

Effect of Protocol of Care on Knowledge and Lipid Profile of Employees at Risk for Coronary artery Disease

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Abstract: Background: Coronary artery disease (CAD) is a serious cardiovascular disorder affecting middle-aged individuals. It is a major cause of death among adults over the age of 35 years. The aim of the current study was to evaluate the effect of protocol of care on knowledge and lipid profile of employees at risk for coronary artery disease, a quasi-experimental research design was utilized. **Subjects:** A Convenient sample of 100 employees who had at moderate to high risk of coronary artery disease selected randomly from four faculties of the Port Said University. Three tools were used for data collection; Employees' interviewing, knowledge assessment questionnaire, and cardiovascular risk assessment scale. **Results** revealed that knowledge scores had significantly increased and lipid profile had significantly decreased after implementation of the protocol of care. There were significant statistical differences in mean scores of modifiable risk factors of the studied subjects after implementing the protocol of care **Collusion :** The protocol of care had positive effect on total knowledge scores, lipid profile and cardiovascular risk of employees' at risk of cardiovascular disease. **Recommendations:** Replication of the study in different settings of the community in order to identify people at risk of coronary artery diseases and reduce the incidence.

1. INTRODUCTION

Coronary artery disease (CAD) is one of the world's most important causes of morbidity and death. In 2020, more than 11.1 million deaths from CAD are expected by the World Health Organization (WHO). The global death to from cardiovascular disease is projected to increase from 17 million in 2008 to 25 million in 2030 (*Peela, 2012*). In Egypt, the WHO report showed that CAD deaths exceeded 23.14% of all deaths in 2014, making CAD Egypt's first cause of death in 2013 (*El-Moselhy et al., 2018*).

According to the **American Heart Association, 2019**; the common risk factors of coronary artery disease include high LDL cholesterol, low HDL cholesterol, high blood pressure, family history, obesity, cigarettes smoking, post-menopausal women and men over 45 years of age. Obesity can be a risk factor as well. The most important factor is dyslipidemia, which is a strong predictor of cardiovascular outcomes. Evaluation of the lipid profile including total cholesterol (TC), triglycerides (TG), low-density lipoprotein (LDL-C) and high-density lipoprotein (HDL-C) makes it possible to determine the threat of CVD. There is growing evidence that high TG, TC, LDL-C and decreased HDL-C accelerates atherosclerosis plaque (*Zhong et al., 2017*).

Most individuals have no signs of coronary artery disease; they do not know they have the condition until complications such as a heart attack or sudden cardiac arrest arise. (National Heart, Lung and Blood Institute, 2019). The lipid profile is a group of tests often performed together to determine the risk of coronary heart disease. These tests are good indicators of whether someone is likely to have a heart attack or stroke that is caused by blocking the blood vessels and hardening the arteries that are high in serum cholesterol (Kumar & Das, 2018).

However CAD is the most common cause of morbidity, most risk factors can be changed. Also, the same activities and lifestyle habits that can help treat disease and help prevent it from first developing. These are identified by the American Heart Association (i.e., avoidance of cigarettes, body mass index maintenance, physically active, healthy diet, maintaining low cholesterol, maintaining normal blood pressure and maintaining normal fasting plasma glucose), eating a low-fat, low-salt diet rich in fruits, vegetables and whole grains, and reducing and managing stress. Leading a healthy lifestyle can help keep the arteries strong and plaque-free (Webber et al., 2013, and Mayo Clinic, 2019).

Providing adequate knowledge of CAD through education program contributes to an accurate understanding of their disease by patients and promotes adherence to a healthy lifestyle. It may also help to slow down the disease process (Tawalbeh & Ahmad, 2013). The primary strategy for minimizing the incidence and prevalence of the disease is improving knowledge of modifiable risk factors (Huma et al., 2012). Nurses are responsible for preventive strategies ' long-term success. The nurse plays the primary role in CAD prevention through education on risky behaviors, healthy lifestyle principles, motivation, and activities that contribute to successful work. The nurse can also give practical advice on several issues and also take the opportunity to make some use of it (Chen, 2013).

