

Research article

Risk Factors, Assessment, and Health Related Quality of Life in Patients with Dyslipidemia in a Tertiary Care Hospital, India

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Abstract: The main objective of this study was to identify the risk factors of dyslipidemia and measure its impact on patients' quality of life (QOL). A cross-sectional study was conducted on 100 elderly individuals. A standardized questionnaire was developed to assess the QOL using the short form-36 (SF-36) score. A total of 100 individuals were interviewed, of which 45% were females. The patients or the caregivers were briefed about the study and consent was obtained to be recruited in the study. The mean age of our study subjects was found to be 55.5 ± 12.1 years. Evaluation of risk assessment done by using JBS3 risk score revealed 55.5% of the study population have the risk of $\leq 20\%$ and 44.4% of the study population have the risk $\geq 21\%$ of developing CVD in the next 10 years, out of which 48.6% of male patients have risk $\leq 20\%$ and 51.4% have risk $\geq 21\%$ and 64% of female patients have risk $\leq 20\%$ and 36% have risk $\geq 21\%$. A risk assessment done have shown variation by 13.8 years in heart age from the actual age. The average actual age and heart age were 55.5 ± 12.1 and 69.3 ± 17.1 years respectively. The health-related quality of life of the patient is a combined assessment of the physical component summary (PCS), and mental component summary (MCS). The average of PCS and MCS were found to be 37.1 and 47.3 respectively indicating an overall average of HRQOL as 42.2 which represent low HRQOL in patients with dyslipidemia. The present study highlights the fact that patients with dyslipidemia have poor HRQOL as the overall PCS and MCS scores were low. KAP assessment revealed the majority of the population lack knowledge about the disease but had a positive response in case of practice and attitude towards the disease. DRP evaluation showed that most of the drug-related problems were potential drug interactions and poor medication adherence. Hence, these results highlight the extensive need for routine screening programs for blood lipid levels and appropriate intervention programs aimed at risk factor reduction, improve the HRQOL and to reduce the risk percentage for developing CVD in the future, and also improve the knowledge about the disease to the patients, as more information about the disease and its management will empower patients to manage their condition better.

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1. Introduction

Dyslipidemia is one of the major risk factors of cardiovascular disease by contributing to the development and progression of atherosclerosis [1]. According to the recommendations of the European Society of Cardiology in 2011, dyslipidemia is defined as abnormal levels of lipids in the blood (cholesterol, triglycerides, phospholipids, and free fatty acids) [2]. The sixth edition of the survey ObEpi Roche [3], conducted in France between January and March 2012, in a sample of more than 25,000 individuals aged 18 years and over, has shown 15.9% of the French population to be treated for dyslipidemia. In the United States, 49% of adults have a total cholesterol level of ≥ 100 mg/dl [4]. Dyslipidemia is considered a major risk factor for cardiovascular complications [5]. Many studies such as those conducted by the World Health

Organization and “Framingham” created the association of plasma cholesterol level with the risk of cardiovascular disease [6, 7]. This association is also confirmed in the results of a meta-analysis of 10 cohort studies, which stated that for a reduction of 0.6 mmol/l of serum total cholesterol in adults aged over 60 years, the risk of fatal cardiovascular disease decreases by 27% [8]. Risk factors for dyslipidemia are well documented, including lifestyle choices such as high-fat diet, smoking, alcohol consumption, physical inactivity, metabolic disorders such as obesity and diabetes, family history, and genetic differences [9-12]. Particularly, the prevalence of dyslipidemia in women increases significantly after the age of 50 [13]. Dyslipidemia has negative effect on health-related quality of life (HRQoL), even though relatively few studies have measured the HRQoL associated with dyslipidemia in women aged 50 yr and over. The Indian Council of Medical Research (ICMR) surveillance project reported a prevalence of dyslipidemia of 37.5% among adults aged 15-64 years, with an even higher prevalence of dyslipidemia 62% among young male industrial workers. [14] Various studies also reported greater triglyceride levels in rural and urban populations associated with low HDL cholesterol levels. [14, 15].

