban and rural areas. But in the coastal area it is very low.

5.2.5. Chronic Obstructive Pulmonary Disease (COPD):

Table 15- Total prevalence of COPD

Total prevalence of COPD	Number	% prevalence out of 360
PM	61	16.94
OM	50	13.89
Difference	11	3.05

Out of the total sample , 16.9 % is reporting COPD, out of which OM is present in 13.89 % only.

Table 16- area and Sex wise distribution of COPD

condition	U(%)		R(%)		C(%)	
COPD	m	f	m	f	m	f
PM	11 (18.33)**	5 (6.57)	22 (33.84)*	1 (1.33)*	14 (32.55)	8 (19.5)*
OM	10 (16.77)	5 (6.57)	20 (30.8)	0	13 (30.2)	2 (17.5)

Generally the rates are high in males , and relatively low rates in urban males.

In addition to the specific diseases named above, any other major diseases if present, were inquired about and data was collected.

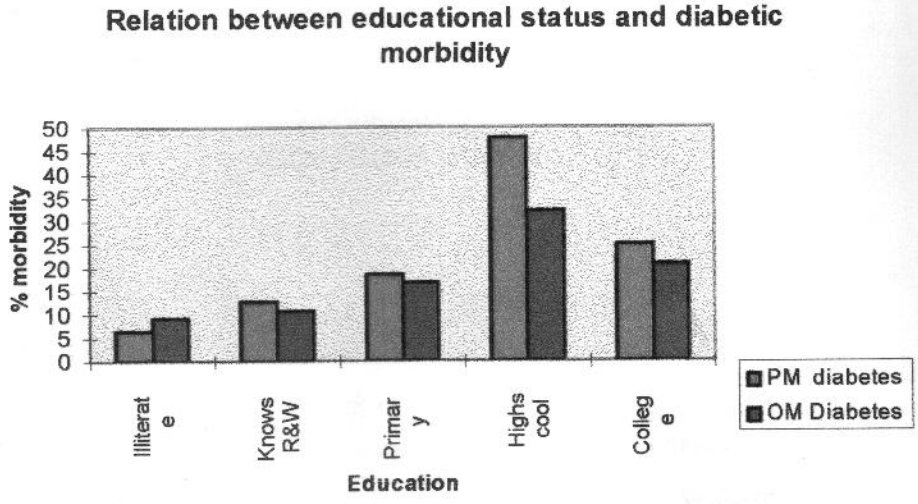
Mainly 16 types of diseases were reported either alone or in combination. Many of the conditions were clubbed together and data was collected. Important problems like loss of vision, impaired hearing, filariasis, pulmonary tuberculosis, cancer, hemorrhoids, cardiovascular problems, neuro-degenerative conditions like stroke, movement disorders & seizures etc. are collected as such. There are multiple coexistence of these diseases. Due to the small number of figures in each column, both rural and coastal are combined together for analysis. The conditions were analyzed both in the rural urban basis and male female basis (Data not shown). The incidence of cardiovascular diseases other than stroke shows a high prevalence in urban population (5.33%) and the males (7.7%). Nutritional deficiency disorders including anemia shows a strong rural urban difference and sex difference (being 7.14% and 12.4% respectively in males and females, 2.66% and 12.88% being respectively in urban and rural population) .Nuero-degenarative conditions including stroke, seizures and

dementia show more prevalence in urban and male population. Filariasis is present in urban elderly only, and does not show a strong sex difference(4% in urban and 0% in rural). Those who were included as pulmonary tuberculosis positive, were either taking treatment for that, or were supposed to take that, but stopped due to some reasons (3.57% and .54% in males and females respectively, .44% and 2.66% in urban and rural respectively). All those who are reported as having stroke, were suffering from active paralysis or were just recovering.

Some *socio-economic factors* were also cross tabulated with the morbidity status.

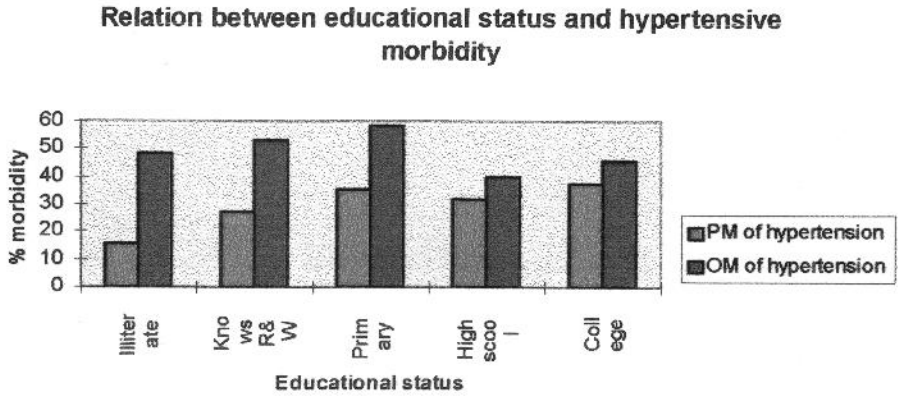
5.3. *Education and morbidity*

Figure 5-



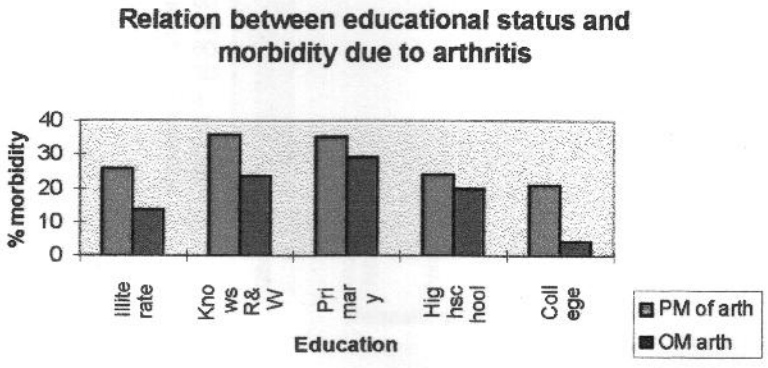
It is seen that the illiterates are the only group with a low PM than OM for diabetes.

