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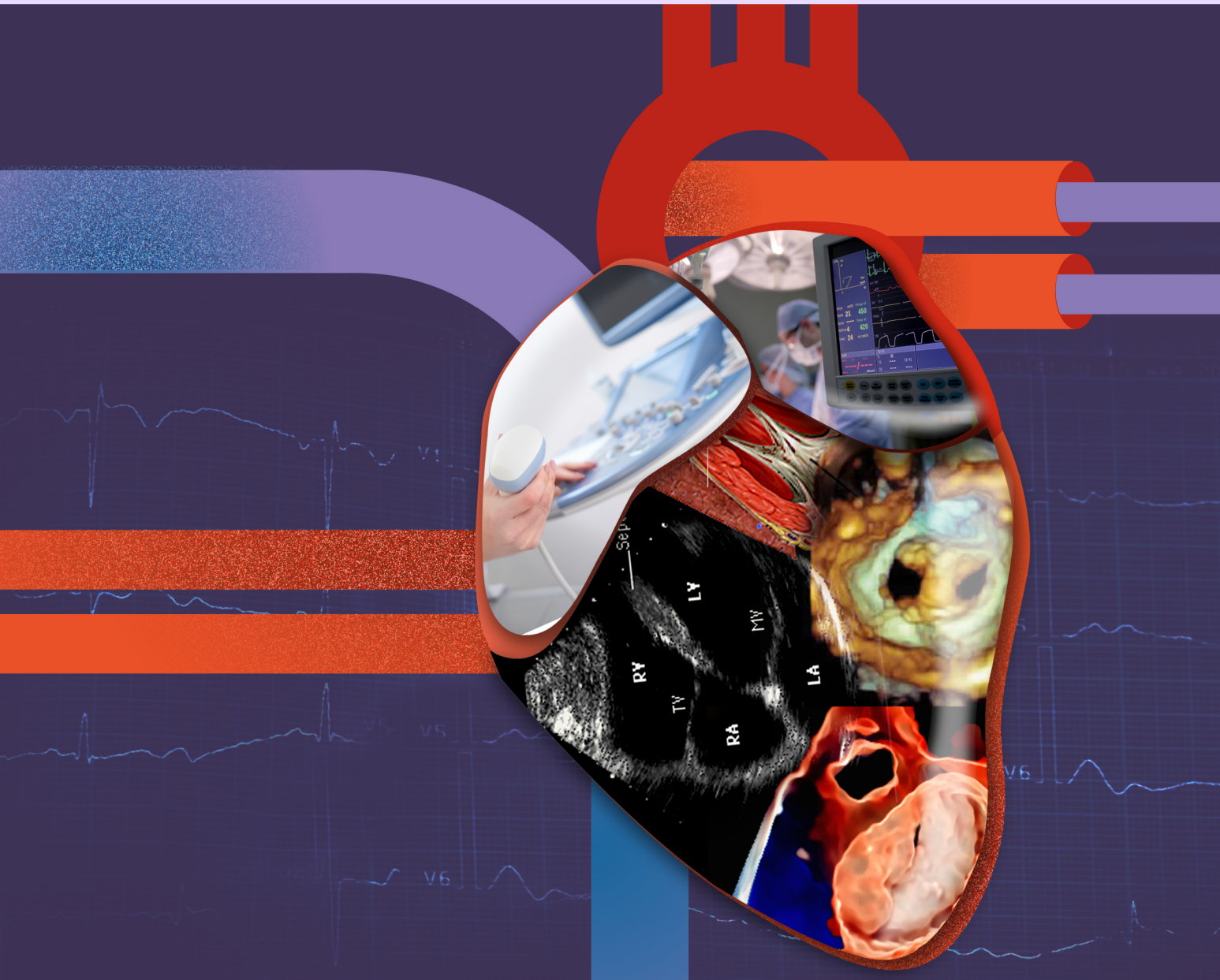

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9th Congress of Clinical Cases in Complex Cardiovascular Therapeutics (CCCCT)

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Shiraz

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AIM AND SCOPE

The International Cardiovascular Research Journal is an international, English-language, peer-reviewed journal dealing with Cardiovascular Medicine and Surgery and is published annually. It was founded in 2007 by Professor Mohammad Javad Zibaeenezhad.The International Cardiovascular Research Journal aims to publish high-quality materials, both clinical and scientific, on all aspects of Cardiovascular Medicine and Surgery. It includes articles related to research findings, technical evaluations, and reviews. In addition, it provides a forum for exchanging information on all aspects of Cardiovascular Medicine and Surgery, including education issues.In addition to publishing original papers on all aspects of Cardiovascular Medicine and Surgery, the journal also features Reviews, Clinical Perspectives, ESC Guidelines, and editorial articles about recent developments in Cardiovascular Medicine and Surgery and encourages correspondence from its readers.

CONTENT COVERAGE

International Cardiovascular Research Journal (ICRJ) is an international journal whose content spans a wide range of topics at the Cardiovascular Medicine and Surgery. The journal is intended to keep cardiologists up to date with the latest worldwide and interdisciplinary research and reviews in the field of cardiovascular disease, therapeutic and preventive aspects as well as surgery.In addition to original research, ICRJ publishes a wide range of other content types in the form of meta-analyses and reviews, case reports, letters to the editor, etc. The Journal welcomes the exchange of knowledge, fosters collaboration, and drives advancements in the field of the Cardiovascular Medicine and Surgery.