Significance of the study

Coronary artery disease is a multifactorial disease that is believed to arise from a genetic history association with environmental factors such as diet, cigarettes, and physical activity. Therefore, elevated serum cholesterol levels are significant risk factors for coronary artery disease. The correlation of hyperlipidemias with coronary heart disease has been confirmed by numerous studies. Identifying and controlling risk factors are important to prevent CHD as a primary prevention for asymptomatic individuals. This study conducted aiming to identify people at risk of CHD and applying a protocol of care in order to reduce the risk and prevent the disease. Risk factors management should be conceived as prevention or treatment of the atherosclerotic disease process itself. CHD risk factors are modifiable and unmodifiable; the presence of unmodifiable risk factors may necessitate more intense management of modifiable risk factors.

Aim of the study

The aim of the current study was to evaluate the effect of protocol of care on knowledge and lipid profile of employees at risk for coronary artery disease.

Research hypotheses:

- Knowledge scores of the study subjects about coronary artery disease and preventive measures will improve after applying the protocol of care.
- Serum cholesterol level of the study subjects will be decreased after applying the protocol of care.

2. SUBJECTS AND METHOD

Research Design

A quasi-experimental research design was utilized to meet the aim of the study.

Research Setting

The study conducted at four Faculties of Port Said University in Egypt selected randomly: Faculty of Science, Nursing, Education, and Arts.

Subjects

A Convenient sample of 100 employees who were at moderate or high risk for cardiovascular disease selected randomly from the previous settings, based on the following criteria:

▪ **Inclusion criteria**

Employees from both sex aged between 20 and 60 years old.

▪ **Exclusion criteria:**

Employees who had physical or mental handicaps.

Employees who had heart diseases.

Tools for data collection:

Three tools were used in data collection:

Tool I: Employees' Interviewing Questionnaire:

This tool consisting of two parts; part 1: Include sociodemographic data of the studied subjects (age, sex, marital status, level of education, and monthly income), part 2: Medical history: including family history of cardiovascular disease associated chronic diseases, physical assessment; vital signs, body weight, height, body mass index, and laboratory investigations of lipid profile (total cholesterol, high density lipoprotein (HDL), low density lipoprotein (LDL), and triglyceride). Body mass index categorized based on WHO classification (underweight (<18.5, normal range (18.5-24.99), overweight (≥ 25), obese (30-34.99 class I, 35-39.99 class II, and ≥ 40 class III obesity).

Tool II: Knowledge Assessment Questionnaire. It was developed by the researchers based on reviewing of recent related literatures and experts' opinions; it was written in simple Arabic language, consisting of 7 closed ended questions about; definition, causes and risk factors, manifestations, complications, diagnosis, management, and preventive measures of cardiovascular disease. Each correct answer was scored as 1 and 0 for incorrect, total score was 30, comparison between pre and post-test was done using mean scores.

Tool III: Cardiovascular Risk Assessment Scale: Adopted from **Genest J et al., 2009** consisting of 6 risk factors (age, HDL level, total cholesterol level, systolic blood pressure, smoking, and diabetes. For scoring system: Each item had different risk points in men and women: for age; scored from (0-15 in men & 0-12 in women) based on increasing age. For HDL; score ranged from -2 to 2 in both men and women, for total cholesterol level; the score ranged from (0-4 in men & 0-5 in women), for systolic blood pressure, score ranged from (-2 to 3 in men & from 0 to 5 in women), for smoking; scored as 0 if the individual is non-smoker man or woman and 4 for smoking man, and 3 for smoking woman. Diabetics has taken 4 if man & 4 if woman. Total score is calculated and percentage, then classified as low (<10%), moderate (10-19%), and high ($\geq 20\%$) risk to develop cardiovascular disease within 10 years. Individuals with moderate and high risk were included in the study, while low risk individuals were excluded.

The Protocol of care: Developed in simple Arabic language based on WHO Guidelines for assessment and management of cardiovascular risk, 2007 and the guide of the National Heart Foundation, 2012.

Operational design: Includes preparatory phase, content validity, test reliability, and pilot study.

Preparatory phase: Included tools development and the review of related literature which carried out from the beginning of August, 2018 to the end of November, 2018, a period of 3 months.

Content validity: Tools were tested for content validity through a jury of five experts in the Community Health Nursing and Medical-Surgical Nursing. The necessary modifications were done accordingly.