Figure 6-



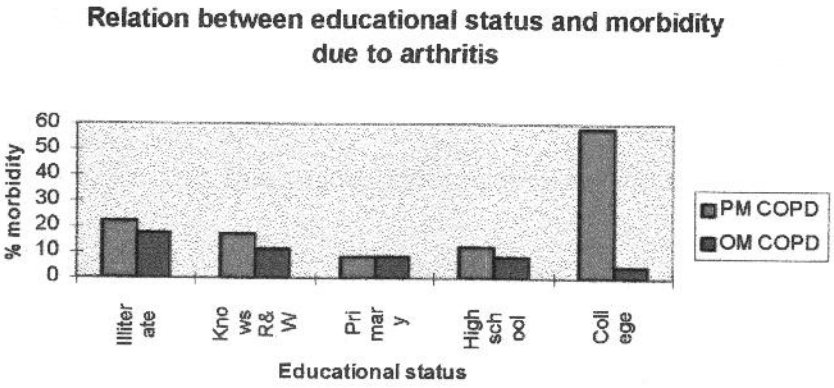
The illiterate group has the minimum PM of hypertension, and the difference between the PM and OM is also maximum here. The Professionally educated have both same.

Figure 7-



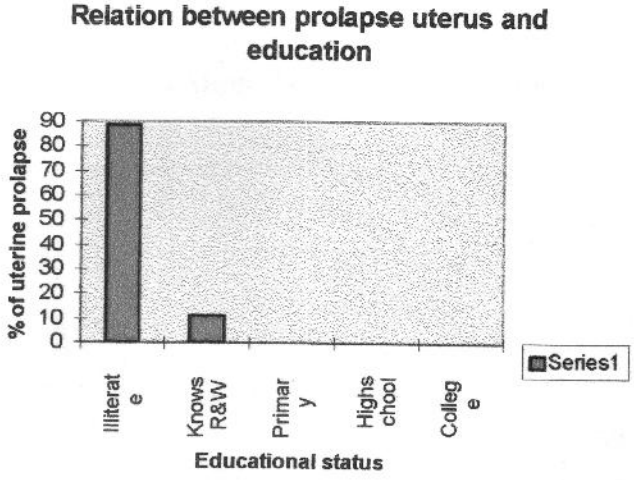
Both OM & PM for arthritis is maximum in the primary educated group. The difference between the PM and OM is maximum in the college educated group.

Figure 8-



The PM is highest in the college educated people, but they are having the maximum difference between the PM and OM.

Figure 9 -



Among those with uterine prolapse, maximum fall into the illiterate category.

5.4. ***Monthly income and morbidity***

Out of the 27 males with diabetes mellitus, 2 i.e. 7.4 % belong to the no monthly income category. The PM due to almost all the diseases is higher in the

lowest monthly income group of <1000 Rs. In the case of uterine prolapse, the prevalence is there in the lowest income group only.

Figure 10- Relation between Monthly income and PM in males

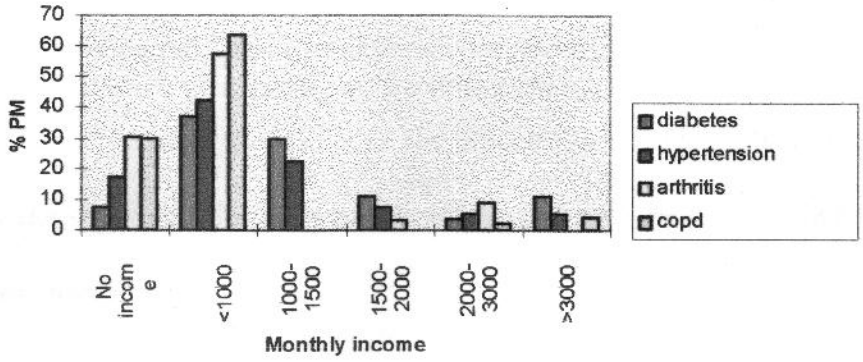
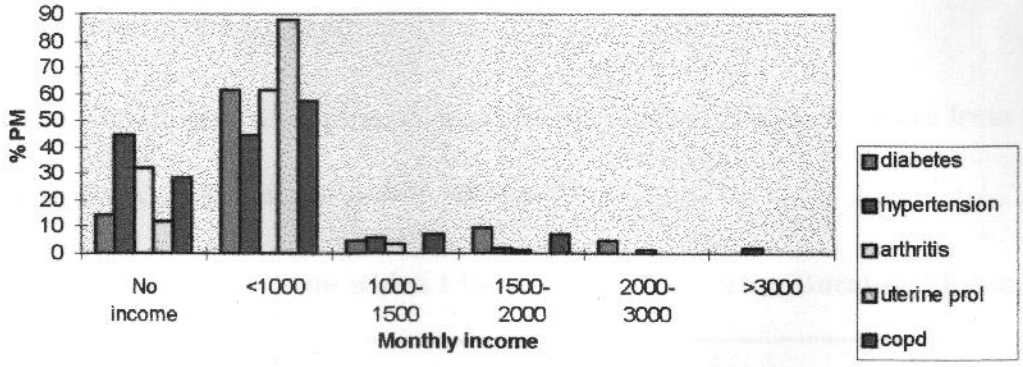


Figure 11- Relation between Monthly income and PM in females



The relation between monthly income and OM is not calculated here.

5.5. Treatment taking pattern

Table 17-The reason for not taking medication in the urban/rural/coastal elderly:

Reason	U	R	C
Financial	11(28.9)	17 (36.95)	7(87.5)*
Nobody to care	3(7.89)	7 (15.2)	
Do not bother	11(28.94)*	10 (21.7)	1 (12.5)
*Non pharm means	22(57.89)*	16 (34.78)	

*** Non pharmacological means are anything which the subject does in order to control his/her disease status like doing exercise, dietary restrictions etc.**

The financial problems as the reason for not taking treatment was stated less by the elderly in the urban area, whereas it was the most stated reason in the rural and coastal area.

In all these cases the treatment history of diabetes mellitus, hypertension and arthritis only were taken into consideration, because for the other two conditions, there was no definite treatment taken by the elderly.

5.6. Sources of treatment

The FBS done by the subjects, was computed according to the place from where it was done, i.e. private or public laboratories.

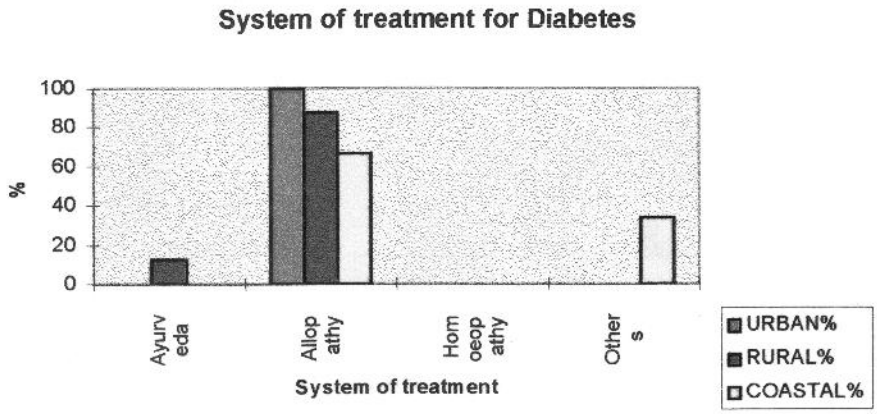
Table 18-Sector from which FBS were done in Urban, Rural and Coastal areas

FBS done where	urban	rural	coastal
Private lab	2(12.5)	8 (72.7)*	4 (57.2)
Govt. lab	12 (75)*		1 (14.3)
Not done	1 (6.25)	3 (27.3)	1 (14.3)
No information	1 (6.25)		1 (14.3)

Majority of persons in the urban area got their FBS from the private sources , whereas majority in the rural persons got their FBS done from the same source.

