



Prevalence and Pattern of Cardiovascular Symptoms and Diseases in Elderly Patients

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Article Info.

Article history:

Received 27 March 2024

Revised 3 May 2024

Published 25 June 2024

Keywords:

Prevalence, Cardiovascular, Symptoms, Diseases, Elderly Patients.

How to cite:

Saeed Hameed Lafta. Prevalence and Pattern of Cardiovascular Symptoms and Diseases in Elderly Patients. *Aca. Intl. J. Med. Sci.* 2024;2(1) 69-78.

DOI:

<https://doi.org/10.59675/M217>

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Abstract

For men and women of all ages, heart disease continues to be the primary cause of death. Emphasising the necessity of creative methods to improve patient care and survival. Between 50% and 75% of cardiovascular disease-related deaths in wealthy nations happen outside of hospitals. Even in most countries, the proportion of persons over 66 steadily rises and makes up a larger population share. The medical treatment of older people heavily burdens the healthcare system. Giving older patients the proper medical treatment requires specialised understanding. As we age, the body undergoes several changes, and numerous chronic illnesses arise. The visceral organs' function deteriorates, the healing process slows, disease symptoms become less noticeable, and diagnosing a condition is frequently challenging. Furthermore, because the pharmacokinetics and pharmacodynamics of medications vary from those of younger individuals, the therapy options also vary. Having a family member

or caregiver participate in the session can be helpful because communicating with elderly individuals can be distressing. For those over 65, "cardiovascular diseases" continue to be the direct reason for death. The most significant of these conditions are atrial "fibrillation", "hypertension", "coronary artery disease", and "congestive heart failure".

Introduction

Globally, cardiovascular diseases (CVDs) constitute a significant reason for death. CVDs account for about a fraction of all non-communicable diseases [1]. Noncommunicable diseases (NCDs) 40 ,million

people die each year, mostly in low- and middle-income nations, according to a World Health Organization (WHO) report. Numerous risk factors are primarily responsible for the incidence of CVDs [2,3]. Cardiovascular disease is a leading world national health burden, contributing to “30% of global mortality”, or “17 million” deaths out of “57 million” deaths annually, with an “alarming 80%” of these deaths taking place in” LMICs” [4]. In Japan, the US, Spain, and the UK, the generality of “CVD in CKD” is “26.8%”, “33.4%”, “39.1%”, and “47.2%”, respectively [5], although in advanced stages of CKD, it varies between 50 and 80% [6]. Whereas the generality of “CVD” in “CKD” was “16.2%” in Tanzanian research [7].

Several factors, such as high blood pressure, diabetes, smoking, elevated cholesterol or triglyceride levels, anemia, chronic inflammation, and endothelial dysfunction, increase the chance of cardiovascular issues in individuals with long-term kidney dysfunction.

"CKD" [8–12]. Patients with chronic kidney disease (CKD) may have various patterns of cardiovascular disease (CVD) depending on the severity of their condition and the presence of other comorbid conditions [13]. Left ventricular hypertrophy, peripheral artery disease, and hypertension are the three most common forms of "CVD" in the early stages of "CKD (stages 1-3)" [14]. The relative incidence of ischemic heart disease and heart failure rises when chronic kidney disease "CKD" advances to advanced stages (stages 4-5) [15].

Cardiovascular diseases "CVDs" were the primary contributors to the global burden of disease "GBD" in 2010, accounting for" 30.3%" of the total burden of disease in older adults [16]; this highlights the importance of close monitoring and effectively controlling "CVD" risk variables in individuals with "CKD", especially when the disease is advanced [17]. The global burden of disease (GBD) in 2010 was caused mainly by cardiovascular illnesses (CVDs), which accounted for 30.3% of the overall burden of disease among older individuals [16]. In people with "CKD," this emphasises how crucial it is to keep a careful eye on and successfully manage "CVD" risk factors, mainly when the illness is advanced [17].

Forecasting future disease burden and directing prevention initiatives require accurate and comparable assessments of "CVD" risks [18]. A linkage between "CVD" and sociodemographic characteristics has been shown in several population-based research on the epithelium duct in lower-income countries. A higher prevalence of "CVD" has been consistently associated with female sex, age, and poorer educational attainment. Behavioral risk factors such as drinking, smoking, not exercising, and eating too little fruits and vegetables are also associated with "CVD," according to specific epidemiological evidence. It is also believed that hypertension is a significant risk factor for "CVD."

