ejpmr, 2020,7(11), 644-658

SJIF Impact Factor 6.222

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

DRUG UTILIZATION PATTERN AMONG GERIATRICS WHO ARE SUFFERING FROM LIFE STYLE DISEASES

Jayakumar K. S.[1*] and Dr. A. Pasupathi[2]

[1]Assistant Professor Department of Pharmacy Practice. Nazareth College of Pharmacy, Kerala, India.
[2]Associate Professor Department of Pharmaceutics. Vinayaka Mission's College of Pharmacy, Salem, Tamil Nadu, India.

***Corresponding Author: Jayakumar K. S.**

Assistant Professor Department of Pharmacy Practice. Nazareth College of Pharmacy, Kerala, India.

Article Received on 20/09/2020 **Article Revised on 10/10/2020** **Article Accepted on 30/10/2020**

ABSTRACT

Lifestyle diseases are ailments that are primarily based on the day to day habits of people. The main cause identified was substantial changes in people's diet along with the lack of physical activity.

A Prospective cross-sectional study was carried out in Eraviperoor Grama Panchayath of Pathanamthitta district in Kerala, Indiaby collecting information on demographic parameters, prevalence of lifestyle disease, risk factors, and co-morbidities, impact of social habits, prescribing and usage pattern of drugs via predesigned structured questionnaire along with adherence and non- adherence parameter with its reasons.

Unemployed, Geriatric patients with in the age group 61-70, females and those with less physical activity accounted for higher lifestyle disease. Social history of alcohol, smoking and tobacco were the most prominent risk factors associated for development of lifestyle disease. Hypertension was the most prevalent lifestyle disease in geriatrics followed by diabetes mellitus, Dyslipidemia and osteoporosis.Patients with diabetes were more prone to hypertension and the hypertension, dyslipidemiacombinedly was associated with the development of coronary artery disease.Adherence to drug therapy measured with the help of a score sheet of fourteen questionnaires, highlighted that majority of thepopulation adhered to drug therapy and the main reason for non-adherence was found to be lack of knowledge about their medications.The pattern of prescribing medications of lifestyle diseases according to the standard guideline were monitored and a deviation was detected in our study.

KEYWORDS: Lifestyle diseases, Geriatrics, Diabetes Mellitus, cardiovascular disease, Hypertension, Medication adherence.

INTRODUCTION

Lifestyle disease are also referred to as disease of longevity as they tend to appear more in industrialized countries and linked to way people live their life. The increased incidence is not related to age, butdiet and lifestyleare major factors to influence susceptibility to many lifestyle diseases.[1] Problems like metabolic diseases, joint and skeletal problems, cardio-vascular diseases, hypertension and overweightcan result dye to unhealthy lifestyle and thus bond between lifestyle and health requires monitoring. As with time a culture drift is observed in India, these diseases are knocking at an alarming proportion in past few years.[2]

According to Indian Council of Medical Research (ICMR), State-Level Disease Burden Study report "India: Health of the Nation's States", estimated all deaths due to Non-Communicable Diseases (NCDs) has amplified from 37.09% in 1990 to 61.8% in 2016.[3] Indian Council for Medical Science and Technology (2010) revealed that the percentage of diabetes, hypertension, overweight and cholesterol among the population of Kerala are 16.2%, 32.7%, 30.8% and 56.8% respectively.[4] The state of Kerala has the highest prevalence of coronary artery disease (CAD) among all Indian States with a rural prevalence of 7.5% and urban prevalence of 12%.

According to the WHO, more than 7 million people die each year due to the use of tobacco and the fatality rate is projected to increase markedly in the years to come. Excessive use of sodium, alcohol abuse and lack of physical activityconstitutetowards 4.1, 1.65, and 1.6 million deaths per year respectively.[1] Management of lifestyle diseases includes proper diagnosis, screening and treating these diseases in addition to palliative care for people who need it. Quality lifestyle disease intervention through a primary healthcare approach where early detection and proper treatment are prioritized is recommended.[4] Drug utilization (DU)

pattern study is a powerful exploratory tool to evaluate present trends of drug use and appropriateness of prescriptions. In India, many factors like illiteracy, poverty, use of multiple health care systems, drug advertising and promotion, sale of prescription drugs without prescription, competition in medical and pharmaceutical market and limited availability of drug information are the main reasons for not achieving the optimal health care.[5] Inappropriate use of drug also leads to increased cost of medical care, antimicrobial resistance, adverse effects and patient mortality.[6] Hence the drug utilization evaluation (DUE) study becomes one of the potential tools in evaluation of health system. Thus, designed a study which monitors Geriatric patients with prevalence of life style disease and their drug utilization pattern.

METHODOLOGY

The study was designed to identify the most prevalent lifestyle disease by age group and gender more prone to lifestyle disease, risk factor and co morbidity associated with lifestyle disease, impact of lack of physical activity and social habits in inducing lifestyle disease and finally the assessment of medication adherence and drug utilization evaluation in geriatrics. It's a prospective observational study, carried out in 500 patients by using a predesigned data collection form that contains various questions to meet the objectives

Location of the study

The study was carried out in Eraviperoor Grama Panchayath of Pathanamthitta district in Kerala on the topic prevalence of lifestyle diseases and drug utilization evaluation in geriatrics.

Duration of study: Six months

Sample size: Sample size is of 500 patients calculated by using the statistical formula

$$\frac{Z^2*P(1-P)}{e^2}$$

$$1+\left(\frac{Z2*P(1-P)}{e^2N}\right.$$

Where,
P = standard deviation
N= population size
E= margin of error
Z= 95% confidence interval of Z

Inclusion criteria

- Age between 60-100 years.
- Patients with lifestyle disease.

Exclusion criteria

- Patients not willing to take part in studies.
- Patients who are taking other system of medicines

Data collection

Data collection was done by using a predesigned data collection formwith various questions to attain the objective, after getting a prior permission the evaluators visited the residence of patients and first obtained a written consent form, followed by the patients were asked to fill in the questionnaire, if any assistance was required by them it was provided by evaluators and thus completed the survey.

RESULTS

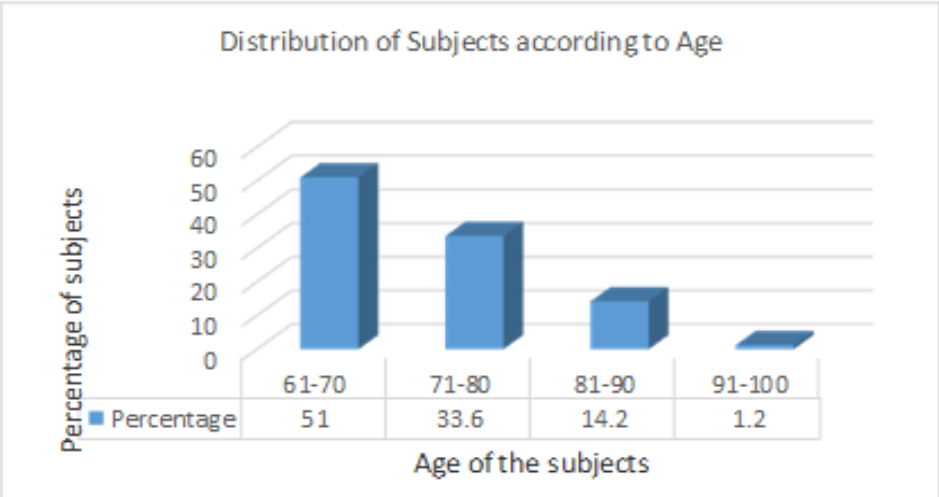

Figure 1: Age of the subjects

The above bar graph shows that, of total sample size the majority 51% are from the age group of 61-70 followed by 71-80 (33.6%) then 81-90(14.2%) and 91-100(1.2%).