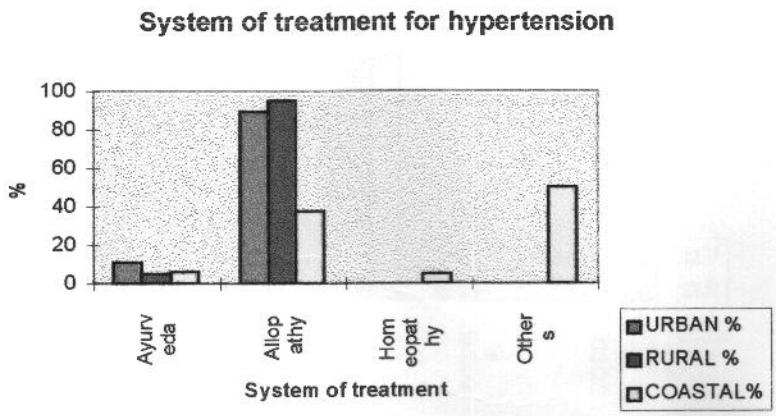
5.7. System of treatment

Figure 12-



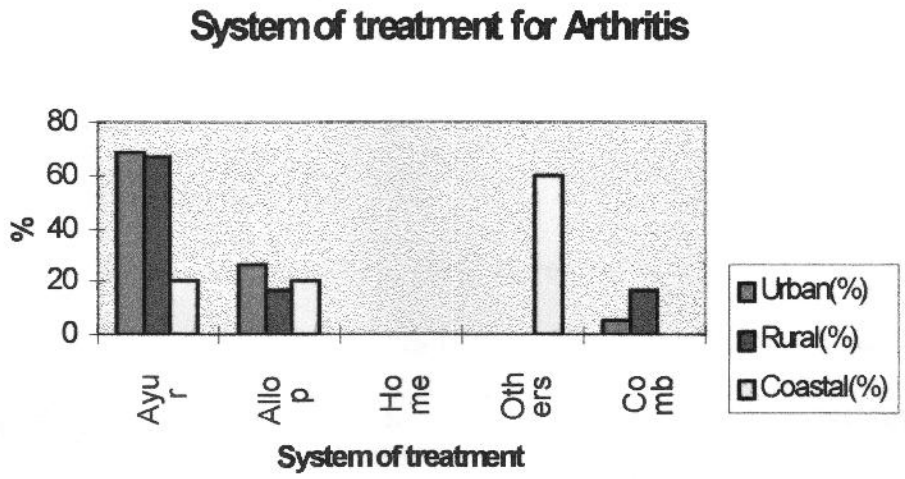
The treatment for diabetes mellitus is mainly allopathic in the urban area, however the rural and coastal areas used other systems of treatment also. The percentage of people taking homeopathy and other systems are more in the coastal area.

Figure 13-



The main system of treatment for hypertension is Allopathy in the urban and rural areas. In the coastal area people depend on "others" also for treatment.

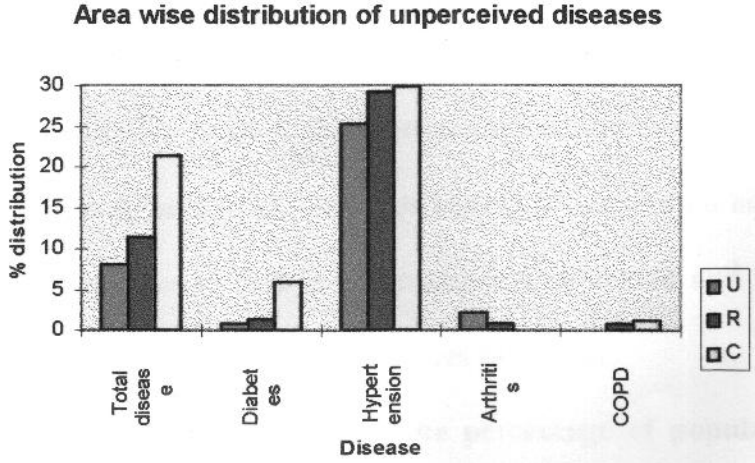
Figure 14-



Of those who are taking medication for arthritis, 68.4 %, 66.66% & 20% respectively in the urban, rural and coastal area are depending on Ayurveda.

5.8. Difference between PM and OM-

Figure 15-



The difference of PM and OM is used to calculate the amount of silent diseases present in each area. Those with no PM but with only OM are taken as having unperceived diseases.

This shows that in the urban area 8.08% of urban subjects were not aware of the fact that they're having any of the five diseases. The percentage reaches to 21.4 in the coastal area. In the case of all the diseases except arthritis, the percentage is increasing from urban to coastal area. The prevalence of unperceived diseases are computed against the educational status.

The p value for the urban, rural & coastal difference for the total disease is .015. The p value for the difference in undiagnosed diabetes mellitus is .0018. The p value for the difference in undiagnosed hypertension is .0438. The p values for difference in arthritis and COPD show that they are not significant.

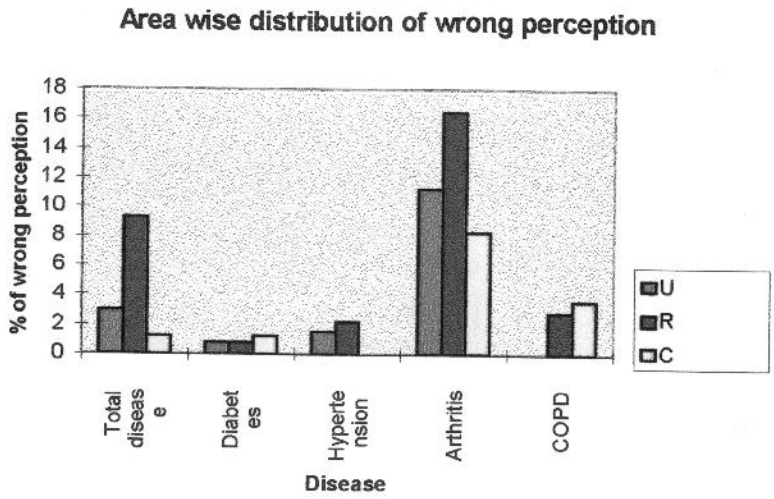
Table 19 - Relation between education and total unperceived diseases

Education	Total diseases unperceived
Illiterate	15.1
knows to read&write	12.78
Primary	10.41
Highschool	4
College & Professional	6.66

The percentage seem to be decreasing from the illiterates to highly educated. The odds ratio for relation ship between education and having any of disease among diabetes mellitus, hypertension, arthritis and COPD shows an association. The OR increases from 1 in illiterates to 5.32 in the highschool educated and then 2.39 in the college educated group. The p value for trend comes to be .048.