An important shortcoming of Indian epidemiological studies is the lack of large studies with details of patterns of dyslipidemia. When compared with the western populations, Indians and migrant South Asians tend to have higher triglyceride levels and lower HDL cholesterol while total cholesterol levels are lower than in the US and the UK. Only a few large studies have reported the prevalence of different forms of lipid abnormalities among Indians. India Heart Watch study carried out among urban middle-class subjects in 11 cities of India with fasting lipid estimation revealed alarming facts that India is undergoing a rapid epidemiological transition with increasing population, economic prosperity, urbanization, and aging with associated risk factor transition. An increase in cardiovascular risk and hypercholesterolemia is also associated with an increase in adverse lifestyles such as greater smoking and tobacco use, change in nutritional habits with greater intake of unhealthy diets, and increasingly sedentary lifestyle. All the above-mentioned risk factors have contributed to the sharp rise in the burden of non-communicable diseases, especially coronary heart disease (CHD). Even in rural areas of India non-communicable and chronic diseases have become the leading causes of death [14,15], Therefore, this study is proposed with the objective to concentrate on the identification of various risk factors, risk assessment associated with dyslipidemia and also measure its impact on patient's HRQOL.

Material and Methods:

The study was conducted at tertiary care hospital. This study was conducted on patients drawn from Outpatient clinic and Inpatient wards of the Department of General Medicine. Patient details and all other medical relevant information of one hundred patients was collected and documented.

A. Short form survey (SF-36): HRQOL was measured using the Short Form Health Survey. It contains 36 questions. The SF-36 assesses eight health dimensions: physical functioning, role physical limitation, bodily pain, general health, social functioning, role emotional limitation, mental health, and vitality. Higher scores represent better HRQOL, indicating higher levels of functioning or well-being.

B. Joint British Societies (JBS-3): Evaluation of risk factors and risk assessment was done by using JBS3 risk calculator; it estimates both ten year risk and lifetime risk of CVD in all individuals except for those with existing CVD or certain high risk diseases i.e. diabetes age >40 years, Patients with chronic kidney disease (CKD) stages 3-5, or familial hypercholesterolemia.

C. Pharmaceutical care network Europe (PCNE) v8.01: It's a classification scheme constructed for drug related problems (DRPs). The classification is part of a total set

of instruments. The classification is for use in research into the nature, prevalence, and incidence of DRPs.

D. KAP questionnaires: It contains questions for assessing the patients, knowledge, attitude and practice towards their disease state.

E- Data collection form:

Data collection was done by using a self-designed data collection form, which contains details like demography, chief complaints, history of present illness, medication and medical history, co-morbidities, clinical data such as various laboratory reports and therapeutic data including dose, duration, frequency, route of administration and concomitant medication were collected and documented.

Result:

This study included a total of 100 patients drawn from Outpatient clinic and inpatient wards of the Department of General Medicine. Out of the 100 set of population enrolled for the study 55.00% were male (n=55), 45.00% were female (n=45). The average age of the study population was found to be 55.5 ± 12.1 years. Among the subjects enrolled for the study, age group 55-64 were the majority in number accounting for 31.50% of the total population, and age group 18-24 were minimal in number i.e. 0.50%. Prevalence of abnormal total cholesterol (TC), triglyceride (TG), high density lipoprotein (HDL) and very low-density lipoprotein (VLDL) in women was higher than in men whereas level of (LDL) was higher in men as shown in figure 1.