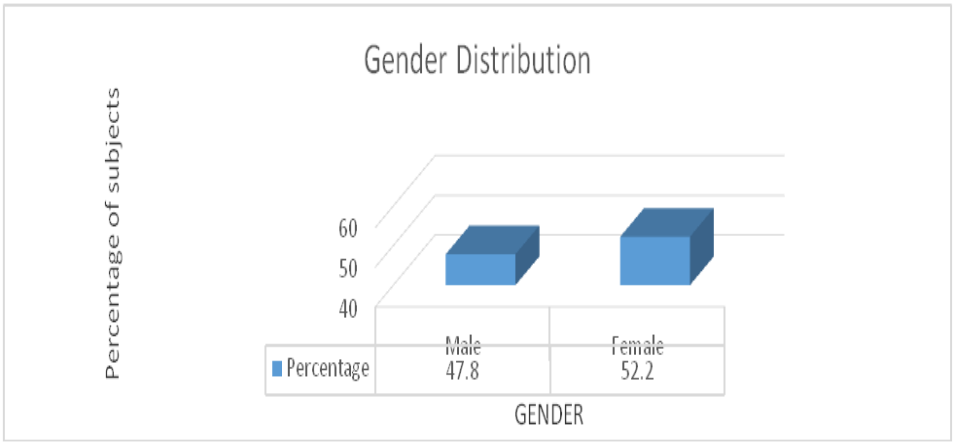

Figure 2: Gender of the subjects.

The above histogram demonstrates that lifestyle diseases are more common in female (52.2%) when compared to males (47.8%).

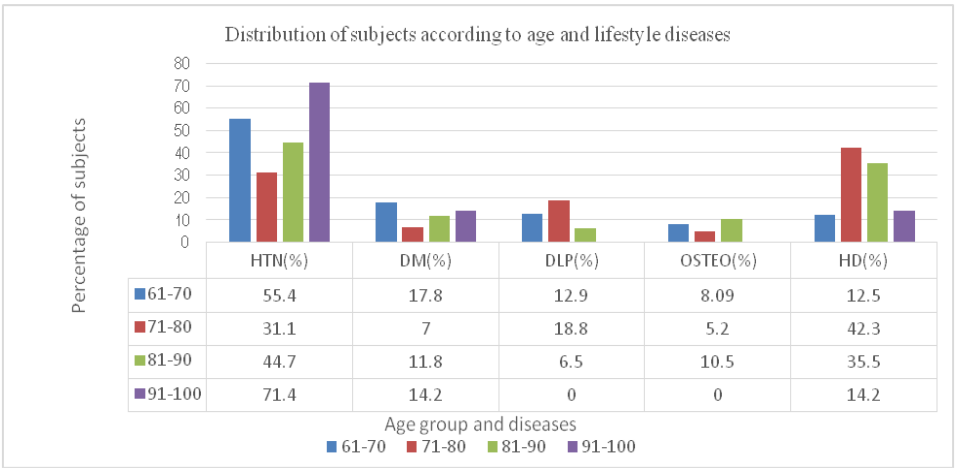

Figure 3: Distribution of subjects according to age and lifestyle diseases.

The above histogram illustrates the correlation of age group and lifestyle disease and it can be concluded that hypertension was the most prevalent lifestyle disease in the age group 61-70 followed by diabetes mellitus, Dyslipidemia and osteoporosis.

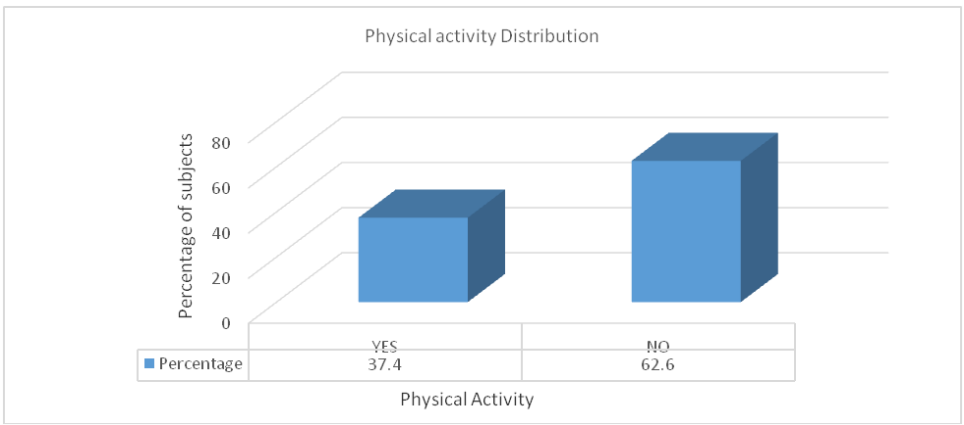

Figure 4: Distribution of subjects according to their Physical activity.

The present histogram supports the above employment graph because out of 500 patients, majority of them are not doing any physical activity (62.6%) and only (37.4%) are having some physical activity which increases the risk for lifestyle diseases.

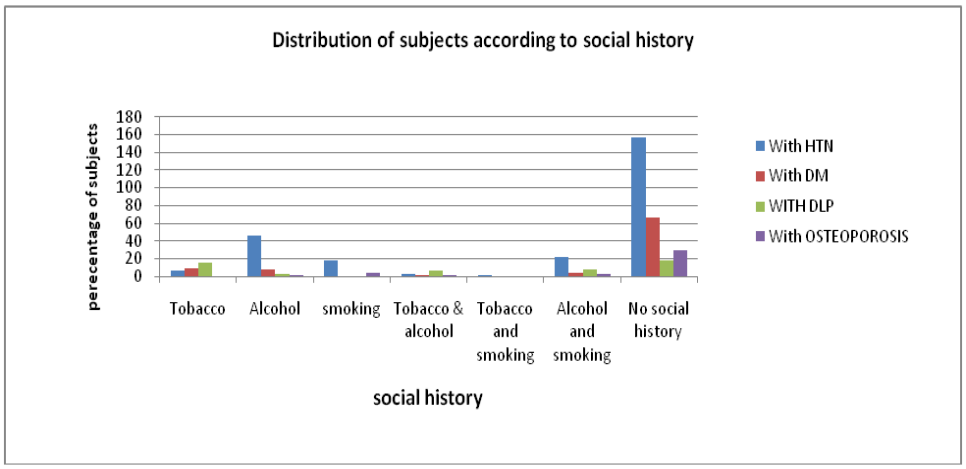

Figure 5: Distribution of subjects according to their Social history.

The above graph illustrates the correlation of social history with the lifestyle disease and it was observed that alcohol (46) and smoking (17) were the most prominent risk factors associated with hypertension and tobacco was associated with the progression of Dyslipidemia. From the graph we can conclude that social history is not alone a cause for lifestyle disease because only a small part of the population is having social habits.

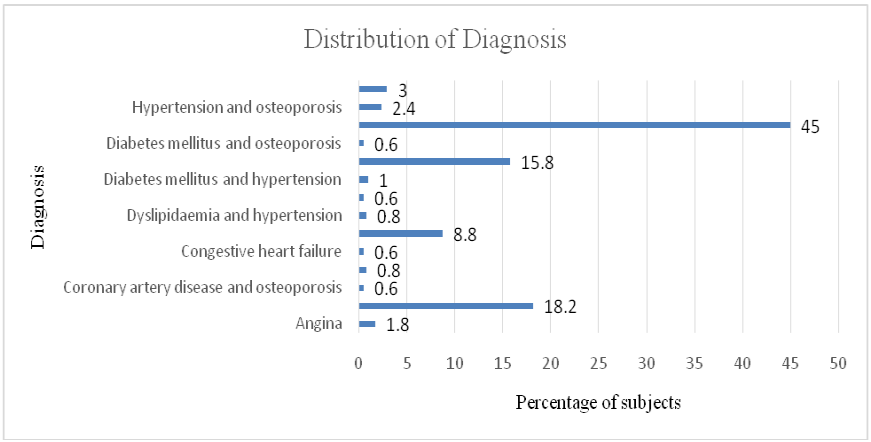

Figure 6: Distribution of subjects according to their diagnosis

The histogram depicts that out of 500 people selected for the study, with respect to current diagnosis the most prevalent lifestyle disease is hypertension 45%, followed by coronary artery disease 18.2%. Diabetes mellitus holds 15.8% trailed by Dyslipidemia 8.8%. Osteoporosis accounts for 3%, angina 1.8% and congestive heart failure 0.6%. Combinations of these diagnoses were also observed in majority of the patients with hypertension and osteoporosis the most 2.4%. The diagnosis of the patients included those diseases which they attained after the age of 60 years.