Now let us look into the percentage of population who perceive wrongly that they're having any of these five diseases.

Figure 16-



The percentage of elderly who had a wrong idea of having a disease, while no having it (according to the techniques used in this study), is very high in the rural area The percentage of wrong perception about diabetes mellitus is high in the coastal area whereas the percentage for hypertension is 0 in the coastal area. The percentage fo arthritis is maximum in the rural area, but the percentage for COPD is high in the coasta area.

Table 20- Education wise distribution of wrong perception of having diseases

Education	Total diseases wrongly perceived %
Illiterate	6.47
knows to read&write	3.75
Primary	2.08
Highschool	4
College & Professional	13.33

The percentage seems to be very high in the highly educated groups. At the sam time the illiterate group is having the next highest value.

5.9. Sensitivity of the method of obtaining PM

The sensitivity of the method of obtaining PM in detecting OM for the five diseases together was calculated area wise.

Table 21 - Sensitivity of obtaining PM for five diseases (all areas)

	OM+ve	OM -ve		
PM+v	229	18		
PM-ve				
Sensitivity=	45	68	229/274=	83.57%
Specificity=			68/86=	79%

Table 22 - Sensitivity of obtaining PM for five diseases in the urban area

	OM+ve	OM -ve		
PM+ve	94	4		
PM-ve	11	27		
Sensitivity=			94/105=	89.9%
Specificity=			27/31=	87%

Table 23 - Sensitivity of obtaining PM for five diseases in the rural area

	OM+ve	OM -ve		
PM+ve	87	13		
PM-ve	16	24		
Sensitivity=			87/103=	84.4%
Specificity=			24/37=	64.86%

Table 24 - Sensitivity of obtaining PM for five diseases in the coastal area

	OM+ve	OM -ve
PM+ve	48	1
PM-ve	18	17

Sensitivity=	**48/66=**	**72.7%**
Specificity=	**17/18=**	**94.4%**

The overall sensitivity of this method of obtaining PM is 83.57%. The sensitivity is maximum in the urban area, i.e. 89.9%, whereas it is minimum in the coastal area, i.e. 72.7%.

5.10. In- depth interviews & focus groups- **A qualitative type of analysis and inquiry into the health care seeking pattern of elderly was done in all the three regions. In the matter of from where getting medical advice from, in the urban area many of the elderly were of opinion that they depend on the private medical care sources for their problems. In personal in-depth interviews many of them had the opinion that, for proper care and medication , it is always better to go privately. Many were having the opinion that the facilities in the Government set up are of high quality, but they are heavily under utilized. The focus group interviews with the elderly in the urban area also pointed out these issues. The planners are not at all aware of the role the government has to do in providing health care for the elderly. One of the top official in the planning section was of opinion that the Government can not take the burden of treatment of the elderly. The role of prevention activity seemed to be well understood by all in the urban area, because almost everybody was reacting positively to the idea of Govt. involving in the preventive care for the elderly.**

In the rural area, the elderly were actually suffering from the lack of proper medical care. But the voluntary activists and the MSS workers etc. were of opinion that because this is Kerala ,where people are very anxious about their health,

they're taking their elderly to private hospitals. But many of the poor rural elderly were suffering.

In the coastal area many of the elderly were regularly attending the Primary Health CENTRE. Many of them were very happy about the services offered there and the medicines distributed there.

The frequency of medical visit was also inquired into. Many of the urban elderly were visiting their physician at least in a month. In the rural area also a small percentage was doing the doctor visit once in a month or twice in a month. The case is different in the coastal population. Majority of them visit "hospital " at least twice in a week.

PART 6-ANALYSIS AND DISCUSSION :

6.1. *Sample characteristics*- The median age of the sample population was 70 years. Figure 3 represents the true picture of the literacy in Kerala at 55-65 years back. In spite of the active literacy campaign the situation becomes this which may due to the fact that, once the literacy program was over, all those who were made literate, have totally forgotten reading and writing (even if they fell under the target age group of the literacy compaign) . So a major portion of the elderly are still illiterate in this sample, which is the finding in other studies also[22].

The number of living children shows the high level of fertility in Kerala 45-60 years back. 22.5% of subjects have 5 children and the number of subjects with 2 or less children are very low.

Coming to the living arrangement , the largest portion of subjects live with their sons. It is a common type of living arrangement throughout India. In addition, older people live with extended families and some live with their daughters also. The percentage of elderly living with others, meaning any body other than their own children, is very small. The data shows that a major portion of the elderly are living with their children or other close relatives. However, the percentage living alone is higher than what is seen in other studies[22].

A major portion of the elderly have their own homes (data not shown). Many of them are living in their own houses which is supposed to be given to their children after their death or is given to the children with the right for the elderly to live in that house till their death.

The monthly income distribution shows that 25.27% of the sample population does not have an independent monthly income . This again points to the worse condition which the elderly are in, in spite of the fact that they require a greater amount of money for their health expenditure.

6.2.Morbidity :

The total PM is less than the OM in the sample. This is surprising given the high literacy state and other socio-health indicators of Kerala. But , here we have to see that this study is limited to five diseases only and the age group of interest was the above 60 population. So we cannot say that the general PM in Kerala is lower than the OM. Moreover the method of diagnosing OM was also not different

from many other studies. So what we can say is that the OM due to these five diseases in this group of elderly was higher than the PM due to these five diseases. When we take the area wise distribution of the PM and OM we can see that the PM in the coastal area is very low, at the same time the OM is very high in this area. When we consider each disease, we can see that the prevalence of diabetes mellitus and arthritis decreases from urban area to coastal area. Diabetes mellitus is usually referred to as an affluent disease. So we can expect such a change. But when we take hypertension, we can see that the area wise change is not obvious. Hypertension is naturally a silent disease. So we can expect the PM to be lower in the case of hypertension.

The age group with maximum percentage of PM is 75-79. This is what is quite natural because, as age increases the prevalence of chronic diseases also increases. But it is surprising to note that, the maximum OM is in the age group of 65-69. After that the OM decreases. This may be due to the fact that long livers are more healthier than who die. But we can't commit anything unless we carry out the study in a large sample size.

