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Original Article

Identification of DRPs and Assessment of Health-Related Quality of Life in Cardiovascular Patients in Tertiary Care Teaching Hospital

Sanatkumar Bharamu Nyamagoud*, Agadi Hiremath Vishwanath Swamy, Amisha Netalakar, Bhoomika S K, Namratha D, Tahameen K Kurabanavar

Department of Pharmacy Practice, KLE College of Pharmacy (A Constituent Unit of KLE Academy of Higher Education and Research, Belagavi), Vidyanagar, Hubballi. Karnataka, INDIA.

ABSTRACT

Background: Cardiovascular Disease (CVD) commonly known as disease of heart blood vessels and is typically composed of fatty deposits. The WHO estimates that approximately 17.3 million people worldwide die each year from CVD. **Purpose:** To identify DRPs, and assess the Health Related Quality of Life in the study population. **Materials and Methods:** A Prospective observational study was carried out on 210 patients in the cardiology department over 6 months. DRPs were identified by using the PCNE tool 9.1 version. The Health-Related Quality of Life was measured by using the SF-36 questionnaire in cardiac patients. **Results:** Among 210 subjects, 205 subject profiles were identified with 520 DRPs, which included 166 drug interactions, 37 problems related, and 147 causes related, a total of 50 interventions were found and accepted, so the outcome of the intervention is 50. significant correlation was observed in the physical function domain of HRQoL, age in Physical functioning, Role limitation due to physical health, and General health and also reported significant correlation of age in Energy/fatigue, Emotional well-being and Role limitation due to emotional problems.

Keywords: Cardiovascular disease, DRPs, HRQoL, PCNE.

Correspondence:
Dr. Sanatkumar Bharamu Nyamagoud
Assistant Professor, Department of Pharmacy Practice, KLE College of Pharmacy (A Constituent Unit of KLE Academy of Higher Education and Research, Belagavi), Vidyanagar, Hubballi. Karnataka, INDIA.
Email: dr.sanathnyamagoud@gmail.com

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INTRODUCTION

Heart-related illnesses are often referred to as Cardiovascular Disease (CVD). Heart attacks and heart failure are caused by the high levels of fatty tissue blocking the coronary arteries.[1]

The World Health Organization (WHO) estimates that approximately 17.3 million people worldwide die each year from cardiovascular disease, and that number will rise to 23 million by the year 2030.[2] The underlying blood vessel illness frequently has no symptoms. A heart attack or stroke could be the initial symptom of a hidden illness. Heart attack signs and symptoms include Chest pain or discomfort in the middle; and/or arm, left shoulder, elbow, jaw, or back pain or discomfort. Sudden weakness of the face, arm, or leg, usually on one side of the body, is the most typical sign of a stroke. Other signs include severe headache with no apparent cause, numbness of the face, arm, or leg, particularly on one side of the body; confusion; difficulty speaking or understanding speech; difficulty seeing with one or both eyes; difficulty walking; dizziness and/or loss of balance or coordination; and/or fainting or unconsciousness.[3]

Drug Related Problems (DRPs) is a situations involving pharmacological therapy that interferes with expected health outcomes either directly or indirectly. DRPs are the results of unmet needs. DRPs can happen for a variety of reasons, including improper drug choice, improper drug interaction, or the use of unproven medication in place of proven therapy. A fundamental component of pharmacological treatment has been described as the discovery, resolution, and prevention of DRPs.[4,5] The PCNE classification system is the most widely used and, because it is regularly updated and changed, offers higher practicability and internal consistency. V9.1 is the most recent version. PCNE has a number of domains, including issue domains, drug-related problem causes, planned intervention domains, and problem status domains. Hospitalized patients are more likely to experience DRPs, which can raise expenses and patient morbidity and death. Hospitalized patients had DRPs almost three times more frequently than outpatients with CVD.[6]

According to the World Health Organization (WHO) Health Related Quality of Life (HRQoL) is described as "a wide notion affected in a complicated way by the person's physical condition, psychological state, level of independence, and social

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relationships. Among CVDs, quality of life can be regarded as the most crucial healthcare outcome. In every disease management strategy, Quality of Life is seen as a significant result, according to the definition of health. One of the key goals of the health care system is to enhance and sustain health-related quality of life.[7]

MATERIALS AND MATERIALS

Study Site

The study was conducted in cardiac inpatients of the cardiology department at Vivekananda General Hospital, Hubballi.