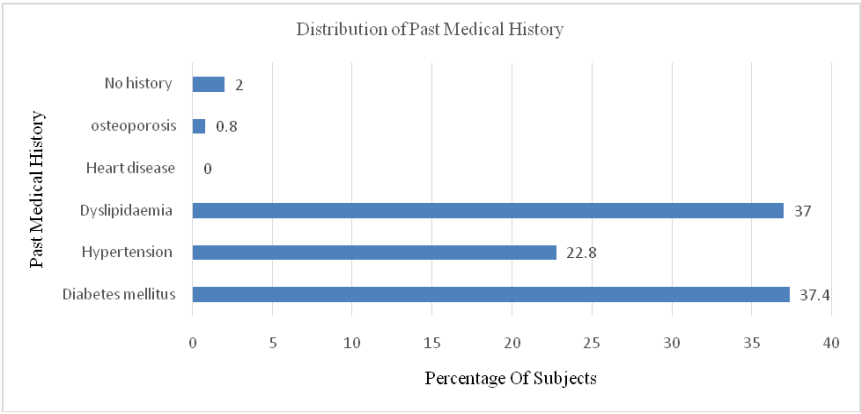

Figure 7: Distribution of subjects according to their past medical history.

The survey included 500 patients, out of them 490 were having past medical histories, with diabetes as a more prominent medical history 37.4% followed by dyslipidemia 37% and hypertension 22.8%. None of them had a past history of heart disease while osteoporosis was seen among few 0.8%. A 2% of them had no prevalence of disease.

Table 1: Distribution of subjects by correlating their past medical history with lifestyle disease.

S. No	Current diagnosis	Past medical history			
		DM	HT	Dyslipidaemia	Osteoporosis
1	Angina	5	10	11	0
2	CAD	56	75	91	0
3	CAD + Osteoporosis	2	3	3	0
4	CAD + Hypertension	4	0	4	0
5	Congestive Heart Failure	0	2	3	0
6	Dyslipidaemia	17	2	**455**	0
7	Dyslipidaemia + Osteoporosis	0	1	3	0
8	Dyslipidaemia + Hypertension	0	0	2	0
9	Diabetes Mellitus	**175**	11	77	1
10	Diabetes mellitus + Osteoporosis	0	0	3	0
11	Diabetes mellitus + Hypertension	0	0	5	0
12	Hypertension	85	**106**	225	3
13	Hypertension + Osteoporosis	5	1	12	0
14	Osteoporosis	1	1	16	**4**

The table exhibits the correlation of past medical history with present lifestyle disease and the results concluded that patients with diabetes as a past history were more prone to hypertension (85). Hypertension was significantly associated with the development of coronary artery disease (75), Dyslipidemia also showed as a risk factor in the progression of coronary artery disease (91) and hypertension (225).

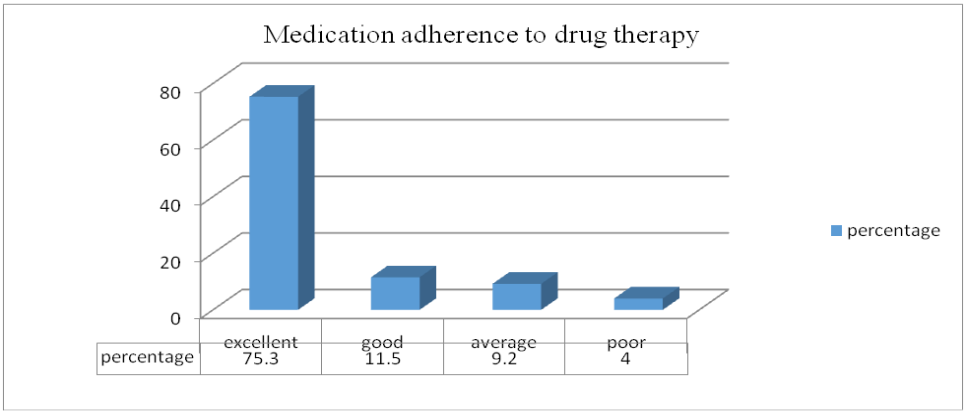

Figure 8: Distribution of subjects according to their medication adherence to drug therapy.

In order to measure the patients adherence to drug therapy we have provided fourteen questionnaires and based on the questionnaires provided to the patient, positive and negative outcomes were measured and scores have been implied to them as excellent, good, average, poor. The above table demonstrate that out of 500 selected patients, 376(75.3%) of them had excellent adherence to their drug therapy while 57(11.5%) were having average adherence and only 4% are poorly adherent to drug therapy.

Table 2: Distribution of subjects according to their reason for non- adherence to drug therapy.

S. No	Reason for non-adherence	Frequency
1	Does not know the names of their medication	181
2	Having physical problem from taking medications.	138
3	Never received information about their medication	95
4	Not Satisfaction with their treatment	148
5	Not getting prescription refilled after doctors visit	137

The reason for non- adherence was measured in the patients and the main reason for non-adherence was found to be the lack of knowledge about their medications (181) followed by physical problems from

taking their medications (138), some of them were non - adhered due to their poor satisfaction with the treatment (148) and not getting prescription refilled after doctors visit (137).

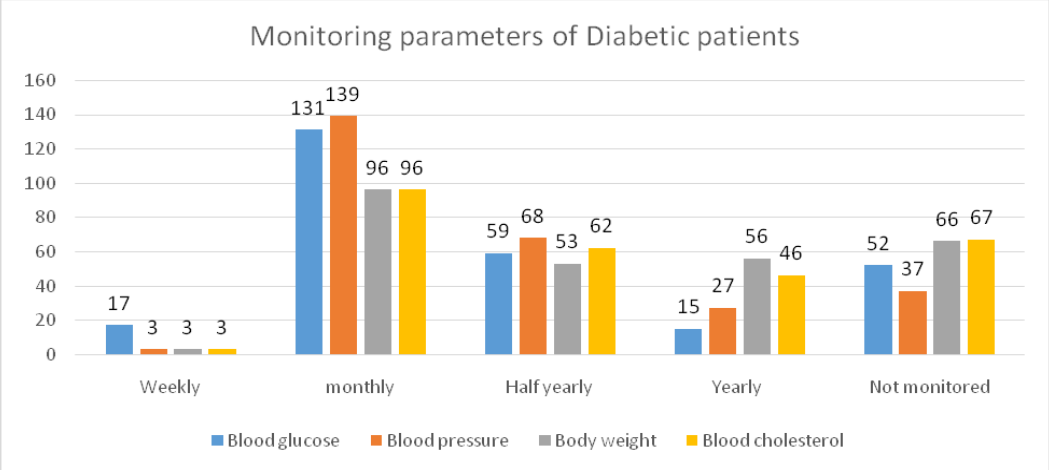

Figure 9: Monitoring parameter of Diabetes.

The above graph exemplifies the total diabetic patients (274), majority of them are monitoring their blood glucose and blood pressure level monthly, and a minute of them does not know the importance of checking monitoring parameters regularly.

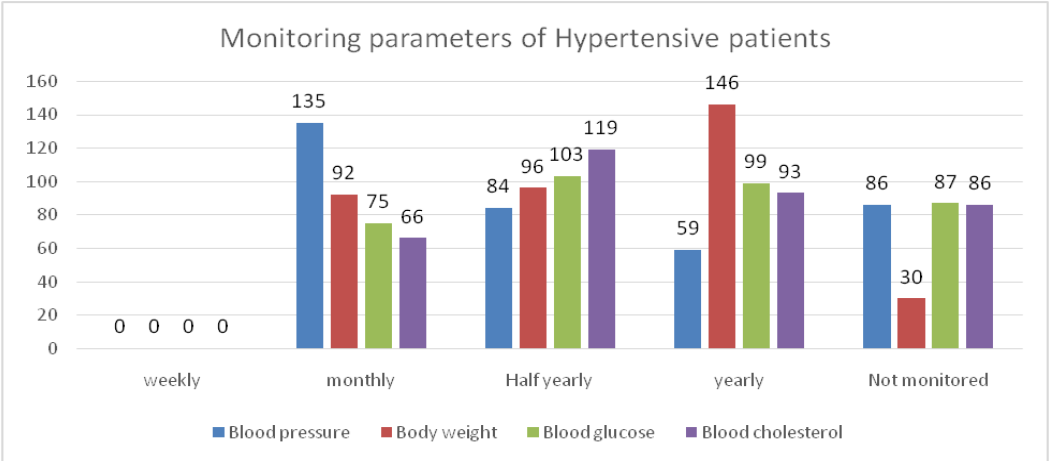

Figure 10: Monitoring parameters for hypertensive patients

The histogram characterizes the 364 patients who were previously and presently diagnosed with hypertension, none of them were measuring their blood pressure weekly and 135 patients are measuring their blood pressure monthly. Blood glucose and blood cholesterol were checked on half yearly basis, while some of them were not monitoring their parameters.