The total OM of diabetes mellitus is less than the PM . The PM is more in urban males and urban females. But in rural area both PM and OM come down . But the interesting thing is that, in the rural elderly females the rates are low and also the PM is less than the OM. This is true in the case of coastal females also. The over all prevalence of diabetes mellitus even by OM is higher than in many other studies[17,23]. But in these studies they are depending on , FBS > 140 mg/dl or known diabetics , for estimating the prevalence of diabetes mellitus. In the present study,

we've resorted to urine sugar method only for the diagnosis of diabetes mellitus. The urine sugar estimation is a very less sensitive method of detecting diabetes mellitus. So there is greater chance of under diagnosing diabetes mellitus by this method. More over in the present study, we've included all those who are taking anti-diabetics also for calculating the OM. In a study done in Hong Kong 69+ population where both interview and physical examination were done simultaneously, the prevalence was seen to be 7.9%[24]

Coming to the hypertension, the situation changes. In all the areas , the PM is less than the OM. The OM rates are higher than other reported studies[23] . One explanation for this may be the difference in the basic case definition of hypertensives in the present and the referred studies. In the present study, any body having a SBP of 140 mm of Hg or above along with or not with a DBP of 90 mm of Hg or above and the vice versa are considered as hypertensives. In addition to these all those who had a normal BP measurement ,but taking anti-hypertensives were also included as hypertensives in calculating OM. Second explanation for a high OM in the study may be the fact that this was mostly a one time reading. Even though at least two readings were taken at least ten minutes apart in all the subjects, it was not feasible to repeat the readings in two sittings. Another explanation may be other studies were done in other states, where the expected prevalence rates may be much lower than Kerala. However, some earlier studies refer to much lower rates in Kerala also. Kutty et al in observed a prevalence rate of 272 and 323 per thousand persons (among males and females

respectively) in 60+ population[25]. Another striking feature is the high prevalence in the coastal population. Coming to the difference in the PM and OM, the difference is maximum in the coastal males whereas it is minimum in urban males. The reason may be the relatively high awareness of urban population regarding their BP status. An in-depth interview was conducted with some of the males who were taking anti-hypertensives, knowing that they're taking anti-hypertensives, but denied to admit that they're hypertensives. Then it was made clear that in some of the evening group meetings of the elderly in the city, many of these elderly exchanged their views regarding diseases especially hypertension . There it was a common opinion that there is no harm in taking half or one anti-hypertensive tablet each day, because it may prevent future development of hypertension. In the rural and coastal areas more percentage of people were not aware of the fact that they're are hypertensives. Many times hypertension is asymptomatic, and people ascribe the symptoms to many other disease especially in rural areas.

In the case of arthritis, the OM is lesser than the PM in all the areas. This can be well understood by the fact that, many times chronic arthritis does not show any signs at all. It is a common finding in all the studies. It is also obvious that the prevalence is high among the females. This is also in accordance with many other studies[26] . Coming to the difference in the PM and the OM of arthritis, it is more in the females. This may be an expression of the mental & other types of sufferings which the females are undergoing. According to a study done in Hong Kong, the OM of arthritis was 32%[24] . Coming to the difference in PM and OM, it is more

among the females, than males. The difference seems to be highest among the Professionally qualified group. The reason may be that, the higher educated group may be complaining even a minor complaint.

The uterine prolapse is a condition often compounded by both bladder and bowel continence and is just one example of a tragedy which millions of women in the developing countries silently endure throughout their elderly life leading to social isolation and being unwanted even in families in which they reside. According to this study both the rural and the coastal areas had a high prevalence compared to the urban area. This is what is expected normally, because elderly females in the rural setup tries to keep this thing hidden and never seek care due to many reasons. In the case of subjects with prolapse, when we inquired into the reasons for not doing the hysterectomy , we can see that in the rural and the coastal areas more percentage of the people do not go for hysterectomy because of financial problems. But in the urban area this is not an important reason. The difference between the PM and the OM for uterine prolapse was zero, because all the cases were third degree prolapse & could be identified very easily by the observer. Here we can argue that, whether it is true to say that only third degree prolapse can be perceived. In many cases it may not be. First and second degree prolapse also can have symptoms. But here main thrust was given to third degree prolapse (both in case of PM and OM) , because it was easily obtainable for both the morbidities. The high prevalence of prolapse uterus is slightly amazing, given the high literacy status of Kerala. So more detailed study involving more sample size is required in this matter. When we examine the prevalence of hysterectomy in

all the areas , we can see that it is almost the same both in the rural and urban areas. So we can say that the demand for hysterectomy is much high in the rural area and there is unmet need. The prevalence of hysterectomy is very low in the coastal sample.

The next condition examined is the COPD. The criteria for including any body in the OM category of COPD included presence of wheezing also. So the percentage of elderly having OM was high. These may be false positives. But it was smaller than the PM in all the areas. The prevalence both by means of percentage and absolute numbers were higher for rural and coastal males. Usually COPD is high in males, because of the prevalence of smoking. In a Hong Kong study the prevalence was 7.2%[25] . When the educational status was considered, the relation with the education is not so evident and the high prevalence shown in the Professionally educated group can not be considered significant, because the number was so small.

Other major diseases were also recorded. This was mainly based on self reporting, but at the same time supported by documentary or medication evidence as far as possible. The prevalence of cardiovascular diseases other than stroke showed was high in the urban and male population. The data collection was purely based on perception and some sort of documentary evidence and no present evidence such as ECG was taken. The stroke was considered along with other neuro- degenerative conditions. The data regarding filariasis is interesting in the sense that it was seen only in the urban area only. This is in accordance with the

common belief that, the Sreekanteswaram area is having high prevalence of filariasis, but no documentary evidence has come across so far.

Now let us consider the level of morbidity in relation to some of the socio-economic factors.

6.3. Education

The High school educated group is having both high PM and OM for diabetes mellitus followed by the college educated group. This shows that the diabetic status is low in the less educated group. This may be explained on the basis of changes in lifestyle with the increasing education. There may also be an access bias. Because of the fact that persons taking oral hypoglycemics were also considered in calculating OM for diabetes, people with more education who approach a Doctor as early as possible may continue to take it.

The prevalence of hypertension is more in the primary educated group. Another interesting finding is the decreasing difference between the PM and OM as the education increases. The OM actually decreases with increase in education. This may be because the educated mass may be aware of the situation and also taking treatment. So the condition might have been controlled . Even though we are including those who are on medication also, many educated mass might have gotten their condition diagnosed early , corrected it and stopped medication.