These risk variables, either alone or in combination, offer a chance for interventions to lessen the burden of "CVD" in "LMIC" ageing populations in the future. Important and necessary information regarding "CVD" and "CVD" Information on these issues has been provided by several recent significant studies that assessed the risks of "CVD" in higher and lower-income countries [19–20].

The Epidemiology of the Old Age

In 2020, 20.6% of EU citizens were 66 or older; by 2050, that percentage is predicted to rise to 40.6%. By 2050, this percentage in Hungary is expected to reach 30%, up from 19.9% in 2020 [21]. Men and women in the EU are evaluated to live “17.9” and “20.1” years, severally, after age 66. Men and women are expected to have 9.4 years of healthy life at age 65. [22]. The primary objective of geriatrics is to enhance the quality of life during these years and the number of healthy life years due to the longer life expectancy.

Elderly patients need medical attention more frequently and are likelier to be hospitalised or admitted for outpatient surgery. Older people comprise a relatively large percentage of those using the healthcare system. About 40% of patients discharged from hospitals are over 66. Along with age, comorbidities, and propinquity to death—particularly in the final “12 months” of life—are the primary factors that determine healthcare expenses. Therefore, enhancing the well-being of older people is both a humanitarian and a financial need [23].

Key clinical traits of illness manifestation in older age

Multimorbidity is the primary characteristic of people over 65. It indicates the co-occurrence of two or more chronic illnesses. Eighty-eight per cent have two or more chronic conditions, and 80 per cent have at least one [24].

Since 1990, there has been a discernible decline in the frequency, generality, mortality, and daily taxation of "CVD" in the age worldwide. In particular, the worldwide incidence rate is constantly declining, with the fastest decline between 1996 and 2000 (APC = -1.09%). But in recent years, this decline's pace has moderated. The incidence rate's APC for 2017–19 was higher than its APC for whatever other period from "1990 to 2017" "(2017–19 APC = -0.04)". The prevalence rate generally declined; however, from "2008 to 2015", there was an upward trend "(APC = 0.07%)". Some of the worldwide death rates and the daily proportion have significantly decreased since 1990, with the most significant drops taking place between "2003 and 2007" (death rate: 'APC = -1.79%; DALY rate: APC = -1.95%)' [25]. Compared to younger people, the clinical manifestation of sickness in elderly patients is usually more smouldering. Fever and pain are less noticeable, and the onset of symptoms is less severe. Another hallmark is the presentation of a disease with little symptoms or asymptomatic illness development. While hyperthyroidism may only show up as atrial fibrillation, which may go undetected, peptic ulcers may be asymptomatic. These factors make it more challenging to establish a suitable diagnosis [26] quickly. Age-related characteristics of cardiovascular diseases include increased thickness of the left ventricle, which results from myocyte hypertrophy and progressive myocyte loss; increased valve calcification and fibrosis; and a loss of cells in the sinoatrial node [27]. Functional changes include sympathetic signalling, contractility, prolonged diastolic relaxation, prolonged systolic contraction, maximal heart rate, and end-systolic and end-diastolic volume.

These modifications hinder compensatory reactions, which lead to abnormal remodelling and dysfunction as the heart ages [28].

Conventional Hazard Cause for Cardiovascular Illness

Older persons are more likely to have hypertension (HT), particularly isolated systolic HT [29]. The prevalence of HT in individuals aged 70 and over is estimated to be 73.6% for men and 77.5% for women in high-income nations, 65.6% for men and 74.7% for women in low- and middle-income countries. Women [30]. Systolic blood pressure (SBP) is a more accurate outcome indicator in these patients than diastolic blood pressure. As elevated DBP, blood pressure (DBP) has further negative consequences for prognosis [31–37].

There is a significant pharmaceutical load because elderly people People with "CVD" typically have several illnesses or other long-term problems [38].

Furthermore, addressing elderly patients with "CVD" raises important questions about complex GSs and functional decline. Since modern "CVD" management is structured to meet the health requirements of senior citizens better, we will offer some recommendations on what to look for when providing care for an elderly patient who has "CVD [39]."