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CONTENTS

■Vol 19 Supplement January 2025

CONTENTS

INTRODUCTION

In 16th Middle East Cardiovascular Congress (MECC) and 9th Clinical Cases in Complex Cardiovascular Therapy (CCCCT) which were held in Shiraz, 23-25 Jan 2025, we received many cases for abstract award session; which most of them were based on research work and novel topics from young investigators.

Since the aim and scope of International Cardiovascular Research Journal (ICRJ) is creating a platform to share the information among the scientists and researchers in cardiovascular field, we decided to have a supplement issue of ICRJ for the abstracts received in these 2 events. I am sure that the researchers will find the topics of original basis across the whole scope; also, up-to-dated review papers and case studies welcome publishing in ICRJ.

MJ Zibaeenezhad, MD, AFACA
Editor - in - Chief of ICRJ
Chairman of MECC

■Awareness and Lack of Awareness Among the Shiraz University Staff regarding to Hypertension, Hyperlipidemia, and Diabetes Mellitus and its Association with Risk of Cardiovascular Disease

Nader Parsa[1], Armin Attar[1], Mohammad Javad Zibaeenezhad[1], Ali Karimi-Akhormeh[1,6], Anahita Ahmadi[1], Maurizio Trevisan[2,3], Lisa Wallin[4], Pari Mahlagha Zaheri[5*], Fatemeh Jaferi[5], Mehrab Sayadi[1], Alireza Moaref[1], Iman Razeghian-Jahromi[1]

[1]Cardiovascular Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

[2]City College of New York Provost & Senior Vice President for Academic Affairs, Dean of Medical School, New York, USA

[3]College of Health Sciences Vin University Hanoi, Vietnam

[4]Strong Memorial Hospital, University of Rochester, Rochester, NY, USA

[5]Shiraz University of Medical Sciences, Shiraz, Iran

[6]Peyvand Pathobiology and Genetic Lab Complex

*Corresponding author: Cardiovascular Research Center, 3rd floor, Mohammad Rasoolallah Research Tower, P.O. Box 71936-35899, Shiraz, Iran. Tel: +98 917 341 3490/Fax: +98 71 3612 2236; E-mail: parizaheri@yahoo.com

Abstract

Background: Considering the high prevalence of hypertension (HTN), dyslipidemia, and diabetes mellitus (DM) as risk factors for developing cardiovascular disease (CVD) and chronic disease approaching middle and old age, this study was designed and implemented to investigate the prevalence of these risk factors in the target population of the Shiraz University Cohort Study Staff (SUCSS) in Shiraz, Iran, to identify the prevalence of awareness of the clinical symptoms that may not be evident in the earlier stages of disease.

Methods: This is a cross-sectional study based on SUCSS using a systematic random sampling method based on the list available at Shiraz University. The data were collected according to inclusion criteria, through questionnaires and participant records, and analyzed statistically by the SPSS software version 22.

Results: Of the 1,191 study subjects who participated in the study, 53.6% (638) were males and 46.4% (553) were females, and 89.9% (1,071) were married. The age range was 25 to 72 years, and their mean and standard deviation of age was 44.29 ± 8.94 years. Among participants, lipid profile abnormalities related to total cholesterol were 37.5% (447), with low density lipids (LDL) 7.6% (91), high density lipids (HDL) 46.9% (559), and triglycerides (TG) 17.6% (210) respectively. Furthermore, among study participants, hypertension abnormalities were 41.2% (491) with abnormal SBP, 41.8% (498) abnormal DBP, 52.6% (627) abnormal SBP or DBP, and 22.3% (265) with both abnormal SBP and DBP. Regarding FBS and DM as risk factors for CVD, 5.4% (64) had abnormal FBS.

Conclusions: The study identified valuable results on the prevalence of elevated blood pressure, abnormally high lipid levels (cholesterol and triglycerides), and high blood sugar that can lead to HTN and DM. Furthermore, a significant proportion of participants were unaware they had abnormal blood pressure. The study also highlighted a less-than-optimal adherence to the prescribed medication treatment regimens among people who were aware they had HTN and diabetes, which pinpoints the need for a robust public health campaign to enlighten the populous and assist health authorities in making appropriate screening decisions and interventions to reduce the burden of these types of diseases in the community.

Keywords: Hypertension; Diabetes; Awareness; CVD

■Prevalence of Dyslipidemia by Gender Following the ESC2019 Guideline for Target LDL-C levels in the Shiraz Cohort Heart Study, Iran

Nader Parsa[1], Ali Karimi-Akhormeh[1], Reza HajAlizadeh[1], Maurizio Trevisan[2,3], Lisa Wallin[4], Pari Mahlagha Zaheri[5*], Fatemeh Jafari[6], Samira Travatmanesh[6], Mohammad Javad Zibaeenezhad[1], Mehrab Sayadi[1], Alireza Moaref[1], Iman Razeghian-Jahromi[1]

[1]Cardiovascular Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

[2]City College of New York Provost & Senior Vice President for Academic Affairs, Dean of Medical School, New York, USA

[3]College of Health Sciences Vin University Hanoi, Vietnam

[4]Strong Memorial Hospital, University of Rochester, Rochester, NY, USA

[5]Shiraz University of Medical Sciences, Shiraz, Iran

[6]Student Research Committee, Shiraz University of Medical Sciences, Shiraz, Iran

*Corresponding author: Cardiovascular Research Center, 3rd floor, Mohammad Rasoolallah Research Tower, P.O. Box 71936-35899, Shiraz, Iran., Tel: +98 917 341 3490/Fax: +98 71 3612 2236. E-mail: parizaheri@yahoo.com

Abstract

Background: Considering the high prevalence of lipid disorders in Iran and the confirmed relationship of this risk factor with cardiovascular diseases, the classification of people based on this risk factor has found a special place in preventing cardiovascular events.