The prevalence of arthritis both by PM and OM are high in the primary educated group. After that the prevalence is coming down. This may be explained

in two ways. The highly educated group may be less prone to develop arthritis due to their lifestyle, or they may be controlling their arthritic status by promptly treating the condition.

The PM of COPD shows a high peak in the College educated group. But the OM is least in the group. This may be due to the fact that, the highly educated group is more corcerned about their cough, wheezing, etc., but they try to keep these things under control by appropriate means. The smoking status also has to do a lot with this, but the lifestyle details are not collected in this study. So all these studies point to the necessity of more detailed study, taking into consideration all the lifestyles and habits.

The prevalence of uterine prolapse is more in the illiterate group. The prevalence sharply comes down with increase in the education. This is quiet natural, because an educated female will never leave the condition untouched. It may also be correlated with the socio- economic status of these illiterate women.

So all together we can say that the effect of education on perception may vary between disease to disease. The fact that a society is highly educated does not necessarily means that, that particular society will be having more perceptions about the disease status. Regarding the OM, due to any disease, also may vary with the level of education. The high education in a society may have an influence in reducing the OM due to a particular disease by treating it and controlling it. But at the same time it may influence in increasing the OM of certain other disease

by increasing the number of persons taking medication (even with a normal disease status at the time of data collection). Moreover the role of education may be influenced by many other factors. So a detailed multifactor study is necessary to explore into this topic.

6.4. Income source

The next thing considered is the income source. The difference in the percentage of morbidity in those with different income source is shown in Fig10& Fig11. This generalization is too broad because, by the fact that they are just having income, does not take into account how much of that income they can spent at their own interest. This varies from the income of 6000 rupees per month to just 500 rupees per month. Any way it just guarantees that he/she may be getting at least that amount monthly. The monthly income refers to the income earned or accessible by that person alone.

Here the morbidity is high among the low socio economical groups. Even the so called affluent diseases like diabetes mellitus, hypertension, etc. are more in the low income groups. This may be because the high income groups are more aware of their disease status and might have treated them. But the relationship ship of the uterine prolapse and income is very marked. Diabetes mellitus and hypertension also seem to be more prevalent in the low income groups. At the same time we can see that in the group without any income, the prevalence of diseases is lower than the lowest income category. So what happens to the category with monthly income less than 1000?. These things point to the fact

diseases is lower than the lowest income category. So what happens to the category with monthly income less than 1000?. These things point to the fact that, the monthly income of the elderly alone may not be the only factor. More detailed studies are needed in this direction.

6.5. Treatment taking pattern

Next let us look into the medication history and the U, R and C status. The reason for not taking the medication varies between the different areas. In the urban area the financial problems avoid 28.9% of the elderly from getting proper treatment, whereas the percentage is 37 in the rural area. The percentage in coastal area is 87.5%. Coming to the non-pharmacological means of treating a disease, the urban area scores highest with 57.89 %. This may be explained on the basis of increased awareness of the urban population regarding healthy life styles.

For hypertension, in urban and rural areas majority of the elderly make use of allopathic medicines. In the coastal area more people make use of some other system of treatment. This "other" means some kind of medicines distributed by the street vendor, who visits the area once a week. This may be the reason for higher percentage of hypertension detected in the coastal area. People might have had a diagnosis of hypertension some years back and might have taken treatment from this source and now may be under the impression that the condition is controlled.

For diabetes mellitus in the urban area, 100 % make use of allopathy. Usually in urban areas people try to control the diabetic situation by non-pharmacological means and once it becomes uncontrollable they go in for allopathic treatment. In the rural area some people make use of Ayurvedic treatment also. There are some locally famous ayurvedic preparations for the treatment of diabetes mellitus. The coastal area elderly make use of some other sources of treatment.

In the case of arthritis, the picture is very different. The percentage of people making use of allopathy for treating arthritis very low in all the three areas. The data from Govt. Ayurvedic institutions show that the percentage of people approaching those institutions for treatment of arthritis is very high. It is a common practice in Kerala to use ayurvedic treatment for arthritis. Here this pattern is seen in the elderly also.

The system of treatment is looked into for three diseases only. Coming to the other two diseases, the treatment for prolapse uterus has already occurred. But the number of persons taking treatment for COPD is very less.

6.6. Difference between PM and OM

The concept of unperceived diseases is very important, because this represents the amount of hidden diseases in our elderly community. This also points to the lack of proper health awareness in a state like Kerala, which is supposed to be much advanced in terms health achievements than other parts of

India. The undetected and untreated patients with diabetes mellitus, hypertension, arthritis and COPD can land up in more complications and more load on health care. The untreated cases of Uterine prolapse may not give rise to life threatening complications, but the amount of suppressed agony and physical burden which an elderly female with uterine prolapse undergoes for years together is very high.

Unperceived diseases

The percentage of unperceived hypertension is very high in all the three areas. Next is the percentage of unperceived diabetes mellitus, but the percentage is very less than the hypertension. This may be due to the fact that the diabetes mellitus is symptomatic even in the early stages. But the symptoms of hypertension like, giddiness etc. can be ascribed to many other diseases and the patient may not take seek health care. But the presence this much unperceived hypertension in our elderly is a danger signal. The unperceived cases of arthritis and COPD are very negligible. The difference in the prevalence of any of these diseases, when these diseases are taken together, was statistically significant. The p value comes to be .015. So we can say that the percentage of undiagnosed cases of these four diseases when taken together will be more in the rural and coastal areas. In the case of diabetes mellitus , when taken alone, also the difference is significant. More cases of undiagnosed diabetes mellitus can be expected in rural and coastal areas. In the case of hypertension also the difference is significant. But when we come to arthritis and COPD the difference is not significant.

In table -19, we can see the percentage of unperceived diseases according to the education. We can see that the percentage is generally high in the illiterate group. this is quiet natural and we can expect this. Illiterate group is very likely to be economically disadvantaged also. So the possibility of 'good medical care' is very low among these groups. The percentage reduction of undiagnosed cases of diseases taken together with education was showing an increasing Odds Ratio. The p value for trend is .048.

Next, let us look into the percentage distribution of subjects who reported of having any of the four diseases (diabetes mellitus, hypertension, arthritis or COPD) in the last one year, but who were actually not having any clinical evidence of it. It is accepted that this depends greatly on the diagnostic techniques. But this analysis is done within this limitation.

Arthritis is the disease having more percentage of wrong perception. The percentage are very low for diabetes mellitus, hypertension & COPD. This need not mean that subjects were just wrongly reporting, but it may also mean that most cases of arthritis may not be clinically evident. The conditions like diabetes mellitus and hypertension can be easily diagnosed at least with laboratory examinations. So from this it is apparent that we can not ignore the condition s which are not clinically evident.