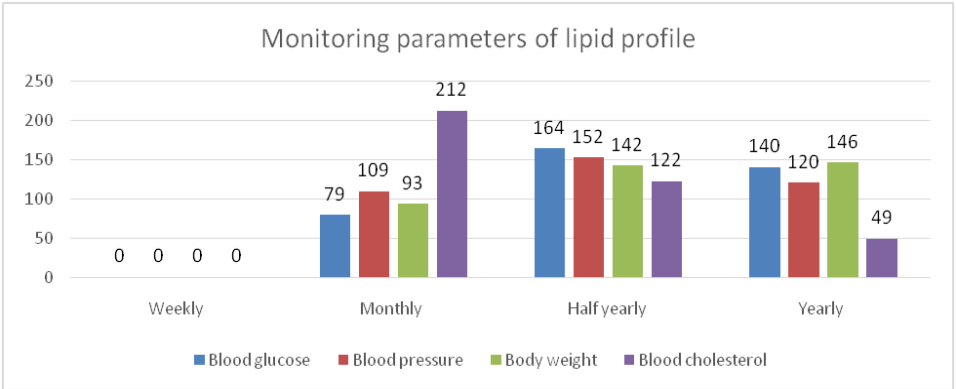

Figure 11: Distribution of frequency of monitoring parameters of lipid profile.

The above histogram represents the monitoring parameters of 236dyslipidaemic patients who were previously and presently diagnosed in which none of them had undergone a weekly check-up while most of them did it in a monthly basis. This shows that many patients are unaware about the importance of checking their cholesterol level regularly.

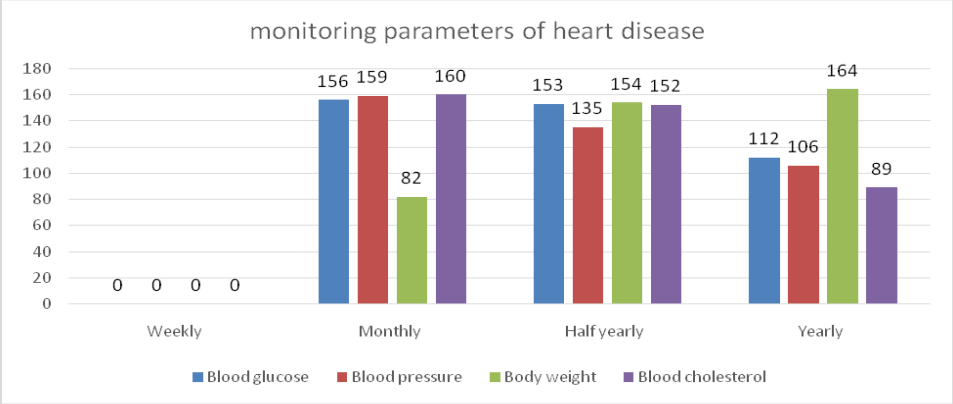

Figure 12: Distribution of frequency of monitoring parameters of heart disease.

The above grid demonstrates the data of total 110 heart disease patients, the frequency of monitoring parameters of heart disease was analyzed and it was found that most of them did their regular check-ups on blood glucose, blood pressure and blood cholesterol at monthly schedule.

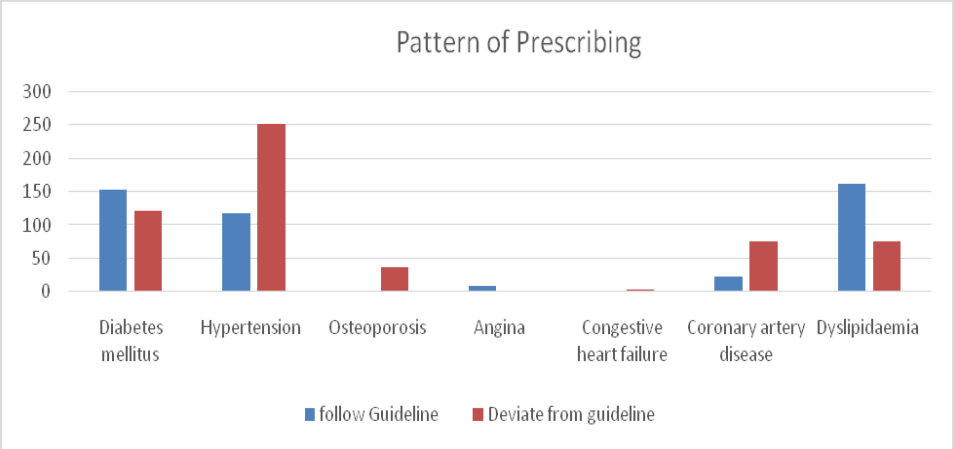

Figure 13: Pattern of prescribing.

The graph shows in detail results of the pattern of prescribing according to the standard guideline and those who deviates from it. The most deviation was observed in the case of hypertension 250 deviates while only 118 follows standard regimen, this in turn can lead to their treatment failure. Among people with diabetes 152 follows guideline treatment while 121 deviates from it. The treatment of angina was strictly in adherence to standard regimen.

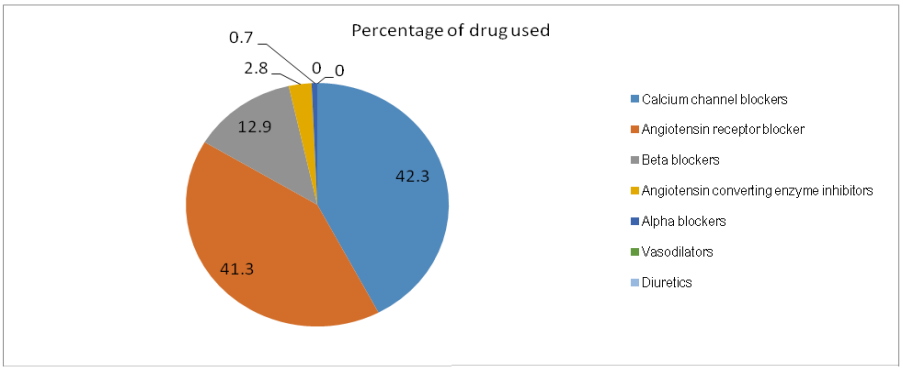

Figure 14: Drug utilization evaluation of Hypertension.

From the above pie chart, the most commonly used class of antihypertensive was found to be calcium channel blocker (42.3%) followed by angiotensin receptor blocker (41.3%) preceded by beta blockers (12.9%) and angiotensin converting enzyme inhibitors (2.8%) and the less commonly used class of antihypertensive is alpha blockers which is only 0.7% and both vasodilators and diuretics are not used as anti-hypertensive.

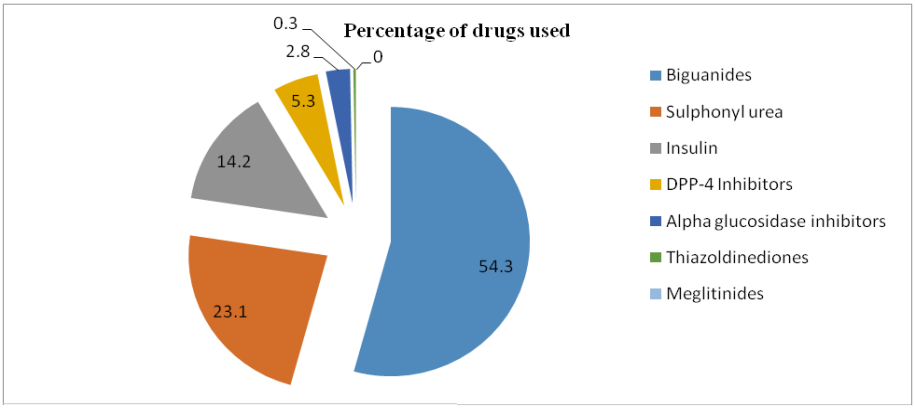

Figure 15: Drug utilization evaluation of Diabetes mellitus.

From the above pie diagram, we can see that the most commonly used anti diabetic class used is biguanides which is 54.3% followed by sulphonylurea (23.1%) preceded by insulin (14.3%)followed by DPP4 inhibitors (5.3%) ,alpha glucosidase inhibitor(2.8%) and the less commonly used anti diabetic class used is thiazoldinediones which is only 0.3%.