Study Participants

Patients of either gender with an age of more than 18 years diagnosed with CVD and admitted to the Department of Cardiology at Vivekananda General Hospital were included in the study. We have excluded pregnant women with CVD from this study.

Study tool

A suitable data collection form was designed, and necessary data were collected from the patient's case notes. DRP's in cardiac patients were evaluated by using the PCNE tool 9.1 version. The health-related quality of life was measured by using SF-36 questionnaire in cardiac patients was documented in the data collection form and analyzed systematically.

RESULTS

Distribution of study subjects based on demographic details

Total of 210 subjects enrolled in the study of which 128 were male (61.0%) and 82 were female (39.0%). The subjects were categorized into age groups. Age group 61-70 years were in majority accounting for 60 (28.57%) and age group 21-30 years were minimal in number 5 (2.38%). Among subjects, 43 (20.48%) were smokers, 56 (26.67%) were alcoholics, 24 (11.43%) engaged in both drinking and smoking and 59 (28.09%) subjects were involved in chewing gutka. In our study most commonly seen co-morbidities were HTN 65 (40.123%), and Diabetic mellitus 58 (35.802%). The study subjects were categorised based on employment status, Employed were 153 and Unemployed were 57.

In this study 116 (55.23%) belong to Rural residences and 94 (44.76%) belong to Urban residences. Subjects were categorized based on marital status and were divided according to their BMI. 76 subjects stayed for longer periods and 37 were for shorter periods stayed in hospital. And in this study subjects were classified based on socioeconomic status such as Upper class, upper middle class, lower class and lower middle class, as shown in the Table 1.

Drug related problems in the study population

Among 210 subjects, 520 DRPs were identified in the 205 patients. Out of 520 DRP's, 89 (17.1%) were Problem-Related, 257 (49.4%) Cause-Related, 85 (16.3%) Interventions, 53 (10.1%) Acceptance of Interventions, and 36 (6.9%) Outcomes of intervention results, Table 2.

Drug interactions in the study population

It was observed that 105 Drug interactions were more common among 520 DRPs, which includes 29 (27.61%) major drug interactions, 65 (61.90%) moderate drug interactions and 11 (10.47%) minor drug interactions as shown in Table 3.

Untreated symptoms or indications in the study population

The untreated symptoms or indications in the study population were diarrhoea 17 (25.7%), cough 10 (15.15%), fever 8 (12.12%), abdominal pain 10 (15.15%), pain 11 (10.47%) and vomiting/ nausea 10 (15.15%). As shown in the Table 4.

Adverse drug reaction in the study population

In our study population, we identified total of 23 ADRs in which a combination of Digoxin and Spironolactone induces gynecomastia 4 (17.39%), Amlodipine induced bilateral pitting oedema 5 (21.73%), Cephalosporin induced erythematous patch 2 (8.69%) and Atorvastatin induced myalgia 12 (52.17%), as shown in the Table 5.

Treatment duration in the study population

In our study population we identified 15 DRPs that were associated with treatment duration. Short duration were Levofloxacin 2 (13.3%), enoxaparin 9 (60%), and PCT 4 (26.6%), And long duration drugs were, Tramadol 4 (57.14%) and Meropenem 3 (42.85%) were recommended the treatment duration for more than 10 days, as shown in the Table 6.

DRPs in Drug Dispensing

In our study, we analysed that a total number of 30 DRPs were related to the Drug Dispensing occurred, as shown in Table 7.

DRPs in Patient Related Domain

A total of 42 DRPs were found in Patient-Related Domain, which were either consciously or mistakenly carried out by patients as seen in the Table 8, 12 (28.57%) patients received their dosages at the incorrect times, 20 (47.61%) patients used their medications incorrectly, and 10 (23.08%) patients improperly stored their medications, as shown in the Table 8.