Test reliability: The reliability was assured by calculating the test of Cronbach's α co-efficient. Its value was (0.603) for all tools, (0.713) for knowledge questionnaire, and (0.707) for risk assessment scale, which indicated high reliability.

Pilot study: The pilot study was carried out on 10 employees (10%) of the study sample in order to test the clarity, relevance, applicability, feasibility of the developed tool and to estimate the time needed for data collection. Those subjects who shared in the pilot study were excluded from the main study sample, as a result of the necessary modifications were done.

Administrative design: An official permission was obtained from the deans of the faculties of the Port Said University after explaining the aims of the study to obtain their approvals to conduct the study.

Ethical Considerations: An oral consent was taken from each employee participated in the study after clear explanation of purposes and nature of the study, and the right to withdraw at any time, or refuse to answer specific question without giving any reason.

Field Work: The actual field work started from the beginning of December, 2018 to the end of June, 2019. The researchers visited the pre-mentioned setting 5 days per week from 9 am to 1 pm until the sample size was completed. The study was carried out through the following four phases:

- **Phase I:** (Pre-test): The study sample was selected according to the inclusion criteria, followed by collecting baseline data. Pre-test questionnaire was filled by the participants; Time estimated for each employee was 40-45 minutes, assessing vital signs, weight, height, collecting blood samples for lipid profile. This phase lasted for a period of one month.
- **Phase II:** Based on pre-test, the protocol of care was developed based on the participants' needs and WHO Guidelines "for assessment and management of cardiovascular risk, 2007" and the guide of the National Heart Foundation, 2012. A simple booklet was developed in simple Arabic language with different colored images to facilitate understanding and enhance retention of acquired knowledge. The booklet covered all elements related to coronary heart disease (definition, types, risk factors, laboratory investigations, acute and chronic complications, management diet, physical exercise, and preventive measures). This phase lasted for one month.
- **Phase III:** (Implementation phase): The instructional program designed for this study was carried out in the teaching room affiliated to the pre-mentioned setting. The researcher interviewed the participants individually or in groups (2-4) employees. The program included three sessions; each session lasted for 20-30 minutes. It was applied through using power point presentations, discussion, and printed handout (booklet). The researcher was in contact with the participants through the mobile to enhance them for adherence. Duration of the program implementation (sessions) was two months.
- **Phase IV: Evaluation: (Post-test):** The post-test was introduced to the study subjects, and laboratory tests for lipid profile re-assessed after three months of implementation of the protocol of care. The results were compared to the pre-test results to evaluate the effect of the program on the knowledge and laboratory results and BMI of the study subjects.

Statistical design: After data collection, they were coded and transferred into special design formats to be suitable for computer feeding. The SPSS version 20 was utilized for statically analysis and tabulation as well as some graphic presentations of the results. Statistical significance and associations were assessed using the arithmetic mean, standard deviation (SD), chi square (X²), and coefficient correlation (r) to detect the relations between the variables with significant level $p \leq 0.05$.

3. RESULTS

Table (1): Percentage Distribution of the Study Subjects According to Their Socio-Demographic Characteristics (No=100):

Item	No=100	(%)
Age in years		
▪ 25-	35	35
▪ 35-	28	28
▪ 45 – 60	37	37
Mean ± SD = 43.96 ± 10.13		
Sex		
▪ Male	21	21
▪ Female	79	79
Marital status		
• Single	8	8
• Married	73	73
• Widowed	7	7
• Divorced	12	12

Level of education		
• Illiterate	19	19
• Read & write	15	15
• Secondary	18	18
• University	39	39
• Post graduate	9	9
Monthly Income		
• Enough	44	44
• Not enough	56	56

Table 1 reveals that; mean age of the study subjects was 43.96, 79.0 % of the employee were females, 73.0 % of them were married, as regards to level of education and monthly income, it was noticed that 48.0 % and 56.0 % of the study subjects were highly educated (university and postgraduate) and hadn't enough monthly income respectively.