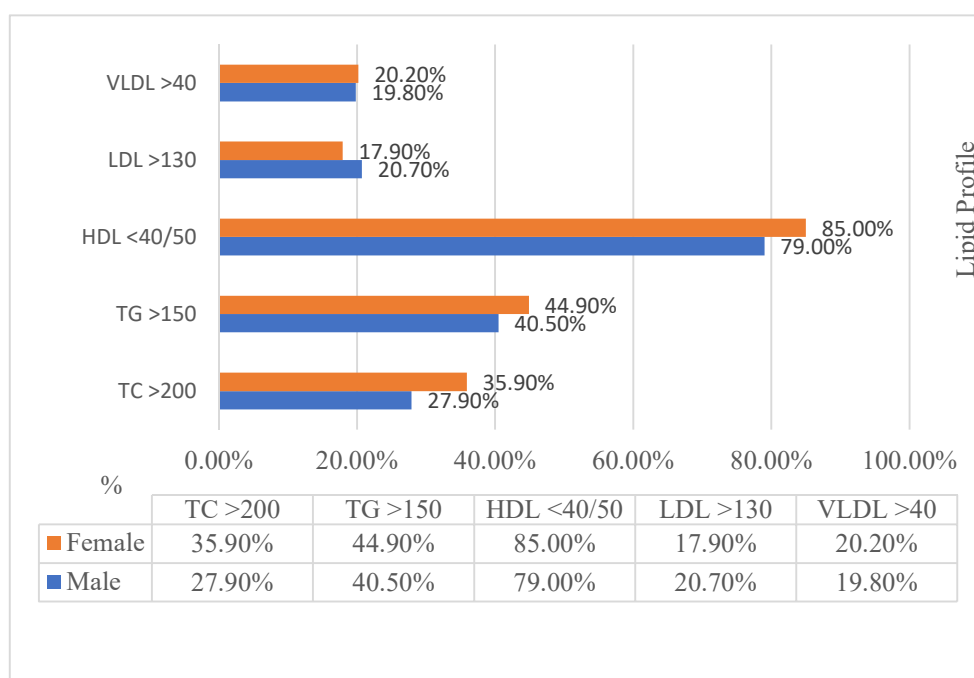


Figure 1: Prevalence of dyslipidemia

Risk Factors

Out of the 100 patients involved in the study, majority of the patients were found to be between the age group of 55-64 (31.5%), thus as the age increases there is a proportionate increase in the risk of acquiring dyslipidemia. Prevalence of the disease was seen more in male population 55% (n=55), than in female population 45% (n=45). Majority of patients in the study i.e. 74.00% (n=74) were found to have lack of physical activity as a chief risk factor and the least percentage of risk factor was among patients who were smoking i.e. 23.00% (n=23), and other risk factors included hypertension, overweight, diabetes, and alcohol consumption as shown in figure 2.

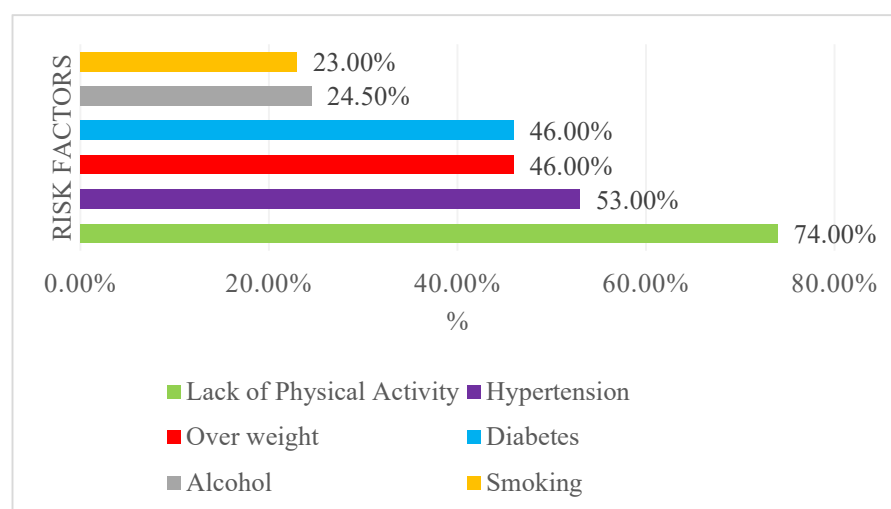


Figure 2: Risk factors

Prevalence of Co-Morbidities in Study Population:

In our study of 100 dyslipidaemia patients, the most commonly seen co-morbidity was HTN with 67.50% (n=67) and the least found comorbidities were bronchitis, COPD and asthma with 4.00% each (n=4), as shown in figure 3.