Objectives: This study was designed to investigate the prevalence of dyslipidemia according to ESC2019 in the Shiraz Cohort Heart Study (SCHS).

Methods: Data of this cross-sectional study is extracted from theSCHS, which is a 10-year-long, cardiovascular-oriented, prospective cohort study that was conducted on 7,260 participants aged 40-70 to investigate cardiovascular risk factors in the metropolis of Shiraz. The outcome measured in this study is the LDL-C level based on the ESC2019 target guidelines.

Results: Men were more common in the moderate-risk and very high-risk group [1,459 (68.9%) and 669 (59.6%), respectively]. Results in the uncontrolled and controlled LDL-C groups were differentiated according to gender. Different risk groups and subgroups that had LDL-C higher than the normal limit showed the most significant findings in the high-risk groups with differences that were significant (P-value = 0.001). Although there were differences in the low-risk, moderate-risk, and very high-risk group, they were not significant (P = 0.229, P = 0.376, and P = 0.540, respectively).

Conclusions: This study found that in the high-risk group, women had a significantly higher risk of Dyslip-

idemia than men. However, in the very high-risk group, the results were seen in reverse. Therefore, results clearly showed gender difference in each risk group related to the type of risk.

Keywords: Dyslipidemia; LDL-C; ESC2019 Guidelines; Iran

■Prediction of Cardiovascular Disease Risk association with Non-alcoholic Liver Disease Over a 10-Year Period

Nader Parsa[1*], Ali Karimi-Akhormeh[1], Maurizio Trevisan[2,3], Lisa Wallin[4], Pari Mahlagha Zaheri[5], Mehrab Sayadi[1], Mohammad Javad zibaeenezhad[1], Roghayeh Askari[1]

[1]Cardiovascular Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

[2]City College of New York Provost & Senior Vice President for Academic Affairs, Dean of Medical School, New York, USA

[3]College of Health Sciences Vin University Hanoi, Vietnam

[4]Strong Memorial Hospital, University of Rochester, Rochester, NY, USA

[5]Shiraz University of Medical Sciences, Shiraz, Iran

**Corresponding author*: Cardiovascular Research Center, 3rd floor, Mohammad Rasoolallah Research Tower, P.O. Box 71936-35899, Shiraz, Iran., Tel: +98 917 341 3490/Fax: +98 71 3612 2236. E-mail: drnaderparsabe930@gmail.com

Abstract

Background: Nonalcoholic fatty liver disease (NAFLD) is the most common liver disease that has been associated with increased cardiovascular disease (CVD) risk.

Objectives: This study investigated the association of NAFLD as an independent risk factor utilizing a well-established global approach to CVD risk assessment methodology.

Methods: A community-based study was obtained from the shiraz cohort heart study (SCHS). Following exclusion criteria, 978 participants remained (453 males and 525 females). Among them, 150 NAFLD cases were matched with 828 controls that were non-NAFLD.

Results: In this study, the prevalence of females with NAFLD was significantly higher than males (58.0% vs. 42.0%, $P < 0.039$). The mean age in the NAFLD cases was higher than controls (53.7 ± 6.7 vs. 52.1 ± 7.1, $P < 0.011$). Educational level of NAFLD cases was significantly different from non-NAFLD ($P < 0.018$). The BMI of NAFLD cases was significantly higher than non-NAFLD ($P < 0.0001$). Levels of FBS, LDL, and TG in NAFLD cases were significantly higher than controls ($P < 0.007$, $P < 0.034$, and $P < 0.035$). Prevalence of hypertension, hyperlipidemia, diabetes, and chronic kidney disease in NAFLD cases was significantly higher than non-NAFLDs ($P < 0.001$, $P < 0.032$, $P < 0.001$, and $P < 0.001$). The correlation coefficient mean risk-score in females was significantly higher than in males ($P < 0.001$, $r = 0.777$) along with average risk-score (10.64 ± 6.40 vs. 7.59 ± 5.77). Results identified significant and positive correlations between age and Q-risk3 score ($P < 0.001$, $r = 0.586$). In this study, the Q-risk3 is an algorithm for predicting the risk of CVD. In terms of risk prediction, using Framingham Risk Score (FRS) guidelines, a Q-risk3 Score ≥ 5 is a potential for CVD associated with NAFLD within the next 10 years. Thus, the percentages of subjects who met moderate (5 - 20) or > 20 risk with significantly higher mean Q-risk3 scores were among NAFLD cases than non-NAFLD (11.66 ± 6.87 vs. 8.55 ± 0.09, $P < 0.001$).

ROC regression analysis identified 4.7 as the best cut-off point for the two groups based on the risk score and area under the curve as 0.646 or 64.6% with 95% CI (61.5 - 67.6) with high sensitivity of 86.7%, 95% CI (80.2 - 91.7).

Conclusions: Findings of this study according to FRS identified a significant association of CVD related to NAFLD Q-risk3 in the next 10 years.