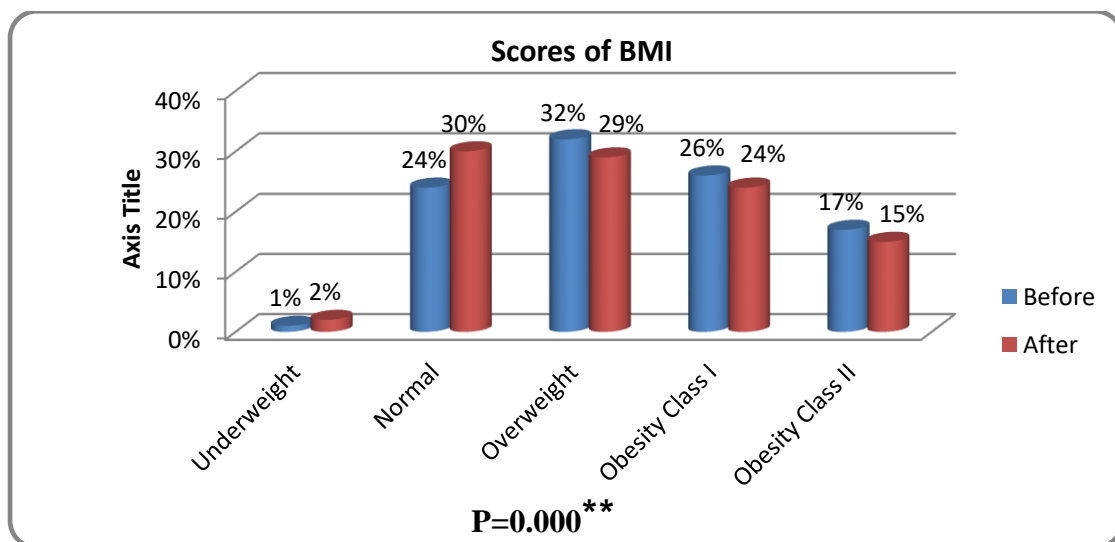


Figure (1): Percentage Distribution of the Study Subjects according to their Scores of Body Mass Index before and after implementation of the Protocol of Care

Figure 1 reveals that; overweight represents 32% of the study subjects before implementing the protocol of care which reduced to 29% after protocol of care. There was statistically significant difference in Body Mass Index before and after implementing protocol of care with p-value (p= 0.000*).

Table (2): Comparison between Mean Knowledge Scores of the Study Subjects before & after implementation of the Protocol of Care (No=100)

Knowledge	Pre-program	Post-program	Test of Significance	
			T (pre/post)	P
Definition of CAD	0.17±0.40	2.00±0.00	-45.36	0.000**
Causes of CAD	1.23±1.46	8.26±0.99	-0.38.45	0.000**
Manifestations of CAD	0.75±0.94	4.99±0.10	-44.41	0.000**
Diagnosis of CAD	0.24±0.49	4.87±0.39	-75.42	0.000**
Complications of CAD	0.56±0.64	3.88±0.40	-41.37	0.000**
Preventive Measures of CAD	1.73±1.05	6.73±0.70	-41.17	0.000**
Management of CAD	0.74±0.90	4.92±0.33	-43.65	0.000**
Total knowledge of CAD	5.42±4.06	35.65±1.34	-71.66	0.000**

** Highly Significance P≤ 0.001

Table 2 reveals that there were highly significant statistical differences in mean knowledge scores of the study subjects after implementing the protocol of care.

Table (3): Comparison between Mean Scores of Cardiovascular Risk Variables before & after Implementing the Protocol of Care (No=100):

Cardiovascular Assessment	Risk	Pre-program	Post-program	Test of Significance	
				T pre/post	P
Age				43.96 ± 10.13	
HDL. Level (mmol/L)		1.38±0.43	0.50±1.43	10.24	0.000**
Total Cholesterol level (mmol/L)		238.8±200.9	200±9	7.13	0.000**
Systemic blood pressure		144.7±62.7	118.2±51.1	3.98	0.000**
Smoking		0.10±0.30	0.50±0.219	2.283	0.025*
Diabetes		1.33±1.8			
Total risk factors		8.94±8.51	7.22±6.98	5.17	0.000**

* Significant ≤ 0.05 ** Highly Significant ≤ 0.001

Table 3 reveals that, there were significant statistical differences in mean scores of cardiovascular risk variable (modifiable risk factors) of the studied subjects after implementing the protocol of care