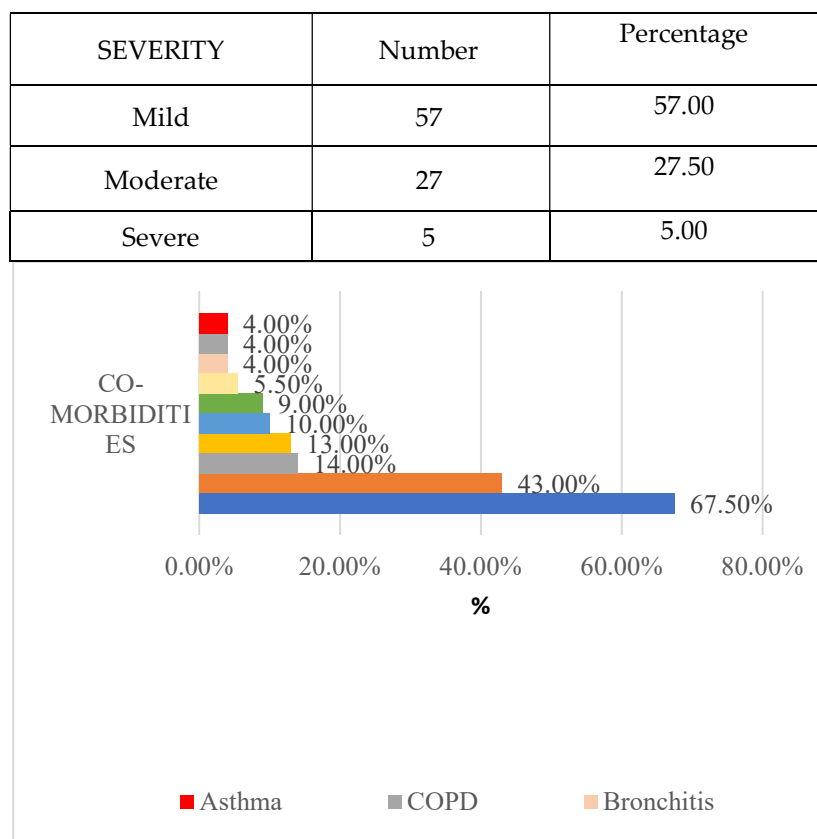


Figure 3: Prevalence of co-morbidities in dyslipidemic patients

Charlson Co-morbidity Index (CCI) scoring was done for all the 100 patients in the study to assess the ten-year mortality for a patient who may have a range of

comorbid conditions, and the highest average of 2.53 was seen in patients between age group of 55-64.

Severity of Co-Morbidities Based on CCI Score:

Among the co-morbidities found in our study population 57% (n=57) were mild, 27% (n=27) were moderate, and 5% (n=5) were severe, as shown in table 1.

Risk Assessment:

Joint British Societies-3 (JBS-3) risk score analysis revealed that 55.5% of the study population have risk of 0-20% for developing CVD in the next 10 years and the least of 5% study population is in between 61-80, as shown in figure 4.

Table 1: Severity of co-morbidities based on CCI score

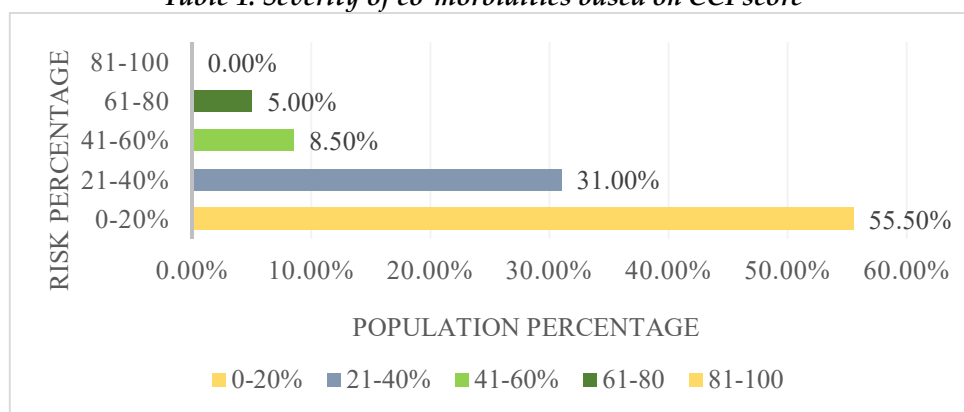


Figure 4: Risk assessment

Risk Assessment in Male Population

JBS-3 risk score analysis to evaluate the risk assessment in male population revealed 48.6% have risk between 0-20 percent for developing CVD in the next 10 years, as depicted in Figure 5.