Keywords: NAFLD; CVD; Risk Assessment; 10-Year Risk

■Prevalence of Long QT Syndrome in the Shiraz Cohort Heart Study, Shiraz, Iran

Nader Parsa[1], Vahid Jorat[1] Ali Karimi-Akhormeh[1,2], Mohammad Javad Zibaeenezhad[1], Maurizio Trevisan[3,4], Lisa Wallin[5], Pari Mahlagha Zaheri[6*], Mehrab Sayadi[1], Leila Hafezi[1], Fatemeh Jafari[6], Iman Razeghian-Jahromi[1], Armin Attar[1] and Mohammad Zarenezhad[7]

[1]Cardiovascular Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

[2]Peyvand Pathobiology and Genetic Lab Complex, Shiraz, Iran

3 City College of New York Provost & Senior Vice President for Academic Affairs, Dean of Medical School, New York, USA

4 College of Health Sciences, Vin University, Hanoi, Vietnam

5 Strong Memorial Hospital, University of Rochester, Rochester, NY, USA

6 Shiraz University of Medical Sciences, Shiraz, Iran

7 Legal Medicine Research Center, Legal Medicine Organization, Tehran, Iran

**Corresponding author*: Cardiovascular Research Center, 3rd floor, Mohammad Rasoolallah Research Tower, P.O. Box 71936-35899, Shiraz, Iran., Tel: +98 917 341 3490/Fax: +98 71 3612 2236. E-mail: parizaheri@yahoo.com

Abstract

Background: The corrected QT (QTc) interval in the surface Electrocardiogram (ECG) is an indicator of the duration from the start of ventricular depolarization to the end of ventricular repolarization. A prolonged QTc interval has been correlated with total and cardiovascular disease (CVD) mortality. Although much is known about the relation between prolonged QTc interval and clinical outcome, there is a lack of information on the prevalence and specific risk factors of QTc prolongation in the general Shiraz metropolis in the shiraz cohort heart study (SCHS).

Objectives: In this regard, the study focused on a method to provide evidence for potential CVD risk prediction and association of prolonged QTc disease burden estimate in the Shiraz target population.

Methods: This study was conducted with a cohort of patients from the SCHS, which is a cross-sectional, population-based study of 7,225 people in the age group of 40 - 70 years. We conducted the study to determine the prevalence of long QT syndrome (LQTs) in our population. Participants were randomly selected using a multi-stage sampling method to ensure that the study included all the population covered by the health care centers. Initially, subjects were invited to participate in the study, then after signing the written informed consent, registering, and assigning a unique identification number, the anthropometrics, physical activity, and biological samples were

collected. A basic ECG was then performed, followed by twelve-lead ECGs, and automatic analysis was performed on all participants. Then, 735 participants who met the criteria of a long QT interval were re-examined by expert cardiologists. Their corrected QT interval was measured and confirmed using the Bazett formula. We used Bazett's formula to correlate specific risk factors with prolonged QT intervals for potential confounders. This formula is commonly used by physicians to correct QT intervals (QTc = QT/ $\sqrt{RR}$) (Figures 1 and 2). Logistic regression adjustments were then made.

Results: Of the 735 subjects with a long QT interval, 260 had a confirmed long QTc with a prevalence of 3.59%. The prevalence of LQTs increased significantly with age, a history of sudden death from CVD in a first-degree relative, and taking ineffective or inappropriate medication.

Conclusions: Findings of this study show that the prevalence of long QTc intervals was proportionally high. Therefore, it is crucial to prevent associated potential risk factors and implement appropriate management strategies in this community to reduce the burden of cardiovascular disease.

Keywords: Prevalence; LQTS; LQTc; ECG; CVD

■Association Between Electrocardiographic Features and 10-Year Atherosclerotic Cardiovascular Disease Risk: Insights from a Cohort-Based Cross-Sectional Study

Pouria Azami[1,2,3], Mohammad Javad Nobakhti[1,2], Mehrab Sayadi[3], Alireza Mirhosseini [3,4], Mohammad Keshavarz[1,2], Raziye Saeedizade[1,2], Masood Dindari Parizi[1,2], Mahsa Borjzadeh[1,2], Mohammad Javad Zibaeenezhad[2,3], Armin Attar[1,2 *]

[1]School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

[2]Department of Cardiovascular Medicine, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

[3]Cardiovascular Research Center, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

[4]MD-MPH Department, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

*Corresponding author: School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran. E-mail: attar_armin@yahoo.com

Abstract

Objectives: This study aimed to examine the connection between various ECG abnormalities and 10-year ASCVD risk scores in asymptomatic individuals without a history of cardiovascular events, using data from the shiraz heart study (SHS). It also sought to identify specific ECG markers that could help in early cardiovascular risk detection, contributing to more effective risk management strategies.

Methods: This cross-sectional analysis included participants aged 40 - 70 years from the Shiraz Heart Study (SHS). Participants had to have complete ECG records and documented ASCVD risk factors. Trained cardiologists reviewed the ECG data, which included both continuous and categorical variables. ASCVD risk scores were calculated based on demographic and clinical factors. Multivariate regression models were used to explore associations between ECG findings and the 10-year ASCVD risk scores while adjusting for key confounders.