Table (4): Correlation Coefficient between Sociodemographic Characteristics of the study Subjects and Cardiovascular Risk Variables of the Study (No=100)

Variables (Post)	Age		Sex		Education		Income	
	R	P. value	r	P. value	r	P. value	r	P. value
Serum Cholesterol	0.229	0.022*	0.159	0.115	-0.233	0.020*	0.175	0.081
Triglyceride	0.108	0.28	0.044	0.664	-0.142	0.160	0.167	0.097
HDL	-0.041	0.683	0.112	0.267	0.015	0.878	-0.084	0.408
BMI (Obesity)	0.319	0.001*	0.146	0.148	-0.378	0.000**	0.349	0.000**
Total Knowledge Scores	0.077	0.448	-0.135	0.181	0.037	0.713	-0.081	0.421
Total Risk Scores	0.623	0.000**	-0.038	0.707	-0.391	0.000**	0.119	0.238

r = Pearson correlation * Significance ≤ 0.05

Table 4 reveals that; the mean age of the study subjects correlated positively with mean scores of serum cholesterol, BMI, and total risk scores after implementing the protocol of care with statistical significant difference, sex correlated negatively with total knowledge and total risk scores without significant statistical difference, Level of education correlated negatively with serum cholesterol, BMI, and total risk scores representing statistical significant difference. While income correlated positively with BMI after implementing the protocol of care.

4. DISCUSSION

Coronary artery disease; atherosclerosis of the coronary arteries, is one of cardiovascular diseases which are a group of disorders of the heart and blood vessels. Most cardiovascular diseases can be prevented by addressing behavioral risk factors such as tobacco use, unhealthy diet and obesity, physical inactivity and harmful use of alcohol. People who are at high cardiovascular risk (due to the presence of one or more risk factors such as hypertension, diabetes, hyperlipidemia need early detection and management using counseling and medicines, as appropriate (WHO, 2017). The aim of the current study was to evaluate the effect of a protocol of care on knowledge and lipid profile among employee at risk of coronary artery diseases.

As regards to sociodemographic characteristics of the study subjects; the results of the current study reveals that mean age of the study subjects was 43.96, most of them were females, married, more than one third were highly educated, and more than half of them had not enough monthly income. These results matched with the findings of Seef et al., (2013) a study

conducted in Egypt assessing people's knowledge about coronary heart disease, attitude towards prevention and main risk reduction barriers in Ismailia, who reported that more than three quarters of the study subjects were under 45 years of age, most of them were females, the majority was married, and more than one third of them were highly educated. This similarity in demographic characteristics may be related to same setting with same environmental factors.

Moreover, obesity is an independent risk factor for mortality from all causes. The results of the current study showed that, before implementing the care protocol, about three quarters of the study subjects were overweight and obesity in different classes. This finding is consistent with **Farrag et al. (2015)** who reported that obesity and overweight to have prevalence of 10.7% and 27.9% respectively. Furthermore, the results represented significant decrease in the mean scores of body mass index of the study subjects after implementing the protocol of care, this result is supported by **Rachel (2017)** who reported that the prevention and control of overweight and obesity in adults and children has become a key element for the prevention of cardiovascular diseases. Although challenging, researchers persistent their encouragement of the study subjects to maintain a healthy dietary habits and to become physically active.

It was established that adequate knowledge about the risk factors for development of CAD are essential for the prevention of the disease and for the reduction of its mortality **Khera, et al. (2016)**. The results of this study revealed that, there was a highly significant improvement with significant statistically differences in total knowledge scores of the study subjects after implementing the protocol of care which reflects the effectiveness of the intervention. These results in agreement with **Tawalbeh & Ahmad (2013)** a study conducted in Jordan evaluating the effect of cardiac education on knowledge and adherence to healthy lifestyle which indicated that the knowledge among patients with CAD had significantly improved at one month after the application of the cardiac educational program. The significant effect of the protocol of care on knowledge may be attributed to many factors. Such as the characteristics of the study subjects, as they are all employee have different levels of education, their awareness about the complications of the disease, and the effectiveness of the program. The previous factors had an important impact on the ability of individuals to learn. In addition to the results of lipid profile in pre-test that could motivate the subjects to adhere and communicate, which may have contributed to the success of the intervention.