So here comes the importance of understanding both the PM and the OM. It is not the clinical presence of disease that matters, but it is the sufferings which

the elderly person undergoes which is important. But at the same time OM of diseases, which can suddenly bring about fatal and intense treatment demanding outcomes like cerebral hemorrhage, ischaemic heart disease or diabetic ketoacidosis, is very important.

6.7. Sensitivity of method of obtaining perception

The sensitivity of this method of obtaining perception is not bad and it actually decreases from the urban area to the coastal area. This shows that the percentage of people who reported as having a disease, when it was actually present (according to the tools used in this study), is minimum in the coastal area. This is shown by the high percentage of unperceived diseases in the coastal area. This may be different for different set of diseases, or if we take all the diseases rather than these five diseases only. So we can't generalize the finding.

In the case of specificity, it is minimum in the rural area and maximum in the coastal area. The percentage of people who report of not having any disease out of those who do not have any disease is more in the coastal area. This is shown by the low percentage of wrong perception of diseases in the coastal area.

6.8. *In depth interviews & focus groups-* In the next section, we will discuss the qualitative analysis of the health care seeking pattern of the elderly. In the urban area , the majority of the elderly were going to private hospitals for their treatment. None of them were getting any kind of preventive and promotive services. In this context , it is interesting to look into the public sector Vs private sector laboratory checking of the fasting blood sugar estimation . All those who

private sector laboratory checking of the fasting blood sugar estimation . All those who had an abnormal urine sugar were asked to do a fasting blood sugar checkup and inform the investigator. In the urban area, only 12.5% of the people who have done this obtained the test from the private laboratories, whereas 75% of the elderly got the test done from the Government sources such as Public Health Laboratory, General Hospital or Medical college Hospital. When we look deeper into the data we can see that these people are those who have enough resources to do it from the private sources. However, when we come to the rural area, we can see that 72.7% of the elderly got their FBS from the private sources. None of them got it done from the public sources. In the rural area 27.3% of the respondents didn't obtain a test from outside sources because they were unable to withstand the time and opportunity costs for themselves and their attendants, which may mean a loss of 200 rupees for a day of work missed. So even in Kerala, those who are in need of free services, are denied them due to other kinds of "costs". At the same time the affluent are being provided with all the free facilities. The frequency of medical care visits show some other interesting results. In the urban area as expected many people were going to the doctor once a month at least. Those without any evident disease were not going. Yet in the urban slum elderly the situation is very different. Many of them were visiting the nearby Fort Hospital, but were not satisfied with the care provided there. Since they don't have money, they were going there. In the rural area they were going to the doctor in the

nearby private clinic or hospital. The frequency of visit was not as regular as in the urban area. As one of the older women in the rural area commented, the waiting in the long queue of Government hospital is actually adding up to the sufferings of the elderly. So she always preferred private doctors and hospitals. However, this woman also said that her son asks her to go to the PHC where a doctor is there, but which is at a further distance. The coastal elderly, who suffer from more chronic diseases, were visiting the nearby PHC at least twice in a week. Upon looking into the morbidity pattern of hypertension etc., we can see the type of care they get from there. These poor elderly are approaching that center after traveling for a distance of 5 KM which is not a short distance as far as an elderly person of 70 who is malnourished, having chronic cough and giddiness is concerned. So even though we say that these conditions are problematic without any age consideration, when we come to the problems of the aged, we have to consider the special circumstances and difficulties the elderly face.

In the discussions with the elderly in all the three areas regarding the role which Government should take in the prevention and promotion activities for the elderly, in the urban area many elderly were very happy about the idea of prevention. But in the rural and coastal areas, the people were more in favor of increasing health care provisions free of cost. When the planners were interviewed in all the three areas, all of them except one or two in the urban area were of opinion that the Government is doing the maximum it can for the elderly . In their opinion,

the elderly pension (which is not more than 100 Rs per month) and the reservation for elderly in bus, train etc. is already in place as a provision for elders. The maximum level to which they are thinking is establishing more and more old age homes. Planners are welcoming the idea of preventive and promotive health, but they are unable to understand why it is important especially for the elderly. One person was saying that there is no use of prevention service among elderly at all.

PART 7 - LIMITATIONS OF THE STUDY

**** The sample size is very small which could not be done other wise within such a small time frame and the financial burden.***

**** The method of estimation of OM of Diabetes mellitus on the basis of Urine Sugar examination only is not reliable. The urine sugar has a sensitivity of 10-50 % only for diagnosing diabetes mellitus. This also was unavoidable due to the high cost of blood sugar estimation.***

**** The method of recording blood pressure twice in one sitting is also not usually recommended. This was also not feasible in this study due to the above mentioned problems.***

**** The life style factors are not measured in this study.***

**** Multivariate analysis is not done here because, individual disease is determined by different factors.***

PART 8 - CONCLUSION

The study's main objectives were to examine the types and prevalence of different chronic diseases among the elderly in the urban/ rural / coastal areas and the difference in perception and observation of those morbidities. The conditions of diabetes mellitus, arthritis (chronic), and COPD with lower OM than PM may point towards the importance of proper education of the elderly regarding the early signs and severity signs of these diseases. The very low PM of hypertension than OM points towards the lack of awareness of the elderly even in the urban area, regarding hypertension.

The elderly morbidity both in terms of PM and OM will be naturally high in a society like Kerala having low levels of infant mortality and high life expectancy (which are usually considered as the indicators of health of a community). The developed countries like US, show the same pattern, with a still higher prevalence of morbidity.

But, here we see a different pattern at least in the case of hypertension. Even though we can argue in terms of the observer disparity, still the percentage is high.

Policy implications of the findings

The proportion of unperceived diseases especially of hypertension points towards the lack of proper screening for these diseases even in the urban area. The necessity of setting up screening facility for common and serious chronic diseases in all the health care institutions is apparent here. In a place like Kerala, where

education is highly valued and sought, health education regarding these conditions should be possible. The high prevalence of prolapse uterus in the rural Kerala in spite of the widespread health care facility including private sector points to the unmet need of hysterectomy in the rural Kerala (since here we have dealt with third degree prolapse only, the recommended treatment is hysterectomy only). For cases in which hysterectomy cannot be done, some other supportive measures can be given. The differences in PM and OM, along with the

level of unawareness on the part of local politicians create a problematic picture of chronic morbidity in Kerala's elderly . We have to take some critical steps to avoid Kerala and India becoming a society with full of unhealthy aged people, which will be a heavy burden for an already struggling economy. The need for a regular "Elderly Clinic" at the PHC level in Kerala is very urgent. Rather than medicating the elderly, messages promoting a healthy elderly population through prevention have to reach the common person.