Results: A total of 1,471 participants were included in the study, with 44.5% male (N = 654) and an average age of 51.65 years (SD = 7.84). The mean ASCVD risk score was 5.49 (SD = 6.41). Significant relationships were found between continuous ECG parameters (such as P-wave duration, PR interval, QRS duration, and QRS axis) and ASCVD risk. Key categorical ECG findings, including ST depression, ST elevation, left bundle branch block (LBBB), prolonged P-wave duration, and left atrial enlargement, were also strongly linked to ASCVD risk scores. After adjusting for factors like age, gender, hypertension, diabetes, and cholesterol, multivariate regression analysis identified ST depression (B = 0.060, P < 0.001) and LBBB (B = 0.031, P = 0.039) as independent predictors of ASCVD risk.

Conclusions: ST depression and LBBB were moderately associated with cardiovascular risk stratification via the 10-year ASCVD risk score. These findings suggest that ECG abnormalities could play a significant role in refining cardiovascular risk predictions. Incorporating these markers into routine clinical practice may help identify individuals at higher risk earlier, allowing for targeted preventative measures and better management of heart health.

Keywords: Atherosclerotic Cardiovascular Disease; Bundle-Branch Block; Cardiovascular Risk Prediction; Electrocardiography; ST Segment Depression

■Association of Dietary Patterns with Atherogenic Index of Plasma and Cardiovascular Risk Factors in Adults: A Cross-sectional Cohort Study

Mehrab sayadi[1], Mohammad Javad Zibaeenezhad[1], Pouria Azami[1*], Nasrin Motazedian[2], Fatemeh Khademian[3], Mohaddeseh Hasanzadeh[4], Fatemeh Zibaeenejad[1], Seyyed Saeed Mohammadi[1], Houri Mousavinezhad[1], Zahra Daneshvar[1], Nader Parsa[1], Iman Razeghian-Jahromi[1]

[1]Cardiovascular Research Centre, Shiraz University of Medical Sciences, Shiraz, Iran

[2]Transplant Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

[3]Division of Human Nutrition, Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, AB, Canada

[4]Nutritional Health Team (NHT), Shiraz, Iran

*Corresponding author: Cardiovascular Research Centre, Shiraz University of Medical Sciences, Shiraz, Iran. E-mail: pouria.azami95@gmail.com

Abstract

Objectives: This study aims to investigate the relationship between dietary patterns, the Atherogenic Index of Plasma (AIP), and cardiovascular risk factors in adults aged 40 - 70 years in Shiraz, Iran, focusing on how different dietary patterns affect cardiovascular risk factors.

Methods: Participants' diets were assessed using a Food Frequency Questionnaire (FFQ) covering 35 food groups. Principal component analysis (PCA) was used to categorize dietary patterns into three types: vegan, Western, and carbohydrate-based. The AIP was calculated as the

logarithmic ratio of triglycerides to HDL cholesterol, and cardiovascular risk was evaluated using a standard risk prediction model. Participants were grouped based on their adherence to these dietary patterns, and their cardiovascular risks were analyzed.

Results: A total of 1,675 participants (average age 53.39 ± 8.28 years, 43.5% male) were included in the study. High adherence to the vegan diet was linked to the lowest AIP (0.41 ± 0.22) and ASCVD risk score (5.81 ± 6.84) compared to other groups. Low adherence to the Western diet showed a slight association with a lower ASCVD risk score (6.05 ± 6.85) compared to intermediate and high adherence, although AIP differences were not significant (P = 0.436). No significant differences in AIP (P = 0.083) or ASCVD risk scores (P = 0.801) were found across different levels of adherence to a high-carbohydrate diet.

Conclusions: The findings suggest that high adherence to a vegan diet is particularly beneficial for cardiovascular health, as it is associated with significantly lower AIP and ASCVD risk scores. These results highlight the potential of plant-based dietary patterns in reducing cardiovascular risk, promoting better heart health, and underlining the importance of nutritional interventions in managing cardiovascular disease risk.

Keywords: Atherogenic Index of Plasma; Cardiovascular Risk; Dietary Patterns; Plant-Based Diet; Risk Factors

■The Effects of Regimen Contains 10% Corn Oil (C.O.) on The Risk of Developing Atherosclerosis on Rabbit Large Arteries

Seyed Mohammad Hosein Noori Mogahi[1,2*], Fatemeh Mohammadrezaii[2], Narges Shafiei Ansari[2]

[1]Department of Histology Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran

[2]Department of Midwifery, Faculty of Nursing and Midwifery, Ahwaz Branch, Islamic Azad University, Ahwaz, Iran

Corresponding Author: Department of Midwifery, Faculty of Nursing and Midwifery, Ahwaz Branch, Islamic Azad University, Ahwaz, Iran. Tell: 09123842483. Email: noorimoo@sina.tums.ac.ir & noorimoo@gmail.com

Abstract

Background: Several studies have indicated the considerable effects of oils on arteries, and its importance in general health and early diagnosis is well known.

Methods: In this study, we investigated the effects of dietary corn oil (10%) on rabbits' arterial walls. The subjects were female Albino rabbits, aged 4 to 7 months. A group of 24 rabbits was fed defined diets for 1, 2, and 3 months as the test group. The control group was fed a standard laboratory diet, while the test group received a diet containing 10% corn oil. Animals were euthanized at the end of 1, 2, and 3 months. The samples were stained with H&E, Orcein, and Mallory's Trichrome. Aortic segments (ascending, horizontal, thoracic, and abdominal aorta), carotid (external and internal), and Subclavian arteries from rabbits fed corn oil were compared with those fed standard diets.