Regarding the cardiovascular risk, the results of the current study revealed that there was a significant statistical difference in mean scores of the cardiovascular risk assessment scale after implementing the protocol of care, the scale contains 4 modifiable risk factors; HDL which has been increased after application of the protocol of care, total cholesterol level "decreased", blood pressure "controlled", and smoking incidence was diminished). our objectives were emphasized on identification of employee who have one or more risk factor of coronary artery disease (i.e positive family history, obesity, diabetes, hypertension, ...etc), applying a protocol of care for improving their healthy life style (physical activity, healthy diet, decrease BMI, ...etc.), which result in reducing the modifiable risk factors, and reducing serum cholesterol which is considered as the most important factor in coronary artery disease as a trial to decrease the incidence of the disease. This point of view is supported by **Dégano et al. (2017)** who reported that identifying the mediating factors is the first step to diminish CVD inequalities associated to different socioeconomic status, particularly regarding modifiable factors, which can be tuned with prevention such as lifestyle interventions on diet, physical activity, and smoking.

Concerning correlation between different variables of the study, the results showed that age of the study subjects correlated positively with the mean scores of serum cholesterol, BMI, and total risk scores after implementing the protocol of care with statistical significant difference. This means that high cholesterol, obesity, and increasing risk scores associated with increasing age. This correlation reflects also poor adherence of elderly to the intervention applied. These findings matched with **Ibrahim et al. (2013)** who reported that increasing age represents a significant risk factor for CAD.

On the same scope; sex correlated negatively with total knowledge and total risk scores without significant statistical difference, which means that males had high risk scores and high knowledge scores than females but variations were not significant. Despite of good knowledge scores of males, gender remains strong risk factor for the disease. This result is supported by the results of **El-Moselhy et al. (2018)** who observed that male gender represented significant risk factor for CAD; **Jayachandra&Agnihotram (2014)** showed overall risk factors are more in males compared to females. On the other hand, **Hadaegh et al. (2009)** reported that CAD was more among females.

Level of education correlated negatively with serum cholesterol, BMI, and total risk scores representing statistical significant difference. Which means that highly educated employees were more compliant to the protocol of care provided, which associated with significant decrease in their serum cholesterol, level body mass index, and risk points for CAD. The general consensus is that knowledge is necessary for effective care, which may be sufficient to improve behavior or influence outcomes.

5. CONCLUSION

The results concluded that the protocol of care had positive effect on total knowledge scores, lipid profile and cardiovascular risk of employees at risk for cardiovascular disease.

6. RECOMMENDATIONS

Replication of the study in different settings of the community in order to identify people at risk for coronary artery disease and to reduce its incidence.