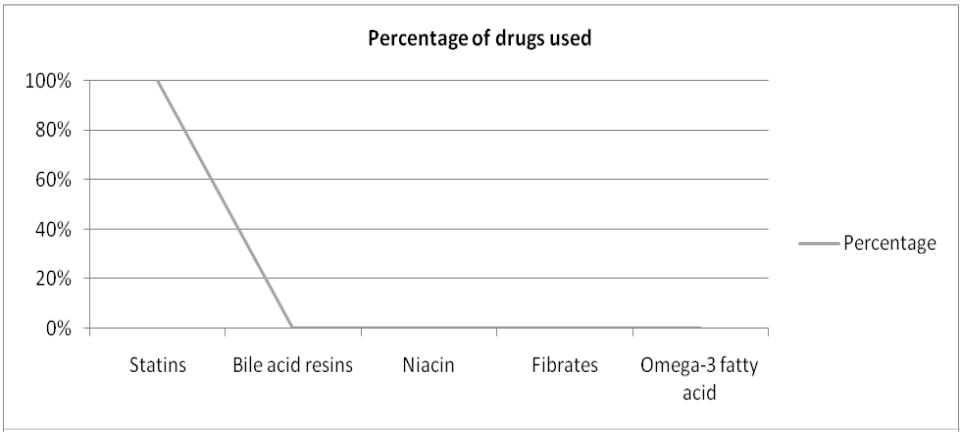

Figure 16: Drug utilization evaluation of Dyslipidemia.

From the above graph, statins were the most commonly used class of dyslipidemic agent and none of the other class of drugs like bile acid resins ,niacin ,fibrates and omega -3 fatty acids were used.

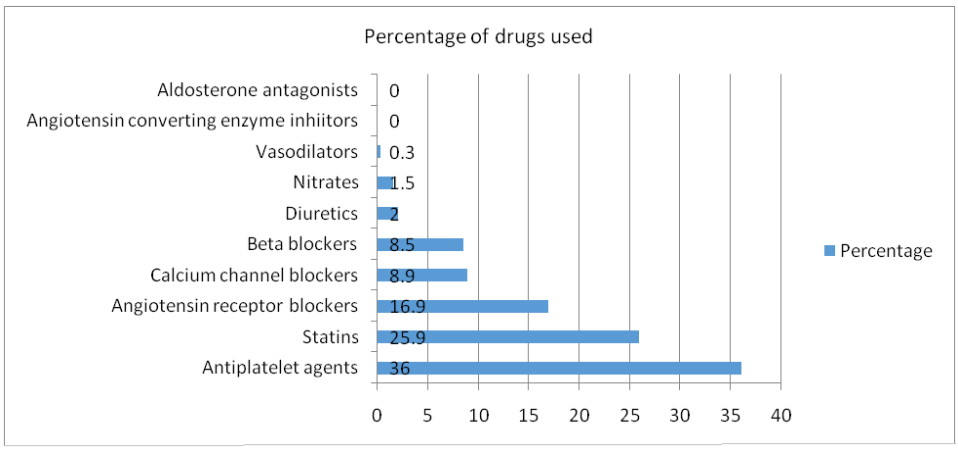

Figure 17: Drug utilization evaluation of coronary artery disease.

From the above graph,we can understand that ,the most commonly used class of drug for coronary artery disease is antiplatelet agents (36%) followed by statins (25.9%),Angiotensin receptor blocker (16.9%),calcium channel blocker(8.9%),beta blockers (8.5%) and the less commonly used classes of drug for coronary artery disease is diuretics which is 2% followed by nitrates which is 1.5% and vasodilators which is 0.3% and none of the angiotensin converting enzymes and aldosterone antagonist were used to treat coronary artery disease.

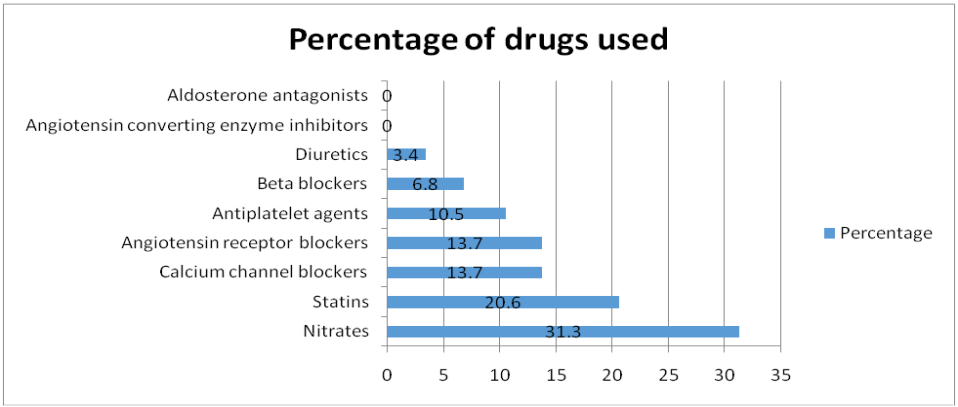

Figure 18: Drug utilization evaluation of angina pectoris.

From the above graph shows that the most commonly used class of drug to treat angina is nitrates which is 31.3% which is followed by statins-20.6%, calcium channel blocker-13.7%, Angiotensin receptor blocker-13.7%, antiplatelet drugs-10.5% and beta blockers -6.8% and diuretics -3.4%were less commonly used class of drug for angina and angiotensin converting enzyme and aldosterone antagonist were not used.

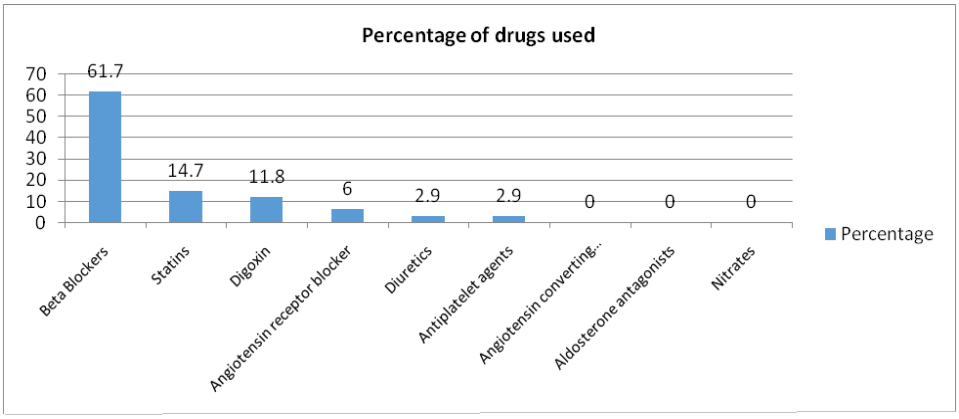

Figure 19: Drug utilization evaluation of congestive heart failure.

From the above graph, we can understand that the most commonly used class of drug for congestive heart failure is beta blockers which is 61.7% and 14.7% of people use statins followed by 11.8% digoxin and less commonly used classes are angiotensin receptor (6%) followed by diuretics and antiplatelet agents 2.9% and angiotensin converting enzymes, aldosterone antagonists and nitrates were not used in the treatment of congestive heart failure.

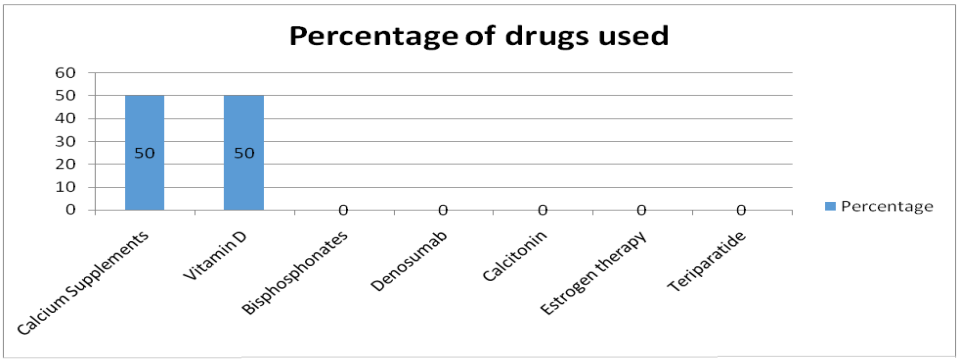

Figure 20: Drug utilization evaluation of osteoporosis.