Results: The study of Intima, Media, and Adventitia in rabbit arteries raised on diets with corn oil demonstrated that the number of elastic lamellae decreased while the number of smooth muscle cells increased in the tunica intima. Other changes observed included: (1) Calcification, (2) foam cells, and (3) extracellular lipid.

Conclusions: These results demonstrated that a diet with corn oil increases the risk of developing Atherosclerosis and luminal narrowing in large arteries. These observed effects are more pronounced at 3 months than at one or two months.

Keywords: Corn Oil; Arteries; Atherosclerosis

■Histopathologic Changes to Corn Oil 10% (C.O.) In Rabbits Aortal Segment of Cardiovascular System

Seyed Mohammad Hosein NooriMogahi[1*], Setayesh Khosravi[2], Fatemeh Eskandari[2], Sanaz Jahangiri[2]

[1]Department of Histology Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran

[2]Department of Midwifery, Faculty of Nursing and Midwifery, Ahwaz Branch, Islamic Azad University, Ahwaz, Iran

Corresponding Author: Department of Midwifery, Faculty of Nursing and Midwifery, Ahwaz Branch, Islamic Azad University, Ahwaz, Iran. Tell: 09123842483. Email: noorimoo@sina.tums.ac.ir & noorimoo@gmail.com

Abstract

Objectives: We investigated the effects of dietary corn oil (10%) on rabbits' aortal segments.

Methods: The subjects were female Albino rabbits, aged 4 to 7 months. A group of 24 rabbits was fed defined diets for 1, 2, and 3 months as test groups. The control group was fed a standard laboratory diet, while the test group received a diet containing 10% corn oil. Animals were euthanized at the end of 1, 2, and 3 months. The samples were stained with H&E. Aortic segments from the rabbits fed corn oil were compared with those fed standard diets. The study of intima, media, and adventitia in rabbit aorta segments raised on diets with corn oil demonstrated that elastic lamellae were less crowded while the smooth muscle cells were more numerous in the tunica intima. Other changes observed included calcification, foam cells, and extracellular lipid.

Results: These results demonstrated that a diet with corn oil increases the risk of developing atherosclerosis and luminal narrowing in large arteries. These observed changes are more noticeable in the 3-month diet than in one or two months.

Conclusions:

We concluded that the longer the duration of corn oil consumption, the greater the risk of atherosclerosis.

Keywords: Rabbit; Corn Oil; Aorta; Atherosclerosis

■Evaluating the Effect of Nurse Telephone Follow-up on Depression, Anxiety, Stress among Hospitalized Cardiovascular Patients in Mazandaran Province

Hossein Mohsenipouya[1*], Maryam Mahtabi[2], Fateme Yaghoubi[2], Abolfazl Hosseinnataj[3], Raha Jafari Ghaleh[4]

[1]Health Education and Promotion, Faculty of Nursing, Mazandaran University of Medical Sciences, Behshahr, Iran

[2]Faculty of Nursing, Mazandaran University of Medical Sciences, Sari, Iran

[3]Department of Biostatistics, Faculty of Health, Mazandaran University of Medical Sciences, Sari, Iran

[4]Student Research Committee, Faculty of Nursing, Mazandaran University of Medical Sciences, Behshahr, Iran

*Corresponding Author: Health Education and Promotion, Faculty of Nursing, Mazandaran University of Medical Sciences, Behshahr, Iran. Email: hosseinmohsenipouya@gmail.com

Abstract

Background: Statistics show an increase in psychological disorders such as depression, anxiety, and stress in patients with cardiovascular diseases.

Objectives: This study aims to investigate whether educational interventions could reduce the prevalence of these disorders in cardiovascular patients.

Methods: In this case-control study, patients were divided into two groups: an intervention group and a control group, each consisting of 30 individuals. The educational intervention was implemented within two weeks of discharge. Data on depression, anxiety, and stress were collected using DASS-21. Mann-Whitney, Wilcoxon, GEE regression, and Spearman correlation analyses were employed to analyze the data.

Results: Significant differences were observed in the mean scores of both groups before and after the intervention ($P < 0.05$). However, no significant differences were found between the intervention and control groups in terms of depression, anxiety, and stress ($P > 0.05$).

Conclusions: While the findings suggest that the remote telephone follow-up intervention did not have a significant positive impact on psychological disorders, a two-week educational program for patients with CVD may be effective in reducing anxiety and depression.

Keywords: Cardiovascular Patients; Depression-Anxiety-Stress; Telephone follow-up Nursing

■The Hidden Burden: Lifestyle Challenges in Hypertensive Acute Myocardial Infarction Patients

Hamidreza Roohafza[1], Marjan Mansourian[2], Fatemeh Zarimeidani[1,3], Rahem Rahmati[1,3], Najmeh Shakibaei[2,4], Masoumeh Sadeghi[1*]

[1]Cardiac Rehabilitation Research Center, Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran

[2]Epidemiology and Biostatistics Department, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran

[3]Students Research Committee, Shahrekord University of Medical Sciences, Shahrekord, Iran

[4]School of Public Health, Isfahan University of Medical Sciences, Isfahan, Iran

*Corresponding Author: School of Public Health, Isfahan University of Medical Sciences, Isfahan, Iran. E-mail: Sadeghimasoumeh@gmail.com

Abstract

Background: Hypertension (HTN) is a prevalent cardiovascular risk factor, affecting around 30% of individuals in developed countries. It is notably prevalent in patients with acute Myocardial Infarction (MI), with rates ranging from 46.0% to 63.4%. Comorbidities and lifestyle components are pivotal, modifiable risk factors for HTN and MI.