Between 55% and 98% of individuals are estimated to have multimorbidity and chronic conditions. People 65 years of age and older who have at least two chronic illnesses are said to be multimorbid [40,41]. Ischemic heart disease is one of the most common chronic diseases in people, and cardiovascular diseases "(CVDs)" are the most common ailments in patients with many comorbidities [42]. Nearly all elderly individuals with "CVD" have multiple comorbidities. Just "70%" of elderly patients with coronary heart disease in one study did not have any other chronic illnesses [43].

Polypharmacy, which is often described as taking five or more medications, is frequently the result of treating many comorbidities. According to the findings, "26.3% and 39.9% of those 65 and older in Europe and Israel had polypharmacy, according to the European Survey on Health, Aging, and Retirement.[44] Drug-based treatments continue to be the mainstay of CVD care despite tremendous advancements in "CVD" prevention. The combination of four drug classes—statins, antiplatelets, β -blockers, and angiotensin-converting enzyme inhibitors—will lead to polypharmacy if clinical guidelines are strictly followed. The most common therapies for elderly patients are cardiovascular medications.

The most significant rates of prescription drug use are associated with "CVD". In a retrospective analysis of older patients with cardiovascular disease admitted to a cardiology department, the prevalence of polypharmacy was much higher than the general population (95% and 69% for extreme polypharmacy [≥ 10 medications]).

The average number of drugs given to patients at home was 11.6 ± 4.5 . The interplay of many chronic illness methods is one of the primary situations that doctors face; arsenic might impede the delivery of integrated treatment by creating competition between them [44].

The use of frailty, a unique and complex GS, in general, acute and specialist care is growing. Frailty is a new, more precise, and individualised way of thinking about biological age. It is a condition of particular concern that may indicate a stage between successful ageing and impairment. In this context,

we suggest a more targeted approach to this GS. The accumulation of impairments in multiple interdependent systems, a reduction in physiological reserves, and the failure of homeostatic mechanisms in response to low-level stress are the hallmarks of frailty, a vulnerable state.[45]

To put it another way, frailty is a premorbid condition that represents "compromised"[46]. "CVD" management recommendations have mainly adopted the concept of frailty. As a result, the European Society of Cardiology's "2021" guidelines paid particular attention to frailty situations in people with atherosclerotic "CVD," highlighting the growing concern and need for specialised therapies [47]. coronary artery disease, or "CAD." Adults 65 and older account for about "80%" of "CAD"-related fatalities. 50% of elderly women and 70% to 80% of men have "CAD" [48].

Traditional Risk Factors Increased Influence Of “CAD”

Prior research on risk factors for severe coronary events has included six classic risk factors: ageing, diabetes, obesity, smoking, high blood pressure, and dyslipidemia. Age " ≥ 65 " was considered old age. Obesity was classified as having a "BMI over 25 kg/m²" [49]. Throughout a lifetime, the adverse effects of classic risk factors—such as diabetes mellitus, obesity, smoking, dyslipidemia, hypertension, and a sedentary lifestyle—accumulate [50]. The obstruction Elderly CAD patients have a blockage of the left major coronary artery, a higher prevalence of multi-vessel disease, and more severe coronary atherosclerosis than younger persons. Even though "60% of those aged 85 or older" have a symptomless presentation or a disease with distinct symptoms, A quiet incident can have the same clinical repercussions as a coronary heart attack with concerning signs. One potential drawback of silent ischemia is the inability to act quickly to avoid it. Since myocardial infarction in older people is associated with a poor prognosis, prevention is crucial. In both acute coronary syndromes and chronic coronary artery disease, dyspnea is often the initial symptom [51].

Tobacco uses and smoking, all things considered, smokers have a 70% higher chance of dying from cardiovascular diseases than non-smokers. About four million deaths were recorded in 1999, with tobacco usage being the primary cause of these deaths [52].

Obesity and dyslipidemia One of the leading independent causes of coronary heart disease is obesity. For South Asians, it is believed to be one of the leading causes of death. Approximately 23% of the global burden of coronary heart disease is attributable to obesity. Additionally, it is thought that a significant risk factor for cardiovascular diseases is a combination of low HDL and high LDL (low-density lipoprotein) readings. A body mass index, or "BMI," of 30 or over is considered obese. Obesity increases the risk of coronary artery disease by aggravating conditions like inflammation, plasma lipids, and hypertension, which strain the heart and change its structure and function [52].