From the above graph, it is found that 50% of people were taking calcium supplements and vitamin D for the treatment of osteoporosis and can see from the graph that no one was taking other classes of drugs such as bisphosphonates, denosumab, calcitonin, estrogen therapy and teriparatide in the treatment of osteoporosis.
Findings:

The salient findings of the study were:

- Geriatric patients with in the age group 61-70 were more affected with lifestyle disease.
- Females are more affected with lifestyle disease than males.
- In the age group 61-70 hypertension was the most prevalent lifestyle disease followed by diabetes mellitus, Dyslipidemia and osteoporosis.
- With respect to the physical activity lifestyle disease were more in population with least physical activity.
- The correlation of social history with the lifestyle disease shows that alcohol and smoking were the most prominent risk factors associated with hypertension and tobacco was associated with the progression of Dyslipidemia.
- Most common incident lifestyle disease in geriatrics was hypertension followed by diabetes mellitus and Dyslipidemia.
- The correlation of past medical history with present lifestyle disease concluded that patients with diabetes were more prone to hypertension. Hypertension was significantly associated with the development of coronary artery disease, Dyslipidemia also showed as a risk factor in the progression of coronary artery disease.
- Of the total 87 diabetic patients included in the study, the most common individual co-morbidity was retinopathy and the most shared multiple co-morbidity identified was retinopathy and neuropathy.
- The most common individual co-morbidity in hypertensive patients was retinopathy and the multiple co-morbidities were found to be stoke and cardiovascular disease.
- Most of the dyslipidemic patients were having cardiovascular disease as the individual co-morbidity and stroke and cardiovascular disease were the multiple co-morbidity.
- The leading individual risk factor for diabetes was found to be age supported by Family history.
- In the case of osteoporosis, Hyperthyroidism was the individual risk factor; age and menopause were multiple risk factors.
- Family history was found to be individual risk factors for hypertension supported by age which leads to risk factors.
- The files of 110 patients who were diagnosed with heart disease revealed that major individual risk factor leading to heart disease was found to be obesity and the major multiple risk factors leading to heart disease was found to be age, high blood pressure and Dyslipidemia.
- In Dyslipidemia, age was found to be most common individual risk factor followed by age, gender, family history contributed for the multiple risk factors.
- Considering the whole population with lifestyle disease,the most common multiple diagnosis and associated multiple risk factors were scrutinized, it was found to be hypertension and osteoporosis and the multiple risk factor associated with it was Dyslipidemia+ diabetes, age+ menopause.
- The data of multiple diagnoses with multiple co-morbidities were also evaluated and the most common multiple diagnosis was found to be coronary artery disease and hypertension and the multiple co- morbidities associated with it was diabetes mellitus+ hypertension+ Dyslipidemia+ nephropathy+ retinopathy+ cardiovascular disease.
- Adherence to drug therapy measured with the help of a score sheet of fourteen questionnaires, highlighted that 376(75.3%) of them had excellent adherence to their drug therapy while 57(11.5%) were having average adherence and only 4% are poorly adherent to drug therapy and the main reason for non-adherence was found to be the lack of knowledge about their medications.
- The monitoring parameters of each lifestyle disease were assessed and with respect to diabetes mellitus, they had monthly check up on their blood glucose levels, with respect to hypertension, they checked their blood pressure levels on a monthly basis. In the case of heart disease, they had a monthly monitoring on their blood glucose, blood pressure, blood cholesterol levels.
- The pattern of prescribing medications of lifestyle diseases according to the standard guideline were monitored and checked those who deviate from it. The most deviation was observed in the case of hypertension where 250 deviates while only 118 follows standard regimen, this in turn can lead to their treatment failure. Among people with diabetes

152 follows guideline treatment while 121 deviates from it. The treatments of angina were strictly in adherence to standard regimen.

- The drug utilization pattern of each lifestyle disease were carried out and it was found that among antihypertensive- calcium channel blocker was the most preferred one, for diabetes- metformin was mostly used, for Dyslipidemia- statins were the most prescribed drug. In case of coronary artery disease antiplatelet agents were given, for angina- nitrates was the suitable choice and for congestive heart failure beta blockers were prescribed. Patients with osteoporosis were mostly prescribed with calcium and vitamin D supplements.

DISCUSSION

- The prevalence of lifestyle disease is increasing worldwide; the state of Kerala has the highest prevalence of coronary artery disease (CAD) among all Indian States with a rural prevalence of 7.5% and urban prevalence of 12%.[4] This was a prospective observational study carried out to assess the prevalence of lifestyle disease in geriatric patients. The study was carried out in a rural area of Pathanamthitta.

- The total sample size of the population was about 500 geriatrics. Most of the patients were from the age group of 61-70. Highest prevalence of lifestyle diseases was in female population about (52.2%) this might be due to menopause.[30] This has been supported by a study conducted in Guntur district of Andhra Pradesh.[30]

- On correlating age group with lifestyle disease, cardiovascular disease is more prevalent in age group 71-80 but in the age group of 61-70 the most prevalent was hypertension, diabetes mellitus, Dyslipidemia, and osteoporosis. The prevalence of hypertension, diabetes mellitus, and Dyslipidemia is one of the risk factors for inducing cardiovascular disease because the above mentioned disease can aggravate the cardiovascular events.

- The most prevalent lifestyle disease for geriatric patients included in our study was hypertension. The reason for increase in hypertension is due to loss of texture of vascular smooth muscles as well as endothelial dysfunction and this has been contributed by diabetes mellitus as well as alcohol and smoking and increasing age which is evident from our study. Hypertensive patients were more prone to be affected by cardiovascular disease, the reason behind was due to the high blood pressure which exerts force against arteries, making them vulnerable to the narrowing and plaque associated with atherosclerosis.[31] A study conducted in Chhattisgarh observed the overall prevalence of hypertension 50% among age ≥ 60 years.[32]

- Family history, age, sedentary lifestyle as well as obesity has been quoted as a risk factor for diabetes due to the combined effects of increasing insulin resistance and impaired pancreatic islet function with aging in various studies.[33] Our study too supports this statement.

- Correlation of the past medical history with the present lifestyle disease and it was observed that people with diabetes mellitus had a higher incidence of evolving hypertension. The underlying reason was due to increased peripheral artery resistance caused by vascular remodelling and increased body fluid volume associated with insulin resistance.[31]

- The third most prevalent lifestyle disease in our population was dyslipidemia, the main reason recognized wereage, gender, and family history followed by diabetes due to the increase in levels of lipoproteins that occurs with age[34] followed by sedentary lifestyle, obesity, and food habits. Food habits are also an important risk factor for dyslipidemia but we were not able to monitor it. Dyslipidemia can lead to hypertension by affecting functional and structural arterial property and promote atherosclerosis that can impair blood pressure regulations.[35] Similar study conducted on the ‘prevalence of dyslipidemia in geriatric rural population residing in a hilly district of uttarakhand state, India’ have shown that the overall prevalence of dyslipidemia was 50.6%.[36]

- Osteoporosis was most popular in female patients of the total population involved in the study, this can be a causative factor linked to decreased oestrogen level which in turn can lead to low bone mineral density associated with menopause. A study conducted on **‘**Factors associated with osteoporosis among older patients at the Geriatric Centre in Nigeria shows that the prevalence of osteoporosis was higher in old age group, Females 65.8.[37]

- Most of the geriatric patients included in the study are unemployed or those leading a retired life. This has contributed to the lack of physical activity as well as sedentary lifestyle which has become a major cause for lifestyle diseases. Another study supported our results, a study conducted on comparing Employment status and lifestyle disease concluded that women employed outside the home had a decreased risk of CHD compared to homemakers.[38] Another study conducted on sedentary behaviour and health outcomes conclude that doing regular physical activity can make you feel good about yourself and it can have a number of benefits for your health. For example, it reduces the risk of developing heart disease, stroke, high blood pressure, many cancers, type 2 diabetes and 'thinning' of the bones (osteoporosis).[39]

- Majority of the population were having social habits, in that the most prevalent social habits present in our study population was alcohol, smoking, tobacco. Alcohol plays an important role in inducing hypertension, which causes loss of relaxation due to inflammation and oxidative injury of the endothelium by angiotensin II leading to inhibition of endothelium-dependent nitric oxide production. Tobacco plays a major role in inducing diabetes; it has been linked to increased central adiposity, which contributes to insulin resistance and diabetes. It also can cause changes in lipid profile which include low level of HDL cholesterol and increased level of TG. Smoking is an important factor for osteoporosis, by reducing bone mass especially among men and postmenopausal women. A study on Impact of Lifestyle on Health In recent decades, life style as an important factor of health. Millions of people follow an unhealthy lifestyle. Hence, they encounter illness, disability and even death[40]

- The assessment of adherence states that only a very few population are non- adherent to drug therapy and the reason for non- adherence was found to be lack of knowledge about their medications.