Objectives: This study aimed to evaluate the effects of these risk factors on HTN in the context of MI.

Methods: The study utilized longitudinal data in a 3-year (2018 - 2020) multi-centric study from patients aged 18 - 75 experiencing their first ST-segment elevation MI. Hypertension was the primary endpoint, with contributing lifestyle components, including sleep quality, sexual activity, smoking status, physical activity, and nutrition, and comorbidities, including peripheral vascular disease (PVD), dyslipidemia, stroke, and diabetes mellitus (DM). We applied Bayesian structural equation modeling to analyze the interplay among key variables influencing HTN in MI patients.

Results: In our study encompassing 1,699 acute MI patients, 424 men (69.9%) and 181 women (30.1%) were identified as having HTN. Analysis within the realm of healthy lifestyle factors revealed that hypertensive individuals exhibited a reduced inclination toward engaging in sexual activity ($P = 0.05$) and demonstrated a notably higher prevalence of never having smoked ($P < 0.001$). Moreover, a substantial escalation in the incidence of comorbidities such as peripheral vascular disease (PVD), dyslipidemia, stroke, and Diabetes Mellitus (DM) was documented within this study (all $P < 0.05$). Through the application of a Bayesian analysis, an integrated model illuminated intricate relationships: an indirect association was observed between healthy lifestyle and HTN (Coefficient: -0.26 (95% CI -0.27 - 0.25)), while comorbidities exhibited a direct association with HTN (Coefficient: 0.60 (95% CI 0.59 - 0.61)) in the context of MI.

Conclusions: The intricate interplay of HTN, lifestyle choices, and comorbidities in acute MI patients underscores the paramount importance of tailored interventions. Understanding these relationships can optimize care strategies, potentially ameliorating outcomes, and elevating healthcare quality post-MI.

Keywords: Bayesian Analysis; Cardiovascular; Comorbidity; Heart Attack; Hypertension; Lifestyle

■Investigating the Blood Pressure status of Operating Room Technologists Working in Hospitals Affiliated to Guilan University of Medical Sciences and Health Service

Seyyedeh Haniyeh Mousavibaghi[1*], Shaqayeq Taqizadeh[2], Alireza Babajani[2]

[1]Instructor of Operating Room, Department of Operating Room and Anesthesiology, Langroud School of Allied Medical Sciences, Guilan University of Medical Sciences, Rasht, Iran

[2]Instructor of Anesthesiology, Department of Operating Room and Anesthesiology, Langroud School of Allied Medical Sciences, Guilan University of Medical Sciences, Rasht, Iran

* *Corresponding author:* Instructor of Operating Room, Department of Operating Room and Anesthesiology, Langroud School of Allied Medical Sciences, Guilan University of Medical Sciences, Rasht, Iran. Email: Haniyehmousavibaghi12@gmail.com

Abstract

Background: Operating room technologists play an important role in the healthcare system as providers of treatment care. The type of activity and environment of the operating room can affect people's health and, as a result, improve or decrease the performance of employees. Night work, long shifts, unpredictability of the type of activity, and various risks in the operating room environment can cause many negative effects on people's health. One of these negative effects is the increase in blood pressure. High blood pressure is considered a risk factor for cardiovascular diseases.

Objectives: This study was conducted with the aim of determining the blood pressure status of operating room technologists working in hospitals affiliated with Guilan University of Medical Sciences and Health Services.

Methods: In this cross-sectional study conducted in 2024, the required information was collected by the census method, and 160 operating room technologists (60% females, 40% males) were selected and evaluated according to the criteria in hospitals affiliated with Guilan University of Medical Sciences and Health Services in Rasht City. The Survey of Shift Workers (SOS) Questionnaire was used to collect the required data. Data were analyzed by SPSS-26 software.

Results: The results of this study showed that 46.9% of the studied subjects had blood pressure problems, of which 30%, 14.4%, and 2.5% of the subjects stated that they rarely, often, and almost always suffer from blood pressure changes. In this study, a significant relationship was observed between gender ($P = 0.016$), age ($P < 0.001$), and work experience ($P < 0.001$) with changes in blood pressure; these problems were more prevalent among women and people with higher age and work experience.

Conclusions: A significant percentage of operating room technologists suffer from hypertension. Since high blood pressure is a risk factor for cardiovascular diseases, policymaking and formulation of effective preventive interventions, more support, and providing better working conditions, especially in at-risk groups and people with higher work experience, and emphasis on follow-up treatment seem necessary.

Keywords: Blood Pressure; Occupational Injuries; Operating Room; Operating Room Technologist

■The Impact of Postoperative High Blood Pressure on Surgical Outcomes

Seyyedeh Haniyeh Mousavibaghi[1*], Parvin Dehghan Soofi[2]

[1]Instructor of Operating Room, Department of Operating Room and Anesthesiology, Langroud School of Allied Medical Sciences, Guilan University of Medical Sciences, Rasht, Iran

[2]Surgical technology student, Department of Operating Room and Anesthesiology, Langroud School of Allied Medical Sciences, Guilan University of Medical Sciences, Rasht, Iran

* *Corresponding author*: Surgical technology student, Department of Operating Room and Anesthesiology, Langroud School of Allied Medical Sciences, Guilan University of Medical Sciences, Rasht, Iran. Email: Haniyehmousavibaghi12@gmail.com

Abstract

Background: Patients may experience high blood pressure after surgery for various reasons. Causes such as pain, stress, anxiety and excitement, cold, hypercarbia, hypoxia, administration of large amounts of fluids, the presence of a tube in the trachea, aspiration of endotracheal tube secretions and its removal, transferring the patient from the bed to the recovery room, and waking the patient up quickly are among the causes that lead to high blood pressure after surgery. High blood pressure after surgery is harmful in any case and can even cause the patient's death.