DRPs in Intervention Domain

Distribution of planned intervention based on PCNE classification, as shown in Table 9.

Table 1: Distribution of study subjects based on demographic details.

Demographic Details	Frequency (N)	Percentage (%)
Gender		
Male	128	61.0%
Female	82	39.0%
Age		
21-30	5	2.38%
31-40	23	10.95%
41-50	44	20.95%
51-60	45	21.43%
61-70	60	28.57%
71-80	27	12.86%
81-90	6	2.86%
Social habits		
Alcoholic	56	26.67%
Smoking	43	20.48%
Alcoholic+Smoking	24	11.43%
Chewing gutka	59	28.09%
No social habits	28	13.33%
Comorbidities (162)		
Hypertension (HTN)	65	40.12%
Diabetes mellitus (DM)	58	35.80%
Ischemic heart disease (IHD)	6	3.70%
Rheumatic heart disease (RHD)	1	0.61%
Tuberculosis (TB)	1	0.61%
Appendicitis	1	0.61%
Hypothyroidism	10	6.17%
Chronic obstructive pulmonary disease (COPD)	15	9.25%
Pulmonary edema	5	3.08%
Residence		
Rural	116	55.23%
Urban	94	44.76%
Marital status		
Married	156	74.3%
Unmarried	25	11.9%
Widow	29	13.8%
Body Mass Index		
Normal weight (18.5-24.9)	70	33.33%
Obesity-class 1(30.0-34.9)	80	38.09%
Obesity-class 2(35.0-39.9)	34	16.19%
Pre-obesity(25.0-29.9)	10	4.76%
Under weight (below 18.5)	16	7.61%
Socioeconomic status		
Upper class	8	3.80%
Upper middle class	37	17.61%
Lower class	76	36.19%
Lower middle class	89	42.38%
Duration of hospital stay		
1-4 days	37	17.61%
5-10 days	53	25.23%
10-15 days	76	36.19%
>15 days	44	20.95%

DRPs in the Intervention Acceptance Domain

In this study, DRPs in the Intervention Acceptance Domain according to PCNE classification have a proportion of 50% acceptance. Our study showed the results as 18.86% of Interventions accepted and fully implemented (*N*=10), 9.43% Intervention accepted partially implemented (*N*=5), 37.73% (*N*=20) of Intervention accepted but not implemented and 33.96% (*N*=18) Intervention accepted but implementation is unknown, as shown in the Table 10.

DRPs in Intervention Outcome Domain

By evaluating the Intervention outcome domain of PCNE classification, 11.11% (*N*=4) problem totally solved, 13.88% (*N*=5) problem was not solved due to the lack of cooperation of prescriber, 13.88% (*N*=5) Problem partially solved, 27.77% (*N*=10) problem not solved due to lack of cooperation of patients, 13.88% (*N*=5) problem not solved in patients as the intervention provided was not effective and 19.44% (*N*=7) problem status, as shown in the Table 11.

Health related quality of life

Correlation of Age with Health-Related Quality of Life in the study population

Correlation of Age with PCS

The test revealed significant correlation between age in Physical functioning (p=0.000), Role limitation due to physical health (p=0.000), General Health (p=0.000) and Pain (p=0.08) as shown in Table 12.

Correlation of Age with MCS

The test revealed a significant correlation between age in Energy/fatigue (p=0.006), Emotional well-being (p=0.000), Role limitation due to emotional problems (p=0.000) and an

Table 2: Distribution of DRP's based on PCNE classification in the study population.