- According to our study the most common comorbidity for hypertension was found to be retinopathy (41) and stroke (16) because high blood pressure can cause damage to the retina's blood vessels, limit the retina's function. When combined with cholesterol deposits in the blood vessels, the risk of heart attack and stroke increases.[41]

- The study assessed the main comorbidities of Dyslipidemia and was found to be cardiovascular disease (35), followed by a combination of stroke and cardiovascular disorders.Dyslipidemia can lead to hypertension by affecting functional and structural arterial property and promote atherosclerosis which result in cardiovascular diseases.[35]

- The prescribing patterns of drugs were studied by comparing with standard drug regimens[42, 43, 44] and.[45] According to American Heart Association, Angiotensin II receptor blockers were preferred first line[42] for hypertension but our study revealed that calcium channel blockers were used as antihypertensives, Present guidelines suggest that diuretics, calcium channel blockers (CCBs), angiotensin-converting enzyme (ACE) inhibitors, and angiotensin II receptor blockers (ARBs) are all suitable for the initiation of antihypertensive treatment, either as monotherapy or in combination therapy. Initial use of CCBs in hypertensive patients might be superior to ARBs for prevention of stroke and MI events, independent of their antihypertensive effect.[42]

- For coronary artery disease beta blockers[42] were preferred agents, on the other hand antiplatelet agents were prescribed. Beta blocker lowers heart rate and blood pressure and reduces the workload of heart.[42]

- For angina, Nitrates were the first line agent by the American heart association guideline,[42] these results correlated with our findings. Nitrates act as vasodilators and thus improving blood flow to heart.

- Congestive heart failure were treated with first line agents such as angiotensin converting enzyme inhibitors,[42] in our study beta blockers were mostly prescribed.ACE inhibitors significantly reduced the need for hospitalization, improved survival, and lowered the risk of heart attacks, Beta-blockers may be preferable in HF patients who have a history of angina or arrhythmias[42]

- Metformin was the standard first line treatment for diabetes[44] according to American diabetes Association, Our study too supports the above statement.Metformin as the first-line therapy for type 2 diabetes, given its relative safety and beneficial effects on Glycated haemoglobin, weight, and cardiovascular mortality (compared with sulfonylureas). And also metformin is the only anti-diabetic agent that has shown reduced macrovascular outcomes.[44]

- According to American association of clinical endocrinologists, in osteoporosis bisphosphonates were preferred agents[45] but in our study the calcium and vitamin D were given to the patients. Among the antiresorptives, bisphosphonates provide some of the higher BMD increase and fracture risk reduction.[45]

CONCLUSION

The study concluded that Geriatric patients with in the age group 61-70 were more affected with lifestyle disease, considering gender; females are more affected with lifestyle disease than males. Hypertension was the most prevalent lifestyle diseasefollowed by diabetes mellitus, Dyslipidemia and osteoporosis. Lack of physical activity as well as sedentary lifestyle has become a major contributing factor for lifestyle disease. Social habits such as alcoholism, smoking and tobacco use has a positive impact in the development of lifestyle disease. With regards to drug therapy given, the pattern of prescribing was not according to standard guidelines.

REFERENCE

1. WHO Noncommunicable diseases. Fact Sheet, 2017. (Retrieved from: http://www.who.int/mediacentre/factsheets/fs355/en/ Last cited on: 02/05/2017)
2. https://www.cdc.gov/chronicdisease/index.htm, Last cited on, 2017; 02: 05.

3. Ministry of health and family welfare, lifestyle diseases in India, press information bureau, 2018. Last cited on: 02/05/2017
4. Venugopal K. "Epidemic of Coronary Artery Disease" in CC Kartha (ed.), Kerala fifty years and beyond, Gautha books, Thiruvananthapuram, 2007; 450.
5. Bergman U. The history of the Drug Utilization Research Group in Europe. Pharmacoepidemiology and Drug Safety [Internet]. Wiley, 2006; 15(2): 95–8. Available from: http://dx.doi.org/10.1002/pds.1171
6. Taskeen M, Anitha N, Ali SR, Bharath R, Khan AB. A Study on Rational Drug Prescribing Pattern in Geriatric Patients in Hyderabad Metropolitan. Journal of Drug Delivery and Therapeutics [Internet]. Society of Pharmaceutical Tecnocrats, 2012; 2(5). Available from: http://dx.doi.org/10.22270/jddt.v2i5.270
7. Tian L, Yang R, Wei L, Liu J, Yang Y, Shao F, et al. Prevalence of osteoporosis and related lifestyle and metabolic factors of postmenopausal women and elderly men. Medicine [Internet]. Ovid Technologies (Wolters Kluwer Health), 2017; 96(43): 8294. Available from: http://dx.doi.org/10.1097/md.0000000000008294
8. Zhang X, Lin J, Yang X, Fei Q, Wang B, Yang Y, Li J, Ma Z, Zhao F, Wang Q. Investigation of osteoporosis prevalence and osteoporosis-related clinical risk factors among healthy elderly male. Zhonghua Yi Xue Za Zhi, 2015; 95(41): 3366-9.
9. Alonge T, Adebusoye L, Ogunbode A, Olowookere O, Ladipo M-A, Balogun W, et al. Factors associated with osteoporosis among older patients at the Geriatric Centre in Nigeria: a cross-sectional study. South African Family Practice [Internet]. AOSIS, 2017; 59(3): 87–93. Available from: http://dx.doi.org/10.1080/20786190.2016.1272248
10. Balkhi B, Seoane-Vazquez E, Rodriguez-Monguio R. Changes in the utilization of osteoporosis drugs after the FDA bisphosphonate drug safety communication. Saudi Pharmaceutical Journal [Internet]. Elsevier BV, 2018; 26(2): 238–43. Available from: http://dx.doi.org/10.1016/j.jsps.2017.12.005
11. Khadilkar A, Kadam N, Chiplonkar S, Khadilkar V. Prevalence of osteoporosis in apparently healthy adults above 40 years of age in Pune City, India. Indian Journal of Endocrinology and Metabolism [Internet]. Medknow, 2018; 22(1): 67. Available from: http://dx.doi.org/10.4103/ijem.ijem_438_17
12. Rockwood K, Tan M-H, Phillips S, Mcdowell I. Prevalence of diabetes mellitus in elderly people in Canada: report from the Canadian Study of Health and Aging. Age and Ageing [Internet]. Oxford University Press (OUP), 1998; 27(5): 573–7. Available from: http://dx.doi.org/10.1093/ageing/27.5.573
13. Chentli F, Azzoug S, Mahgoun S. Diabetes mellitus in elderly. Indian Journal of Endocrinology and Metabolism [Internet]. Medknow, 2015; 19(6): 744. Available from: http://dx.doi.org/10.4103/2230-8210.167553
14. MacKnight C, Rockwood K, Awalt E, McDowell I. Diabetes mellitus and the incidence of dementia in the Canadian study of health and aging. Neurobiology of Aging [Internet]. Elsevier BV, 2000; 21: 171. Available from: http://dx.doi.org/10.1016/s0197-4580(00)82107-7
15. Adhikari PM, Pai MR. Drug utilization study in geriatric type 2 diabetic patients. Journal of clinical and diagnostic research, 2007; 1(5): 440-3.
16. Rema M, Premkumar S, Anitha B, Deepa R, Pradeepa R, Mohan V. Prevalence of Diabetic Retinopathy in Urban India: The Chennai Urban Rural Epidemiology Study (CURES) Eye Study, I. Investigative Opthalmology& Visual Science [Internet]. Association for Research in Vision and Ophthalmology (ARVO), 2005; 46(7): 2328. Available from: http://dx.doi.org/10.1167/iovs.05-0019
17. Lim K, Sivasampu S, Khoo E. Antihypertensive drugs for elderly patients: a cross-sectional study. Singapore Medical Journal [Internet]. Singapore Medical Journal, 2015; 56(05): 291–7. Available from: http://dx.doi.org/10.11622/smedj.2015019
18. Nguyen QT, Anderson SR, Sanders L, Nguyen LD. managing hypertension in the elderly: a common chronic disease with increasing age. American health & drug benefits, 2012; 5(3): 146.
19. Altaf MO, Rasheed AN, Mujtaba AR, Mohammed SH. Drug utilization evaluation of antihypertensives in geriatric patients in a tertiary care hospital. Int J Pharm Pharm Sci, 2014; 6(9): 261-4.
20. Anchala R, Kannuri NK, Pant H, Khan H, Franco OH, Di Angelantonio E, et al. Hypertension in India. Journal of Hypertension [Internet]. Ovid Technologies (Wolters Kluwer Health), 2014; 32(6): 1170–7. Available from: http://dx.doi.org/10.1097/hjh.0000000000000146.
21. Prince MJ, Ebrahim S, Acosta D, Ferri CP, Guerra M, Huang Y, et al. Hypertension prevalence, awareness, treatment and control among older people in Latin America, India and China. Journal of Hypertension [Internet]. Ovid Technologies (Wolters Kluwer Health), 2012; 30(1): 177–87. Available from: http://dx.doi.org/10.1097/hjh.0b013e32834d9eda
22. Qi L, Ding X, Tang W, Li Q, Mao D, Wang Y. Prevalence and Risk Factors Associated with Dyslipidemia in Chongqing, China. International Journal of Environmental Research and Public Health [Internet]. MDPI AG, 2015; 12(10): 13455–65. Available from: http://dx.doi.org/10.3390/ijerph121013455
23. Sharma U, Kishore J, Garg A, Anand T, Chakraborty M, Lali P. Dyslipidemia and associated risk factors in a resettlement colony of Delhi. Journal of Clinical Lipidology [Internet]. Elsevier