Diabetes mellitus: In 2000, there were about 177 million cases of diabetes mellitus worldwide; by 2030, that number is expected to rise to over 360 million cases. The Epidemiology of Diabetes Interventions (CAD) states that patients with aggressive glucose management are less likely to develop cardiovascular illnesses. A fasting plasma “glucose” level over “126” milligrams per deciliter is considered diabetes.

Insulin sensitivity is compromised in type 2 diabetes mellitus because adipose tissue releases free fatty acids (FFAs). Defects in activation are caused by reactive oxygen species produced by free fatty acids. Eventually, the "insulin" receptor substrate (IRS-1)" and "phosphatidylinositol-3-kinase and protein kinase B (PI3K-Akt)" signaling cause the insulin-responsive "glucose transporter 4 (GLUT-4)" to be downregulated. This leads to endothelial dysfunction, elevated arterial thickness, and a deficiency of "phosphorylation of endothelial nitric oxide synthase" (eNOS), all of which are potent indicators of cardiovascular disease [53].

When the heart's cardiac muscles pump blood, the force of the blood on the blood vessel wall increases, a condition known as hypertension or high blood pressure. Excessive triglycerides, renal dysfunction, obesity, and excessive salt to low potassium levels are the main risk factors for hypertension. A diastolic blood pressure of more than 90 mmHg or a systolic blood pressure of more than "140 mmHg" indicates arterial hypertension. Because it disrupts two vital pathways—the hyperactivation of the "renin-angiotensin-aldosterone system (RAAS)" and an increase in vascular tone—hypertension is regarded as a substantial risk factor for cardiovascular illnesses [54].

Conclusion

This study found indications of "accelerated ageing" in older adults with "CVD" in our narrative review. To effectively serve the needs of this highly vulnerable patient population, our treatment approaches should be implemented, considering the significant comorbidity burden among older persons with "CVD." Without a doubt, the considerable prevalence of geriatric conditions associated with "CVD" underscores the need for a multisystemic, integrated strategy.

Our review intends to address the lack of agreement on managing cardiovascular disease in very senior people and to stimulate the development of novel approaches to explain the complexity of ageing since individual health trajectories in older adults are currently difficult to predict. Given the information above, we think that treating elderly patients with "CVD" requires a thorough, targeted approach and that geriatric medicine is a valuable extra ally in the doctor's decision-making process.

References

1. Laslett LJ, Alagona P, Clark BA, Drozda JP, Saldivar F, Wilson SR, Poe C, Hart M. The worldwide environment of cardiovascular disease: prevalence, diagnosis, therapy, and policy issues: a report from the American College of Cardiology. *Journal of the American College of Cardiology*. 2012 Dec 25;60(25S): S1-49.
2. Sabra AA, Taha AZ, Al-Sebiany AM, Al-Kurashi NY, Al-Zubier AG. Coronary heart disease risk factors: prevalence and behavior among male university students in Dammam City, Saudi Arabia. *J Egypt public health Assoc*. 2007 Feb 1;82(1-2):21-42
3. Cappuccio FP, Miller MA. Cardiovascular disease and hypertension in sub-Saharan Africa: burden, risk and interventions. *Internal and Emergency Medicine*. 2016. 11(3):299–305.
4. Yuan J, Zou XR, Han SP, Cheng H, Wang L, Wang JW, et al. Prevalence and risk factors for cardiovascular disease among chronic kidney disease patients: Results from the Chinese cohort study of chronic kidney disease (C-STRIDE). *BMC Nephrology*. 2017. 18(1):1–12.