	Code	Primary domain	Frequency
Problem	P		89(17.1%)
	P1.3	Untreated symptoms or indication.	66
	P2.1	Adverse drug events (side effects).	23
Causes	C		257 (49.4%)
	C2	Drug Selection.	32
	C4	Treatment duration.	22
	C5	Dispensing	30
	C6	Drug use process.	26
	C7	Patient Related	42
	C9.2	Drug interaction	105
Planned intervention	I		85 (16.3%)
	I1.1	Prescriber informed only.	10
	I1.2	Prescriber asked for information.	8
	I2.1	Patient counselling	30
	I2.4	Spoken to family member	12
	I3.2	Dosage changed to	10
	I3.5	Drug paused/stopped	7
	I3.6	Drug started	8
Intervention acceptance	A		53 (10.1%)
	A1.1	Intervention accepted and fully implemented.	10
	A1.2	Intervention accepted partially implemented.	5
	A1.3	Intervention accepted but not implemented.	20
	A1.4	Intervention accepted implementation unknown.	18
Outcome of Intervention	O		36(6.9%)
	O0.1	Problem status unknown.	7
	O1.1	Problem totally solved.	4
	O2.1	Problem partially solved.	5
	O3.1	Problem not solved lack of cooperation of patients.	7
	O3.2	Problem not solved lack of cooperation of prescriber.	5
	O3.3	Problem not solved intervention not effective.	8
Total	520		

insignificant correlation of age in functioning (p=0.215) as shown in Table 12.

Correlation of Gender with MCS HRQoL employing Mann-Whitney U test in the study population

Physical Component Summary (PCS)

Comparing each domain and demographic factors using Mann Whitney U-Test.

There was a negative correlation between gender and Role limitation due to physical function, General health and pain component of HRQoL but there was a significant correlation in the physical function domain of HRQoL.

Mental Component Summary

Comparing each domain of MCS and demographic factors by using Mann Whitney U-Test.

Table 3: Drug interactions in the study population.

Sl. No.	Interacting drugs	Effect	Severity	No. of patients (N)	Monitoring parameters
1	Aspirin+clopidogrel	Increased bleeding.	Major	9 (8.57%)	Monitor bleeding closely.
2	Aspirin+prasugrel	Increased bleeding.	Major	10 (9.52%)	Monitor bleeding closely.
3	Amlodipine+clopidogrel	Decreased anti- platelet effect.	Major	10 (9.52%)	Monitor clopidogrel efficacy.
4	Digoxin+metoprolol	Increased risk of bradycardia.	Moderate	20 (19.04%)	Monitor HR, bradycardia.
5	Digoxin+ furosemide	Increased risk of digoxin toxicity (nausea, vomiting).	Moderate	30 (28.57%)	Monitor potassium levels.
6	Enalapril+metformin	Increase hypoglycemia.	Moderate	15(14.28%)	Dose adjustment needed.
7	Aspirin+hydrocortisone	Increased risk of GI ulceration.	Minor	11(10.47%)	Monitor the patients.

Table 4: Untreated symptoms or indications in the study population.

Sl. No.	Indication	No. of patients (N)
1	Diarrhea	17 (25.7%)
2	Vomiting/ Nausea	10 (15.15%)
3	Fever	8 (12.12%)
4	Abdominal pain	10 (15.15%)
5	Cough	10 (15.15%)
6	Pain	11 (10.47%)
Total	66	

There was an insignificant correlation between the gender and MCS of HRQoL.

DISCUSSION

The prospective study was conducted for 6 months attending inpatients Department of Cardiology Vivekananda General Hospital which is a 500-bed multispecialty tertiary care teaching hospital in Hubballi. A total of 210 patients were enrolled in this study based on inclusion and exclusion criteria of which 128 were male and 82 were female.

The mean age of the study population was found to be 58.62±26.02. Subjects with age group of 61-70 years were in the majority accounting for 28.57% (*N*=60) of the total population and the age group 21-30 years were minimal accounting for 2.38% (*N*=5). Contrary to the study conducted by M. Reshma *et al.*,[8] subjects with age group of 41-50 years and 51-60 years were in the majority and subjects greater than 80years were minimal in number

In this study out of 210 subjects, 43 were engaged in habits such as smoking, 56 were alcoholics, 59 were involved chewing gutka and 24 were indulged in both drinking alcohol and smoking. A similar study was conducted by Bibirsa Sefera *et al.*,[9] where 31 were alcoholic, 38 were smokers and 62 were involved in khat chewing.