BV, 2013; 7(6): 653–60. Available from: http://dx.doi.org/10.1016/j.jacl.2013.06.003
24. Raja S, MohapatRa S, Kumar JS, Rani RJ. Prescription patterns of hypolipidaemic drugs in a tertiary care teaching hospital of Southern India. Journal of Clinical and Diagnostic Research: JCDR, 2014; 8(4): 01. Shraddha Chauhan, Dr.BaniTamberAeri. Prevalence of cardiovascular disease in India and its economic impact- A review, International Journal of Scientific and Research Publications.
25. Saks K, Kolk H, Soots A, Takker U, Vask M. Prevalence of cardiovascular disorders among the elderly in primary care in Estonia. Scandinavian Journal of Primary Health Care [Internet]. Informa UK Limited, 2003; 21(2): 106–9. Available from: http://dx.doi.org/10.1080/02813430310001716
26. Vinodkumar, M., Ravishankar, etal. "Drug utilization evaluation of cardiovascular drug in outpatient department in tertiary care hospital", International Journal of Current Research, 2015; 7(9): 20693-20697.
27. Liau C-S, Tseng Y-Z, Lee T-K. Prevalence of cardiovascular diseases in elderly Chinese people in Taiwan. International Journal of Cardiology [Internet]. Elsevier BV, 1998; 67(2): 177–81. Available from: http://dx.doi.org/10.1016/s0167-5273(98)00282-4
28. Nagabushan H, Roopadevi H, Prakash G, Pankaja R. A prospective study of drug utilization pattern in cardiac intensive care unit at a tertiary care teaching hospital. International Journal of Basic and Clinical Pharmacology [Internet]. Medip Academy, 2015; 579–83. Available from: http://dx.doi.org/10.18203/2319-2003.ijbcp20150044
29. Nallapu SSR. Estimation of Lifestyle Diseases in Elderly from a Rural Community of Guntur District of Andhra Pradesh. JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH [Internet]. JCDR Research and Publications, 2014. Available from: http://dx.doi.org/10.7860/jcdr/2014/8050.4239
30. Grant DJ[1] ClinEndocrinol (Oxf), 1995; 43(3): 339-45.
31. Chinnakali P, Mohan B, Upadhyay R, Singh A, Srivastava R, Yadav K. Hypertension in the elderly: Prevalence and health seeking behavior. North American Journal of Medical Sciences [Internet]. Medknow, 2012; 4(11): 558. Available from: http://dx.doi.org/10.4103/1947-2714.103314
32. Khandelwal R, Gupta A, Kapil U. Prevalence of Dyslipidemia in Geriatric rural Population Residing in a Hilly District of Uttarakhand State, India. Indian Journal of Community Health, 2018; 30(3).
33. Weigensberg MJ, Goran MI. Type 2 diabetes in children and adolescents. The Lancet [Internet]. Elsevier BV, 2009; 373(9677): 1743–4. Available from: http://dx.doi.org/10.1016/s0140-6736(09)60961-2
34. Barlassina C. Genetics of Essential Hypertension: From Families to Genes. Journal of the American Society of Nephrology [Internet]. American Society of Nephrology (ASN), 2002; 13(90003): 155–164. Available from: http://dx.doi.org/10.1097/01.asn.0000032524.13069.88
35. Chentli F, Azzoug S, Mahgoun S. Diabetes mellitus in elderly. Indian Journal of Endocrinology and Metabolism [Internet]. Medknow, 2015; 19(6): 744. Available from: http://dx.doi.org/10.4103/2230-8210.167553
36. Alonge T, Adebusoye L, Ogunbode A, Olowookere O, Ladipo M-A, Balogun W, et al. Factors associated with osteoporosis among older patients at the Geriatric Centre in Nigeria: a cross-sectional study. South African Family Practice [Internet]. AOSIS, 2017; 59(3): 87–93. Available from: http://dx.doi.org/10.1080/20786190.2016.1272248
37. Rezende LFM de, Rodrigues Lopes M, Rey-López JP, Matsudo VKR, Luiz O do C. Sedentary Behaviour and Health Outcomes: An Overview of Systematic Reviews. Lucia A, editor. PLoS ONE [Internet]. Public Library of Science (PLoS), 2014; 9(8): 105620. Available from: http://dx.doi.org/10.1371/journal.pone.0105620
38. Long AN, Dagogo-Jack S. Comorbidities of Diabetes and Hypertension: Mechanisms and Approach to Target Organ Protection. The Journal of Clinical Hypertension [Internet]. Wiley, 2011; 13(4): 244–51. Available from: http://dx.doi.org/10.1111/j.1751-7176.2011.00434.x
39. Puth M-T, Klaschik M, Schmid M, Weckbecker K, Münster E. Prevalence and comorbidity of osteoporosis– a cross-sectional analysis on 10,660 adults aged 50 years and older in Germany. BMC Musculoskeletal Disorders [Internet]. Springer Science and Business Media LLC, 2018; 19(1): 144. Available from: http://dx.doi.org/10.1186/s12891-018-2060-4
40. Farhud DD. Impact of lifestyle on health. Iranian journal of public health, 2015; 44(11): 1442.
41. Huml D, Štimac D, Čulig J, Andabaka I, Tadić I, Portolan M. Improving patient's medication adherence in chronic diseases. InESCP 37th European Symposium on Clinical Pharmacy, Pharmaceutical Care Models, and Therapeutic Innovations, Dubrovnik, Croatia, Pharmacy World & Science [Internet]. Springer Science and Business Media LLC, 2009; 31(2): 90. Available from: http://dx.doi.org/10.1007/s11096-008-9274-8
42. Tabrizi JS, Sadeghi-Bazargani H, Farahbakhsh M, Nikniaz L, Nikniaz Z. Prevalence and Associated Factors of Prehypertension and Hypertension in Iranian Population: The Lifestyle Promotion Project (LPP). Fuchs FD, editor. PLOS ONE [Internet]. Public Library of Science (PLoS), 2016; 11(10): 0165264. Available from: http://dx.doi.org/10.1371/journal.pone.0165264

43. Committees, ESC/EAS Guidelines for the management of dyslipidaemias: The Task Force for the management of dyslipidaemias of the European Society of Cardiology (ESC) and the European Atherosclerosis Society (EAS), European Heart Journal, 2011; 14: 1769–1818. Available from: https://doi.org/10.1093/eurheartj/ehr158
44. Daniel D. Dressler. Guidelines for Diabetes Care in the Hospital.American Diabetes Association. Diabetes Care, 2019.
45. Camacho PM. 2016 American Association of Clinical Endocrinologists/American College of Endocrinology Clinical Practice Guidelines on Postmenopausal Osteoporosis. US Endocrinology [Internet]. Touch Medical Media, Ltd, 2016; 12(02): 74. Available from: http://dx.doi.org/10.17925/use.2016.12.02.74.