REFERENCES

- [1] **Chen Xiaohui.(2013):** 91 Cases of Laparoscopic Hysterectomy with Experience; *J Foreign Medical Research*,12 (07): 90.
- [2] **Dégano I., Marrugat J., Grau M., González B., Ramos R., Zamora A., Martí R., and Elosua R. (2017):** The Association between Education and Cardiovascular Disease Incidence is Mediated by Hypertension, Diabetes, and Body Mass Index, *Scientific Reports*, 7: 12370. DOI: 10.1038/s41598-017-10775-3.
- [3] **El-Moselhy, Mohammed A., Abd El-Aziz A., Sadek I., Hagrass S., and Farag G. (2018):** Coronary Artery Disease among Elderly Egyptian Patients: I. Socio-Demographic, Lifestyle, Psychosocial, Medical, and Biochemical Risk Factors; *American Journal of Gerontology and Geriatrics*. Volume 1, Issue 2, Article 1006
- [4] **Farrag A., El Eraky A., El Aroussy W., Sayed G., Mahrous A., Adel A., Ibrahim A., and Ibrahim M. (2015):** Obesity and Other Cardiovascular Risk Factors in Egyptian University Students: Magnitude of the Problem; *Epidemiology (sunnyvale)*, 5:1 DOI: 10.4172/2161-1165.1000181.
- [5] **Genest J et al. (2009):** Canadian Cardiovascular Society/Canadian Guidelines for the Diagnosis and Treatment of Dyslipidemia and Prevention of Cardiovascular Disease in the Adult. *Can J Cardiol*; 10 (25)1-13.
- [6] **Hadaegh F, Harati H, Ghanbarian A, Azizi F. (2009):** Prevalence of Coronary Heart Disease among Tehran Adults: Tehran Lipid and Glucose Study. *East Mediterranean Health J.*; 15:157-66. Available at: <https://www.heartfoundation.org.au/images/uploads/publications/Reducing-risk-in-heart-disease.pdf>
- [7] **Huma S, Tariq R, F AD, Kt MD. (2012):** Modifiable and non-modifiable predisposing risk factors of myocardial infarction -A review. *J Pharm Sci Res*.
- [8] **Ibrahim A, Shaheen K., and Nour M. (2013):** Lipid profile in Egyptian patients with coronary artery disease. *Egyptian Heart J.*; 65:79-85.
- [9] **Jayachandra S, Agnihotram G, Rao RP, Murthy VCR.(2014):** Risk-factor Profile for Coronary Artery Disease Among Young and Elderly Patients in Andhra Pradesh. *Heart India*; 2(1):11-4.
- [10] **Khera AV, Emdin CA, Drake I, et al.(2016):** Genetic Risk, Adherence to a Healthy Lifestyle, and Coronary Disease. *N Engl J Med*. 2016;375(24):2349–2358.
- [11] **Mayo Clinic, Patient Care and Health Info, 2019:** Available at: <https://www.mayoclinic.org/diseases-conditions/coronary-arterydisease/symptoms-causes/syc-20350613>
- [12] **National Heart Foundation (2012):** Reducing Risk in Heart Disease an Expert Guide to Clinical Practice for Secondary Prevention of Coronary Heart Disease Updated 2012 of Australia and Cardiac Society of Australia and New Zealand. PMID: 29184622doi: 10.4103/HEARTVIEWS.HEARTVIEWS_106_17.

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- [13] **National Heart, Lung, and Blood Institute (2019):** Available at: <https://www.nhlbi.nih.gov/health-topics/ischemic-heart-disease>.
- [14] **Peela J. (2012):** Study of Lipid Profile in Coronary Heart Disease patients in Libya; *Journal of Biomedical Sciences*, Vol. 1 No.4:3 doi: 10.3823/1011. Available at: <https://www.researchgate.net/publication/263889314>
- [15] **Rachel H. (2017):** Risk Factors for Coronary Artery Disease: Historical Perspectives Heart Views. 2017 Jul-Sep; 18(3): 109–114. PMID: PMC5686931
- [16] **Seef S., Jeppsson A., Stafström M. (2013):** What is killing? People’s knowledge about coronary heart disease, attitude towards prevention and main risk reduction barriers in Ismailia, Egypt, Descriptive cross sectional study; Pan African Medical Journal, 2013; 15:137. doi:10.11604/pamj.2013.15.137.1628. Available online at: <http://www.panafrican-med-journal.com/content/article/15/137/full/>
- [17] **Tawalbeh L. & Ahmad M. (2013):** The Effect of Cardiac Education on Knowledge and Adherence to Healthy Lifestyle; *Clinical Nursing Research*. DOI: 10.1177/1054773813486476. PubMed.
- [18] **Webber D, Guo Z, Mann S. (2013):** Self-care in health: we can define it, but should we also measure it? *Self Care.*; 4:101–106.
- [19] **WHO, 2017:**[https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-\(cvds\)](https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds))
- [20] **Zhong Z., Liu J., Li B., Li C., Liu Z., Yang M., Zhang O., Zhong W., and Zhao P. (2017):** Serum lipid profiles in patients with acute myocardial infarction in Hakka population in southern China; *Lipids in Health and Disease*, 16:246. Available at: DOI 10.1186/s12944-017-0636-x
- [21] **WHO (2007):** Guidelines for Assessment and Management of Cardiovascular Risk. https://www.who.int/cardiovascular_diseases/guidelines/Full%20text.pdf
- [22] **Kumar L. & Das A. (2018):** Assessment of Serum Lipid Profile in Patients of Coronary Artery Disease: A case-Control Study. *International Journal of Contemporary Medical Research*; 5(5):E59-E62. Available at: <http://dx.doi.org/10.21276/ijcmr.2018.5.5.42>