In this study, the most commonly seen comorbidities were HTN (65) and DM (58) whereas the least found comorbidities were RHD (1), TB (1), Appendicitis (1). The other comorbidities found in the subjects were COPD (15), Hypothyroidism (10), Pulmonary edema (5). A similar study by conducted by Asmita *et al.*, which revealed the similar results.

In our study, we classified the subjects based on the employment status such as employed and unemployed. Out of 210 subjects, employed category included 43 subjects and unemployed category included 67 subjects. A study by Bibirsa Sefera *et al.*,[9] showed contradictory results that is unemployed category included 34 subjects and employed category included 203 subjects.

In our study 118 (56.2%) subjects were from rural area and 92 (44%) subjects were from urban area. Similar results were revealed by Bibirsa Sefera *et al.*,[9] Whereas the study conducted by Aikaterini *et al.*, revealed, 62 (77.5%) subjects were from urban area and 18(22.5%) were from rural area.

Among 210 study subjects 156 (74.3%) were married, 25 (11.9%) were unmarried and 29 (13.8%) were widows. Similar result was shown by Bibirsa Sefera *et al.* study.[9]

In the current study out of 210 study subjects, 16 belongs to under-weight, 70 had normal weight, 80 belonged to the obesity class-1, 34 belongs to obesity class-2 and 10 belongs to pre-obesity class. A study Francisco Lopez-Jimenez *et al.*,[10] revealed the similar results

Out of 210 study subjects, 53 stayed up to 5-10 days, 76 stayed up-to 10-15 days, 37 stayed 1-4 days and 44 stayed for more than 15 days. A study conducted by M. Reshma *et al.*,[8] showed 81 stayed for 1-3 days, 51 stayed for 4-6 days and 18 stayed for more than 6 days.

Table 5: Adverse drug reaction in the study population.

Sl. No.	ADR occurred	No. of ADR in patients	Percentage of ADR (%)	Drug causing ADR
1	Gynecomastia	4	17.39%	Spironolactone+ Digoxin
2	Bilateral pitting edema	5	21.73%	Amlodipine
3	Erythematous	2	8.69%	Cephalosporin
4	Myalgia	12	52.17%	Atorvastatin
Total		23		

Table 6: Treatment duration.

Sl. No.	Duration of treatment too short	No. of patients (%)	Prescribed duration (days)	Duration of treatment according to standard guidelines
1	Levofloxacin	2(13.3%)	3-5	>7
2	Enoxaparin	9(60%)	3-5	>7
3	PCT	4(26.6%)	3-5	>7
Total	15			
	Duration of treatment too short			
1	Tramadol	4(50%)	11-14	<7
2	Meropenem	3(50%)	14-15	≤7
Total	7			

Table 7: Drug dispensing.

Sl. No.	Causes	Number (%)
1	Prescribed drug not available	22 (73.33%)
2	Necessary drug information not provided	3 (10%)
3	Wrong drug prescribed	5 (16.66%)
Total		30

Table 8: Patient Related Domain.

Sl. No.	Patient related problem	Number (%)
1	Drug taken inappropriately	12 (28.57%)
2	Drug taken in wrong way	20 47.61%)
3	Drug stored inappropriately	10 (23.80%)
Total		42

Among 210 subjects, 205 subject profile were identified with 519 DRP's, which included 166 drug interaction, 36 problem related, 147 causes related, a total of 50 interventions were found and accepted, so the outcome of the intervention is 50. A study by Bibirsa Sefera *et al.*,[9] revealed that out of 237 study subjects, 157 were problem-related, 327 were causes related, a total of 408 interventions were found and 158 were accepted.

Overall 520 DRP's were identified and the most commonly reported were drug interactions 105, followed by ADRs 23,

Table 9: DRPs in Intervention Domain.