5. Insights P. Cardiovascular Disease in Chronic Kidney Disease. *Circulation*. 2021 Mar 16;143(11):1157-72.
6. Chillo P, Mujuni E. Prevalence and predictors of left ventricular dysfunction among patients with chronic kidney disease attending Muhimbili National Hospital in Tanzania—a cross-sectional study. *Research Reports in Clinical Cardiology*. 2018 May 21:11-21.
7. Babua C, Kalyesubula R, Okello E, Kakande B, Sebatta E, Mungoma M, Mondo C. Pattern and presentation of cardiac diseases among patients with chronic kidney disease attending a national referral hospital in Uganda: a cross sectional study. *BMC nephrology*. 2015 Dec;16:1-6.
8. House AA, Wanner C, Sarnak MJ, Piña IL, McIntyre CW, Komenda P, Kasiske BL, Deswal A, DeFilippi CR, Cleland JG, Anker SD. Heart failure in chronic kidney disease: conclusions from a Kidney Disease: Improving Global Outcomes (KDIGO) Controversies Conference. *Kidney international*. 2019 Jun 1;95(6):1304-17.
9. Meremo AJ, Mwashambwa MY, Masalu MB, Kapinga J, Tagalile R, Ngilangwa DP, Sabi I. Prevalence and predictors of anaemia among patients presenting with kidney diseases at the University of Dodoma Hospital in central Tanzania. *Tanzania Journal of Health Research*. 2017 Jun 28;19(3).
10. American Diabetes Association. Diagnosis and classification of diabetes mellitus. *Diabetes care*. 2010 Jan 1;33(Supplement_1):S62-9.
11. Gibore NS, Munyogwa MJ, Ng'weshemi SK, Gesase AP. Effect of community-based lifestyle education intervention to reduce cardiovascular diseases risk factors among vulnerable population in Dodoma city, Tanzania: a cluster randomized controlled trial study protocol. *Biology Methods and Protocols*. 2021 Jan 1;6(1):bpab019.
12. Fraser SD, Blakeman T. Chronic kidney disease: identification and management in primary care. *Pragmatic and observational research*. 2016 Aug 17:21-32.
13. Matsha TE, Erasmus RT. Chronic kidney disease in sub-Saharan Africa. *The Lancet Global Health*. 2019 Dec 1;7(12):e1587-8.
14. Saad M, Karam B, Faddoul G, Douaihy YE, Yacoub H, Baydoun H, Boumitri C, Barakat I, Saifan C, El-Charabaty E, Sayegh SE. Is kidney function affecting the management of myocardial infarction? A retrospective cohort study in patients with normal kidney function, chronic kidney disease stage III–V, and ESRD. *International journal of nephrology and renovascular disease*. 2016 Jan 22:5-10.
15. Ali S, Dave N, Virani SS, Navaneethan SD. Primary and secondary prevention of cardiovascular disease in patients with chronic kidney disease. *Current Atherosclerosis Reports*. 2019 Sep;21:1-9.
16. Agarwal R, Sinha AD, Cramer AE, Balmes-Fenwick M, Dickinson JH, Ouyang F, Tu W. Chlorthalidone for hypertension in advanced chronic kidney disease. *New England Journal of Medicine*. 2021 Dec 30;385(27):2507-19.
17. Gaziano TA, Bitton A, Anand S, Abrahams-Gessel S, Murphy A. Growing epidemic of coronary heart disease in low-and middle-income countries. *Current problems in cardiology*. 2010 Feb 1;35(2):72-115.