A reliable database on the health status, morbidity & disability of the elderly by gender, locality and socio-economic status should be developed.

The factors like lifestyle and occupation in which the elderly spent more amount of his/her lifetime etc. are not taken into account in the analysis. So the need for more elaborate study with more sample size is highly necessary.

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ANNEXURE

QUESTIONNAIRE FOR STUDYING THE HEALTH PROBLEMS OF POPULATION AGED 60 AND ABOVE

Designed by Kalavathy.M.C , Master of Public Health Scholar, AMCHSS, Sree Chithira Thirunal Institute for Medical Sciences & Technology, TVM, for data collection for the study entitled " Morbidity due to Chronic Diseases in the Aged Population".

SERIAL NUMBER-SL **U/R/C-URC1,2,3**

1.Name :

2.Age :AGE **3. Sex: 1.m,2.f**

4.Education : (1. illiterate, 2. knows to read and write, 3. primary, 4. high school, 5. college educated, 6. technically educated)-EDCN

5.community : 1. Nair , 2. Tamil Brahmin, 3. Kerala Brahmin , 4. Other tamil , 5. Ezhava , 6. Muslim, 7. Christian, 8. Sc/St ,9.Others-COMM

6.Marital status : 1. Living with spouse, 2. Unmarried, 3. Divorced, 4.Widowed/Widower-MARST

7.Occupation : 1.Labourer, 2.coir work/cashew work,3. merchant,4. Professional, 5. Agriculture, 6.Others (specify), 7.Nil-PREOCC

8.Total number of living children: LIVCHIL

9.Whom do you live with :1. Alone, 2. Husband/Wife , 3. Son's family, 4.Daughter's family , 5. Extended family , 6. Others-LIVEWITH

10.Who owns the house in which you live ? 1. You , 2. Husband/Wife , 3.Son, 4. Daughter, 5. Others , 6. Rent-OWNHSE

11.Source of income for you: 1. yes, 2. no -INCSOU

12.Type of income :1. Pension , 2. Agriculture , 3. Business , 4.Deposits/ shares, 5. Son/husband / Daughter/Wife, 6. labourer -TYPEINC

13.Amount of monthly income (Rs) : 1. < 500 , 2. 500-1000 , 3.1000-1500,4. 1500- 2000, 5.2000 - 3000, 6.>3000-MONTINC

14.Total monthly income for the family(Rs) : 1. < 500 , 2. 500-1000 , 3.1000-1500,4. 1500- 2000, 5.2000 - 3000, 6.>3000-FAMMINC

15.If there is no source of income, you are economically dependent on whom :1. Husband, 2. Son , 3.Daughter , 4. Brothers , 5. Others -ECODEP

16.(For females) Have you undergone hysterectomy ? 1.yes, 2. No -HYSTER

17.If yes, what was the indication ?-INDIC 1.prol,2.cerv,3.bleeding,4.others

18.Do you suffer from any of the following diseaes for the last one year ? (1.yes,2.no)-ONEYDIS

disease	history	examination		medication
19.diabetes	a.DIAHIS	b.DIAEXA		c.DIAMED
20.hypertension	a.HPHIS	SBP	DBP	c.HPMED
21.arthritis	a.ARTHHIS	b.ARTEXA		c.ARTMED
22. prolapse ut	a UTPRHS	b.UTPREX		c.UTPRME
23. ch resp infn	a.COPDHS	b.COPDEX		c.COPMED

19B-0-blue, 1- green, 2-yellow,3-orange, 4-red, 5-refused US,6-unable to do US

20 B- SBP-0.<=139, 1.140-159, 2.160-179, 3.>=180
DBP-0.<=89, 1.90-94, 2. 95-99, 3.>=100

21b-0-normal,1-creps,2-swelling,3-tenderness,4-thickening of joint,5-combination of any of above

22b-0-normal,1-1degree prolapse,2-2 degree prolapse, 3- 3degree prolapse

23b-0-normal,1-creps,2-rhonchi,3-wheeze,4-combinations of any three

24. Any other major health problem (specify):-MAJDIS
0-normal,1-Cardiovascular disorders other than stroke,2-Minor complaints of musculoskeletal system other than arthritis,3-Nutritional deficiency disorders including anaemia, 4-non ambu latory ,5- Giddiness/headache/dyspnoea on walking/sinusitis/allergy 6-Neurodegenarative conditions like strokes/dementia/seizures/TIA, 7- Miscellaneous GI problems (gastritis, worms, pepticulcer), 8-symptoms of urinary disorders(nephritis,prostatism), 9-Pulmonary TB, 100-Cancer, 110- Leucorrhoea & RTI, 120- Skin conditions/contact dermatitis, 130-Others/miscellaneous, 140-filariasis, 150-impaired vision, 160-impaired hearing, 170-heamorrhoids

If diabetic,

25.Whether taking any medication : 1.yes, 2.no-TAMEDDI

26. If no, why?-NOWHY
1. financial problems ,2. nobody to care, 3. do not bother,4. non pharm means

27. If yes, what system of medicine-SYST
1. Ayurveda, 2.Allopathy, 3.Homeopathy, 4.Others

If Hypertensive,

28. Whether taking any medicine :1.yes, 2. no-HPMED

29. If yes, 1.regular,2. irregular -YESREGIRRE

30. If not why? 1. financial problems ,2. nobody to care, 3. do not bother,4. non pharm means-WHYNO

31. If yes, what system of medicine-SYS
1. Ayurveda, 2.Allopathy, 3.Homeopathy, 4.Others

If having Arthritis,
32. Whether taking any medication : 1.yes, 2.no-IFARTMED

33. If yes, 1.regular.2. irregular-REGIRRE

34. If no, why?-NWHY
1. financial problems ,2. nobody to care, 3. do not bother,4. non pharm means

35. If yes, what system of medicine-SYSTEM
1. Ayurveda, 2.Allopathy, 3.Homeopathy, 4.Others

If having Prolapse uterus,
36. Why didn't you do Hysterectomy?-PRNOH
1. Financial problems,2. Nobody to care , 3. Do not care for that, 4. Other problems

37. Where do you get medical advice from?
1. Private practitioner, 2.Govt doctor , 3. Govt doctor doing pvt practice- MEDADVICE

38. Where do you get medicines from?
1. Private practitioner, 2.Govt doctor , 3. Govt doctor doing pvt practice- MEDIFROM

39. Why do you go to Pvt/Public ?-WHYTHERE

40. How often do you go to medical practitioner ? (how many times a year)- TIMES
41. FBS, 0.<=119, 1. 120-179, 2. 180-219, 3. 220-259

42. FBS done where (1- public,2- private , 3-not done,4-not informed) - FBSDON