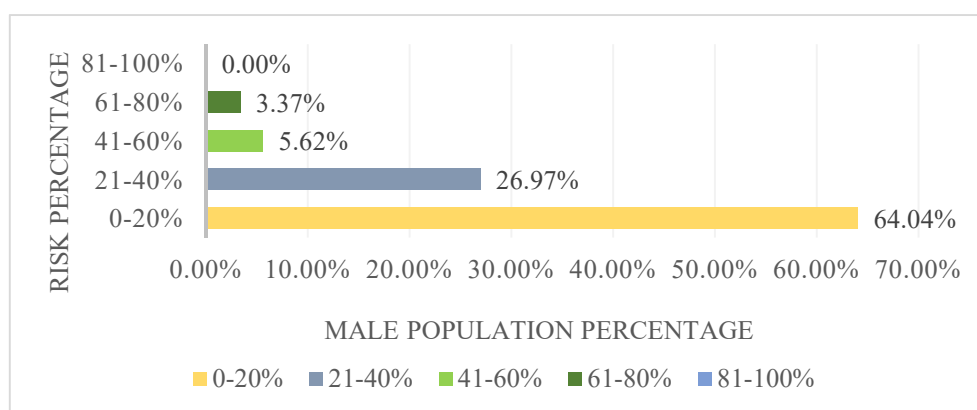


Figure 5: Risk assessment in male population

Risk Assessment in Female Population:

JBS-3 risk score analysis to evaluate the risk assessment in female population revealed 64.04% have risk between 0-20 percent for developing CVD in the next 10 years, as depicted in Figure 6.

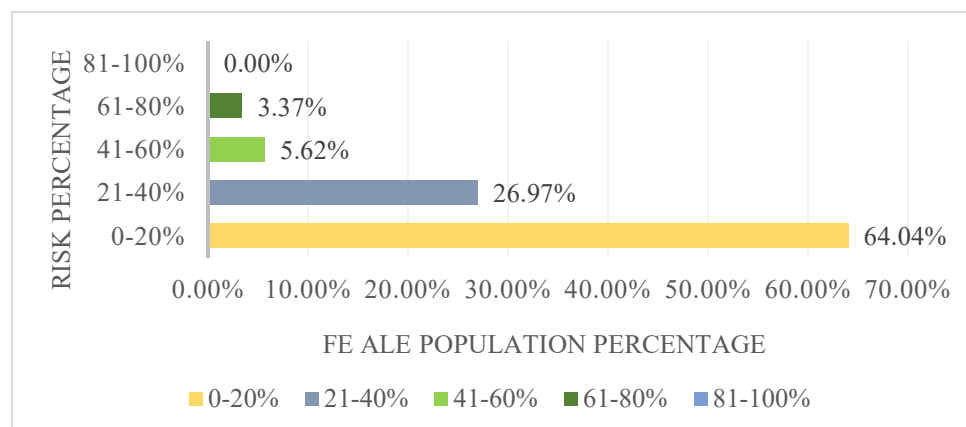


Figure 6: Risk assessment in female population

Health Related Quality of Life Assessment

Physical component summary (PCS)

Analysis of HRQOL in study population using SF-36 revealed the average of physical functioning (PF), role limitation due to physical health (RLPH), pain and health change to be 45.7, 28.8, 39.3, and 34.7 respectively. Physical functioning dimension had better average and the least average was seen in role limitation due to physical health, as shown in Figure 7.