18. Yusuf S, Rangarajan S, Teo K, Islam S, Li W, Liu L, Bo J, Lou Q, Lu F, Liu T, Yu L. Cardiovascular risk and events in 17 low-, middle-, and high-income countries. *New England Journal of Medicine*. 2014 Aug 28;371(9):818-27.
19. Teo KK, Dokainish H. The emerging epidemic of cardiovascular risk factors and atherosclerotic disease in developing countries. *Canadian Journal of Cardiology*. 2017 Mar 1;33(3):358-65.
20. Tombor I, Paksi B, Urbán R, Kun B, Arnold P, Rózsa S, Berkes T, Demetrovics Z. Epidemiology of smoking in the Hungarian population, based on national representative data. *Clinical and Experimental Medical Journal*. 2011 Mar 1;5(1):27-37.
21. Kočanová D, Kováč V, Buleca J. Differences and Similarities in Patterns of Society Ageing in the European Union. Available at SSRN 3973814. 2021.
22. Hazra NC, Rudisill C, Gulliford MC. Determinants of health care costs in the senior elderly: age, comorbidity, impairment, or proximity to death?. *The European journal of health economics*. 2018 Jul;19(6):831-42.
23. Qu C, Liao S, Zhang J, Cao H, Zhang H, Zhang N, Yan L, Cui G, Luo P, Zhang Q, Cheng Q. Burden of cardiovascular disease among elderly: based on the Global Burden of Disease Study 2019. *European Heart Journal-Quality of Care and Clinical Outcomes*. 2024 Mar;10(2):143-53.
24. National Research Council, Division of Behavioral, Social Sciences, Committee on National Statistics, Committee on Population, Panel on a Research Agenda, New Data for an Aging World. Preparing for an aging world: The case for cross-national research.
25. Lye M, Donnellan C. Heart disease in the elderly. *Heart*. 2000 Nov 1;84(5):560-6.
26. Strait JB, Lakatta EG. Aging-associated cardiovascular changes and their relationship to heart failure. *Heart failure clinics*. 2012 Jan 1;8(1):143-64.
27. Tasić I, Kostić S, Stojanović NM, Djordjević D, Bogdanović D, Deljanin Ilić M, Lović M, Stoičkov V, Aleksandrić S. Predictors of cardiovascular events in hypertensive patients with high cardiovascular risk. *Medicina*. 2020 Apr 16;56(4):182.
28. Mills KT, Bundy JD, Kelly TN, Reed JE, Kearney PM, Reynolds K, Chen J, He J. Global disparities of hypertension prevalence and control: a systematic analysis of population-based studies from 90 countries. *Circulation*. 2016 Aug 9;134(6):441-50.
29. Vishram JK, Borglykke A, Andreassen AH, Jeppesen J, Ibsen H, Jørgensen T, Broda G, Palmieri L, Giampaoli S, Donfrancesco C, Kee F. Impact of age on the importance of systolic and diastolic blood pressures for stroke risk: the MONica, Risk, Genetics, Archiving, and Monograph (MORGAM) Project. *Hypertension*. 2012 Nov;60(5):1117-23.
30. Brown DW, Giles WH, Greenlund KJ. Blood pressure parameters and risk of fatal stroke, NHANES II mortality study. *American journal of hypertension*. 2007 Mar 1;20(3):338-41.
31. Gueyffier F. Blood pressure and cardiovascular disease in the Asia Pacific Region. Commentary. *Journal of hypertension*. 2003;21(4):673-5.
32. Franklin SS, Khan SA, Wong ND, Larson MG, Levy D. Is pulse pressure useful in predicting risk for coronary heart disease? The Framingham Heart Study. *Circulation*. 1999 Jul 27;100(4):354-60.