Code	Intervention	Number (%)
I1.1	Prescriber informed only	10 (11.76%)
I1.2	Prescriber asked for information	8 (9.41%)
I2.1	Patient counseling	30 (35.29%)
I2.4	Spoken to family member	12 (14.11%)
I3.2	Dosage changed to	10 (11.76%)
I3.5	Drug paused/stopped	7 (8.23%)
I3.6	Drug started	8 (9.41%)
Total	85	

incomplete drug treatment despite existing indication 66 and DRP's associated with treatment duration i.e. treatment duration too short 15, treatment duration too long 7, our findings were similar to the findings reported by Biradar S.M *et al.*[11]

The significances levels of DRP's were analysed based on three severity criteria; major, moderate, minor. DRP's with major severity is considered as serious problems which requires interventions (prevent or address), while moderate severity are those problems which necessitate adjustment and improve the effectiveness of the drug therapy, whereas minor is considered as problems requiring small adjustments.

In the current study 105 drug interactions were most common among 520 DRP's, which accounts 29 (27.61%) major drug

Table 10: DRPs in Intervention Acceptance Domain.

Code	Acceptance	Number (%)
A1.1	Intervention accepted and fully implemented.	10 (18.86%)
A1.2	Intervention accepted partially implemented.	5 (9.43%)
A1.3	Intervention accepted but not implemented.	20 (37.73%)
A1.4	Intervention accepted implementation unknown.	18 (33.96%)
Total		53

Table 11: DRPs in Intervention Outcome Domain.

Code	Outcome of intervention	Number (%)
O0.1	Problem status unknown.	7 (19.44%)
O1.1	Problem totally solved.	4 (11.11%)
O2.1	Problem partially solved.	5 (13.88%)
O3.1	Problem not solved lack of cooperation of patients.	10 (27.77%)
O3.2	Problem not solved, lack of cooperation of Prescriber.	5 (13.88%)
O3.3	Problem not solved intervention not effective.	5 (13.88%)
Total		36

Table 12: Correlation of Age with Health Related Quality of Life in the study population.

	PF	RLPF	GH	Pain	Energy/ fatigue	EW-B	SF	RLEP
Kruskal-Wallis H	32.304	29.300	33.763	17.426	18.209	24.492	8.328	26.882
Df	6	6	6	6	6	6	6	6
Asymp. Sig.	0.000*	0.000*	0.000*	0.008*	0.006*	0.000*	0.215	0.000*

interactions, 65 (61.90%) moderate drug interactions, 11(10.47%) minor interactions. A study by Biradar S.M *et al.*,[11] reported 140 drug interactions among 208 DRP's, which included 70 (50%) major drug interaction, 54(38.5%) moderate drug interactions and 16 (11.4%) minor drug interactions.

In our study, we observed that the subjects with Cardiovascular disease (CVD) are more prone to DRP's followed by different types of cancers, DM and respiratory tract infection. This may be because CVD needs long term treatments and is frequently associated with co-morbidities and complications which ultimately lead to multiple drug administration and thus predispose to DRP's. A similar study was conducted by Biradar S.M *et al.*,[11] which showed that CVD patients are at high risk of developing DRP's.

The current study demonstrated the negative correlation between gender and role limitation due to physical function, General health and pain component of HRQoL, but there is significant correlation in physical function domain of HRQoL. There is insignificant correlation between the gender and MCS of HRQoL. Our findings were similar to the findings of Chatzinikolaou A *et al.*[7]

In our study to evaluated the difference across domains of HRQoL with preference to age grouping in CVD subjects using Kruskal Wallis Test. The test revealed significant correlation of age in Physical functioning, Role limitation due to physical health, General health. The test also revealed significant correlation of age in Energy/fatigue, Emotional well-being and Role limitation due to emotional problems, whereas insignificant correlation between age in Social functioning. A similar study was conducted by Chatzinikolaou A *et al.*,[7] which reported the significant main effects of age on physical limitation, emotional limitation and pain.

CONCLUSION

We found 520 DRP's among 210 study subjects which included 17.1% problem-related, 49.4% cause-related, 16.3% related to planned intervention, 10.1% related to acceptance of intervention and 6.9% were outcome of intervention. Thus the therapeutic outcome of the patient can be improved by early detection and documentation of DRP's.