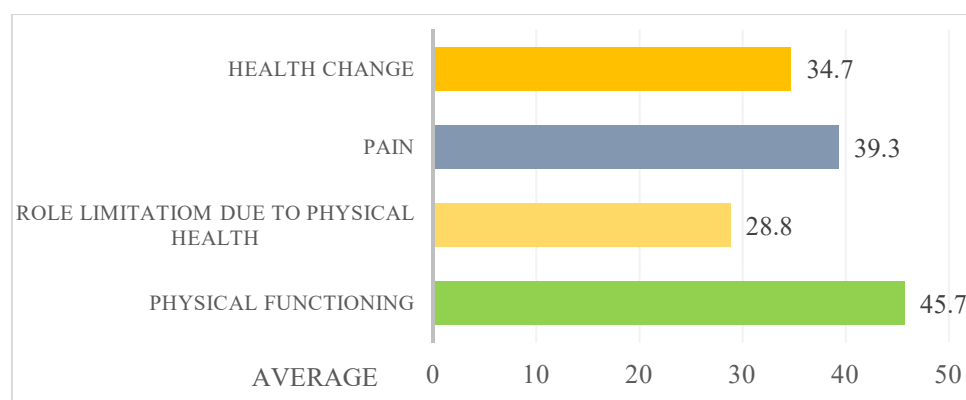


Figure 7: Physical component summary

Mental component summary (MCS)

Analysis of mental component revealed the average of social functioning, role limitation due to emotional problems (RLEP), energy and emotional well-being to be 47.6, 31, 53.9, and 56.8 respectively. Emotional well-being had better average and the least average was seen in role limitation due to emotional problems, as shown in Figure 8.

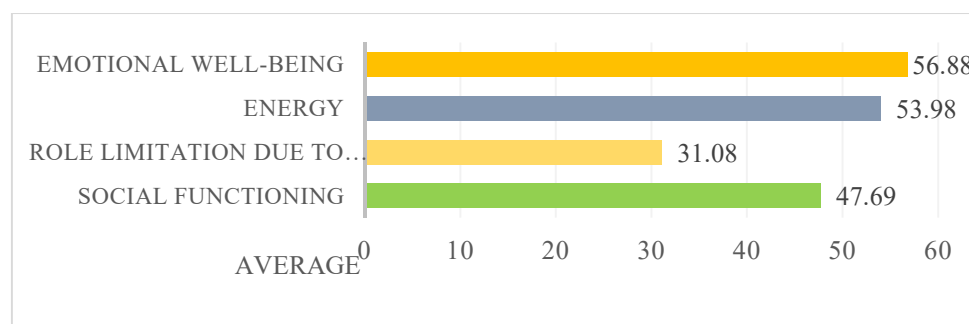


Figure 8: Mental component summary

Physical and mental component summary

As shown in fig 9 the total average of four dimensions each under MCS and PCS were 47.3 and 37.1 respectively.

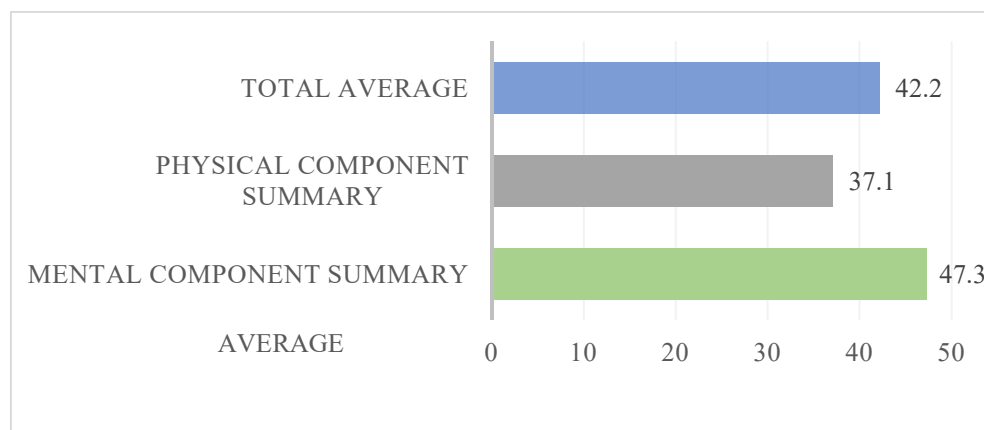


Figure 9: Physical and Mental component summary

Drug Related Problem

The drug related problems identified in our study population includes inappropriate combination of drugs, patient uses/takes less drug than prescribed or does not take the drug at all, patient stores drug inappropriately and inappropriate timing or dosing intervals, as shown in Table 2