33. Domanski M, Mitchell G, Pfeffer M, Neaton JD, Norman J, Svendsen K, Grimm R, Cohen J, Stamler J, MRFIT Research Group, MRFIT Research Group. Pulse pressure and cardiovascular disease-related mortality: follow-up study of the Multiple Risk Factor Intervention Trial (MRFIT). *Jama*. 2002 May 22;287(20):2677-83.
34. Majnarić LT, Bosnić Z, Kurevija T, Wittlinger T. Cardiovascular risk and aging: the need for a more comprehensive understanding. *Journal of Geriatric Cardiology: JGC*. 2021 Jun 6;18(6):462.
35. Marengoni A, Angleman S, Meinow B, Santoni G, Mangialasche F, Rizzuto D, Fastbom J, Melis R, Parker M, Johnell K, Fratiglioni L. Coexisting chronic conditions in the older population: Variation by health indicators. *European journal of internal medicine*. 2016 Jun 1;31:29-34.
36. St Sauver JL, Boyd CM, Grossardt BR, Bobo WV, Rutten LJ, Roger VL, Ebbert JO, Therneau TM, Yawn BP, Rocca WA. Risk of developing multimorbidity across all ages in an historical cohort study: differences by sex and ethnicity. *BMJ open*. 2015 Feb 1;5(2):e006413.
37. Bussche HV, Koller D, Kolonko T, Hansen H, Wegscheider K, Glaeske G, Leitner EV, Schäfer I, Schön G. Which chronic diseases and disease combinations are specific to multimorbidity in the elderly? Results of a claims data based cross-sectional study in Germany.
38. Weiss CO, Boyd CM, Yu Q, Wolff JL, Leff B. Patterns of prevalent major chronic disease among older adults in the United States. *Jama*. 2007 Sep 12;298(10):1158-62.
39. Midão L, Giardini A, Menditto E, Kardas P, Costa E. Polypharmacy prevalence among older adults based on the survey of health, ageing and retirement in Europe. *Archives of gerontology and geriatrics*. 2018 Sep 1;78:213-20.
40. Inouye SK, Studenski S, Tinetti ME, Kuchel GA. Geriatric Syndromes: Clinical, Research, and Policy Implications of a Core Geriatric Concept: (See Editorial Comments by Dr. William Hazzard on pp 794–796). *Journal of the American Geriatrics Society*. 2007 May;55(5):780-91.
41. Clegg A, Young J, Iliffe S, Rikkert MO, Rockwood K. Frailty in elderly people. *The lancet*. 2013 Mar 2;381(9868):752-62.
42. Visseren, F.L., Mach, F., Smulders, Y.M., Carballo, D., Koskinas, K.C., Bäck, M., Benetos, A., Biffi, A., Boavida, J.M., Capodanno, D. and Cosyns, B., 2021. 2021 ESC Guidelines on cardiovascular disease prevention in clinical practice: Developed by the Task Force for Cardiovascular Disease Prevention in clinical practice with representatives of the European Society of Cardiology and 12 medical societies With the special contribution of the European Association of Preventive Cardiology (EAPC). *European heart journal*, 42(34), pp.3227-3337.
43. Paneni F, Diaz Cañestro C, Libby P, Lüscher TF, Camici GG. The aging cardiovascular system: understanding it at the cellular and clinical levels. *Journal of the American College of Cardiology*. 2017 Apr 18;69(15):1952-67.
44. Hochman JS, Tamis JE, Thompson TD, Weaver WD, White HD, Van de Werf F, Aylward P, Topol EJ, Califf RM. Sex, clinical presentation, and outcome in patients with acute coronary syndromes. *New England Journal of Medicine*. 1999 Jul 22;341(4):226-32.
45. Vaccarino V, Parsons L, Every NR, Barron HV, Krumholz HM. Sex-based differences in early mortality after myocardial infarction. *N Engl J Med* 1999;341:217-25.

46. Canto JG, Kiefe CI, Rogers WJ, Peterson ED, Frederick PD, French WJ, Gibson CM, Pollack CV, Ornato JP, Zalenski RJ, Penney J. Number of coronary heart disease risk factors and mortality in patients with first myocardial infarction. *Jama*. 2011 Nov 16;306(19):2120-7.
47. Farage MA, Miller KW, Ajayi F, Hutchins D. Design principles to accommodate older adults. *Global journal of health science*. 2012 Mar;4(2):2.
48. Oh SW. Obesity and metabolic syndrome in Korea. *Diabetes & metabolism journal*. 2011 Dec;35(6):561.
49. Forman DE, Alexander K, Brindis RG, Curtis AB, Maurer M, Rich MW, Sperling L, Wenger NK. Improved cardiovascular disease outcomes in older adults. *F1000Research*. 2016;5.
50. Nuri MM, Nawaz A, Usman H. A PROPOSED STUDY OF RISK FACTORS OF HEART DISEASE IN RURAL POPULATION OF PUNJAB (PAKISTAN)—TIME TO ACT!. *Pakistan Heart Journal*. 2006;39(3-4).
51. Muhammad R, Masood A, Zaffar J, Butt U. Correlation of mean HbA1c levels with severity of coronary arteries disease in diabetics. *Pakistan Heart Journal*. 2014;47(4).
52. Anker SD, Berne C, Cosentino F, Danchin N, Deaton C, Escaned J, Hammes HP, Huikuri H, Marre M, Marx N, Mellbin L. ESC Guidelines on diabetes, pre-diabetes, and cardiovascular diseases developed in collaboration with the EASD. *European Heart Journal*. 2013;34:3035-87.
53. Sharma S. Hypertension with special reference to causes and diet. *Indian Journal Of Applied Research*. 2015;5:12.
54. Quiat D, Olson EN. MicroRNAs in cardiovascular disease: from pathogenesis to prevention and treatment. *The Journal of clinical investigation*. 2013 Jan 2;123(1):11-8.