Through statistical analysis, we identified a correlation between demographics and HRQoL, where we found a significant correlation between the genders in PF but there was insignificant correlation between gender and other domains of the PCS such as RLPH, GH and Pain. Also insignificant difference was observed between genders with MCS of HRQoL. Whereas PF, RLPF, Pain and GH, EW-B and RLEP show significant differences between the age but insignificant in social functioning. While comparing age and final diagnosis we found that patients of above 60 years of age were seen with chronic cardiovascular disease.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ETHICAL APPROVAL

The study was approved by Institutional Ethics Committee (KLECOPH/ IEC/2022-23/04).

CONSENT

Patient consent was taken verbally and in written format during the study period.

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ABBRIVATIONS

DRP: Drug Related Problem; **HRQoL:** Health Related Quality of Life; **CVD:** Cardiovascular disease; **WHO:** World Health Organization; **PCNE:** Pharmaceutical Care Network Europe; **ADR:** Adverse drug reaction; **PCS:** Physical Component Score; **MCS:** Mental Component Score.

REFERENCES

1. American Health. Association 2017-05-31;2014. What is Cardiovascular Disease. doi: 10.1016/jcplett.
2. Vilahur G, Badimon JJ, Bugiardini R, Badimon L. Perspectives: the burden of cardiovascular risk factors and coronary heart disease in Europe and worldwide. European Heart Journal Supplements. 2014; 16(Suppl A):A7-11. doi: 10.1093/eurheartj/sut003.
3. CDC. High blood pressure symptoms and causes; 2021 | cdc.gov. In *Centers for Disease Control & Prevention*.
4. Garin N, Sole N, Lucas B, Matas L, Moras D, Rodrigo-Troyano A, *et al*. Drug related problems in clinical practice: a cross-sectional study on their prevalence, risk factors and associated pharmaceutical interventions. Sci Rep. 2021; 11(1): 883. doi: 10.1038/s41598-020-80560-2, PMID 33441854.
5. Westerlund T. Pharmaceutical care and the role of drug-related problems; 2019. doi: 10.1007/978-3-319-92576-9_2.
6. Ahmed KO, Muddather HF, Yousef BA; 2021. Pharmaceutical care network Europe (PCNE) drug-related problems classification. Version 9.1: First Implementation in Sudan. doi: 10.9734/jpri/2021/v33i59a34321.
7. Chatzinikolaou A, Tzikas S, Lavdaniti M. Assessment of quality of life in patients with cardiovascular disease using the SF-36, MacNew, and EQ-5D-5L questionnaires. Cureus. 2021; 13(9): e17982. doi: 10.7759/cureus.17982, PMID 34667665.
8. Reshma M, Gouthami P, Tasleem P, Shailaja B, Thipperudra J. Assessment of drug related problems in patients with cardiovascular diseases in tertiary Care Hospital: A clinical pharmacist intervention. ijccd. 2020; 7(1): 1-6. doi: 10.13189/ijccd.2020.070101.
9. Sefera B, Getachew M, Babu Y, Bekele F, Fanta K. Drug-related problems and its predictors among hospitalized heart failure patients at Jimma Medical Center, South West Ethiopia: prospective interventional study. BMC Cardiovasc Disord. 2022; 22(1): 418. doi: 10.1186/s12872-022-02859-4, PMID 36123632.
10. Lopez-Jimenez F, Almahmeed W, Bays H, Cuevas A, di Angelantonio E, le Roux CW, *et al.* Obesity and cardiovascular disease: mechanistic insights and management strategies. A joint position paper by the World Heart Federation and World Obesity Federation. Eur J Prev Cardiol. 2022; 29(17): 2218-37. doi: 10.1093/eurjpc/zwac187, PMID 36007112.
11. Biradar SM, Kohima B, Nayak V, Nandikol S, Warad V, Byakod SM, *et al*. Assessment of drug related problems and pharmacist interventions in inpatients with cardiovascular disease. Racional'naâ farmakoterapiâ v kardiologii. 2022; 18(5): 536-43. doi: 10.20996/1819-6446-2022-10-07.

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