Table 2: Drug related problems

Drug Related Problem	number
C1.4	05
C7.1	05
C7.6	04
C7.7	04
Total number of Drug Related Problem	18

C1.4: Inappropriate combination of drugs or drugs and herbal medication.

C7.1: Patient uses/takes less drug than prescribed or does not take the drug at all

C7.6: Patient stores drug inappropriately.

C7.7: Inappropriate timing or dosing intervals.

Discussion:

This study was three months long observational study performed in the outpatient clinic and inpatient wards of the Department of General Medicine in Tertiary Care Hospital, A total of 100 patients were enrolled in the study based on various inclusion and exclusion criteria. Male predominance was seen in this study as 55% (n=55)

of the patients were male and 45% (n=45) were female. A similar study was conducted by Bansal M, et al., on "Relationship between different cardiovascular risk scores and measures of subclinical atherosclerosis in an Indian population" had a study population of 194 patients constituting the majority of male patients. [17] In another study conducted by Bansal M, et al., on "Comparative accuracy of different risk scores in assessing cardiovascular risk in Indians" comprised a study population consisting of 82% males and 18% females. [18] The mean age of our study subjects was 55.5 ± 12.1 years, which was similar to the mean age (57.5 ± 13.2 years) in a study conducted by Qi L, et al., on "Prevalence and Risk Factors Associated with Dyslipidemia in Chongqing, China". [19] In our study majority of patients i.e. 31.5% belonged to the age group of 55 – 64 years whereas in the study conducted by Ebrahimi H, *et al.*, most of the patients were in the age group of 45-69 years. [14]. Prevalence of various dyslipidemia among male and female were done in this study. The abnormal findings in male and female respectively were as follows: total cholesterol ≥ 100 mg/dl in 27.90% and 35.90%; triglyceride ≥ 150 mg/dl in 40.50% and 44.90%; HDL ≤ 55 mg/dl (male) and ≤ 65 mg/dl (female) in 79.00% and 85.00%; LDL ≥ 130 mg/dl in 20.70% and 17.90%, whereas a study conducted by Gupta R, et al., on "Recent trends in epidemiology of dyslipidemia in India" found the abnormal findings in male and female respectively were as follows: total cholesterol ≥ 100 mg/dl in 25.40% and 35.60%; triglyceride ≥ 150 mg/dl in 33.90% and 26.80%; HDL ≤ 40 mg/dl (male) and ≤ 50 mg/dl (female) in 54.90% and 64.40%; LDL ≥ 100 mg/dl in 28.10% and 35.10%. [15] A study conducted by Ebrahimi H, et al., on "Dyslipidemia and its factors among urban middle-aged Iranians" revealed low HDL was the most common disorder with a prevalence of 42.3%; the prevalence of hypertriglyceridemia and hypercholesterolemia was 28.9% and 13.4% respectively. [14] Risk factors like age, gender, smoking, alcohol, hypertension, diabetes, overweight, lack of physical activity was seen in our study population which is similar to study conducted by Qi L, et al., concluded with findings such as lack of gender, age, obesity, physical activity, as risk factors for dyslipidemia. [19] While a study conducted by Moor VJA, et al., found a strong association between diabetes mellitus and dyslipidemia. [20] The study conducted by Tripathy JP, *et al.*, on "Burden and risk factors of dyslipidemia in Punjab, India" revealed risk factors like smoking, alcohol, hypertension, diabetes, age, gender, and family history. [21] A study by Farhat A, *et al.*, on "Risk factors and QOL of dyslipidemic patients in Lebanon" also concluded with risk factors such as active and passive smoking, hypertension, diabetes, overweight and lack of physical activity. [22] Evaluation of risk assessment done by using JBS3 risk score revealed 55.5% of the study population had risk of $\leq 20\%$ and 44.4% of the study population have risk $\geq 21\%$ of developing CVD in the next 10 years. A study conducted by Bansal M, et al., on "Relationship between different cardiovascular risk scores and measures of subclinical atherosclerosis in an Indian population" found $\geq 20\%$ risk of CVD in 58.6% of his study population using JBS3 risk score. [18] Then in our study a comparison of chronological age and heart age was done, where heart age was found to be higher than the chronological age, which is similar to a study conducted by Patel RS et al., on "Online self-assessment of cardiovascular risk using Joint British Society (JBS3) - derived heart age: a descriptive study" also concluded that the heart age was higher than the chronological age [23]. The health-related quality of life of the patient was assessed using SF-36 questionnaire. It is a combined assessment of the physical component and mental component of the patient, in which physical component constitutes of physical functioning, role limitation, physical health, pain and health change and mental component constitute of social functioning, role limitation due to emotional problems, energy, and emotional wellbeing. In a study conducted by Farhat A, *et al.*, showed average of physical functioning,

role limitation, physical health, pain and general health as 60.2, 50.7, 65, and 45.8 respectively [22]. The average of social functioning, role limitation due to emotional problems, energy, and emotional wellbeing were 66.7, 66.1, 47.4, and 61.7 respectively. The average of PCS and MCS were 55.4 and 60.5 respectively indicating an overall average of HRQOL as 57.9, [22] while in our study the average of physical functioning, role limitation physical health, pain, and health change were 45.7, 28.8, 39.3, and 34.7 respectively. The average of social functioning, role limitation due to emotional problems, energy, and emotional well-being were 47.6, 31, 53.9, and 56.8 respectively. The average of PCS and MCS were 37.1 and 47.3 respectively indicating an overall average of HRQOL as 42.2. According to a study conducted by Lalonde L, *et al.*, which stated that cardiac patients with hypertension reported lower physical health than those without hypertension, while cardiac patients with dyslipidemia reported better physical health than those without dyslipidemia. Whereas it was found that physical health in our study population was comparatively lower [24]. A study conducted by Huri HZ, *et al.*, on "Drug related problems in type 2 diabetes mellitus patients with dyslipidemia", using PCNE tool concluded potential drug interactions, poor medication adherence, and the lack of health consciousness as the three most common factors, which is similar to our study where majority of the drug-related problems were potential drug interactions and poor medication adherence [25].

Conclusion:

In conclusion the majority of the patients enrolled in the study were males, the age distribution seen highest in age group between 55-64. The results of our study show age, gender, lack of physical activity, overweight, HTN, DM, consumption of alcohol and smoking were found. The result of risk assessment revealed 55.5% of the study population have risk of $\leq 20\%$ and 44.4% of the study population have risk $\geq 21\%$ of developing CVD in the next 10 years. The comparison of actual age and heart age data have shown variation by 13.8 years in heart age from actual age. The average of actual age and heart age were 55.5 ± 12.1 and 69.3 ± 17.1 years respectively. The present study highlights the fact that patients with dyslipidemia have poor HRQOL as the overall PCS and MCS scores were low. KAP assessment revealed out of the 100-study population, majority of the population lack knowledge about the disease but in case of practice and attitude towards the disease, majority of the population have positive response. Evaluation of DRPs showed majority of them was potential drug interactions and poor medication adherence. Hence, these results highlight the pivotal role of pharmacist as a health care team provider in the management of dyslipidemia through routine screening programs for blood lipid levels and appropriate intervention programs aimed at risk factor reduction, improve the HRQOL and to reduce the risk percentage for developing CVD in the future, and also improve the knowledge about the disease to the patients, as more information about disease and its management will empower patients to manage their conditions better. Focus on dyslipidemia management is urgently required in India to halt the rising tide of coronary heart disease

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