Objectives: This study aimed to investigate the impact of postoperative hypertension on surgical outcomes.

Methods: In this review study, Scopus, PubMed, SID, and Google Scholar databases were used to search Persian and English articles, and the keywords "High blood pressure," "Postoperative outcomes," and "Surgery" were used. The search period was from 2014 to 2024. After checking the titles and abstracts of the found articles and removing duplicates, 29 articles were selected and included in the study.

Results: Studies have shown that most patients' high blood pressure lasts less than 6 hours after surgery. Studies also showed that people with low blood pressure recover faster and more easily after surgery than people with high blood pressure. High blood pressure after surgery can be associated with adverse cardiovascular events and dysfunction of the heart and other organs of the body. Complications of high blood pressure after surgery include myocardial infarction, stroke, and death.

Conclusions: Careful management of postoperative blood pressure by anesthesiologists is a critical factor in patient care because intraoperative hemodynamic instability is associated with cardiovascular complications. Proper postoperative planning and preoperative counseling can be very effective and help reduce postoperative risks.

Keywords: High Blood Pressure; Postoperative Outcomes; Surgery

■Investigating the Predictive Value of the HEART Scoring System in the Prediction of Major Cardiovascular Events

Zahra Alipour [1*], Saeed hayati[2], Seyed Ashkan Tabibzade[2], Latifah Jabbari[2]

[1]Student Research Committee, Faculty of Medicine Hormozgan University of Medical Sciences, Bandar Abbas, Iran

[2]mergency Medicine Department, Shahid Mohammadi Hospital, Hormozgan University of Medical Sciences, Bandar Abbas, Iran

Correspondence author: Student Research Committee, Faculty of Medicine Hormozgan University of Medical Sciences, Bandar Abbas, Iran. Email: dr.zah.alipour@gmail.com

Abstract

Background: Chest pain is one of the most common and potentially dangerous clinical complaints of adults presenting to emergency departments (EDs) in developed and developing countries. The management of chest pain is one of the major challenges in the ED. The HEART scoring system (HEART SCORE) is one of the most recently introduced models.

Objectives: In this study, we investigated the predictive value of the HEART scoring system in predicting Major adverse cardiovascular events (MACE) in patients with chest pain who were referred to the emergency department of Shahid Mohammadi Hospital in 1401.

Methods: During the study period, all patients over 18 years of age who were referred to the emergency department of Bandar Abbas Shahid Mohammadi Hospital with the main complaint of chest pain were included in the study. The HEART score was calculated on the basis of 5 items: history, ECG, age, risk factors, and troponin. Patients with a score of 0 to 3 were classified as low risk, patients with a score of 4 to 6 were classified as intermediate risk, and patients with a score of 7 and above were classified as high risk. The primary outcome in this study was the occurrence of MACE, including death from any cause, nonfatal myocardial infarction (MI), and coronary revascularization within 6 weeks.

Results: A total of 1,501 individuals with a mean age of 48.99 years (±14.71), of whom 50.9% were men, were included in the study. A diagnosis of MACE was made in 28.6% of cases. Finally, 74.2% were discharged, 7.6% were transferred to the ward, 2.1% to the intensive care unit, and 16.1% were discharged by personal consent. The best cut point for the HEART score in predicting MACE (with an area under the curve of 0.932) was equal to 3.5, and with this criterion, the sensitivity was 93.72% (91.43% - 96.01%) and the specificity was 78.34% (75.87% - 80.81%). Also, the positive predictive value is 63.46% (59.72% - 67.21%), the negative predictive value is 96.88% (95.72% - 98.04%), the positive likelihood ratio is 4.327 (2.855-6.558), and the negative likelihood ratio is 0.080 (0.053-0.121).

Conclusions: Based on the findings of our study, the HEART score in patients with MACE was significantly higher than in patients without MACE. The HEART score has a high sensitivity for short-term MACE in the low-risk group and is associated with high specificity for predicting MACE in the high-risk group.

Keywords: Cardiovascular events; HEART score; Chest pain

■In Patients' Own Words: Hidden Barriers to Self-care in Heart Failure

Seyede Fatemeh Gheiasi[1*], Elham Navab[2]

[1]Department of Operating Room and Anesthesiology, School of Nursing and Midwifery, Zanjan University of Medical Sciences, Zanjan, Iran

[2]Department of Critical Care Nursing, School of Nursing & Midwifery, Tehran University of Medical Sciences, Tehran, Iran. fatemeh.gheiasi@gmail.com

Correspondence author: Department of Operating Room and Anesthesiology, School of Nursing and Midwifery, Zanjan University of Medical Sciences, Zanjan, Iran

Abstract

Background: One of the main challenges in the management of heart failure (HF) is poor adherence to self-care. Patients with HF face several barriers to adherence to self-care.

Objectives: The present study aimed to explain the experiences of patients with HF regarding barriers to adherence to self-care behaviors.

Methods: This study was a descriptive qualitative study. The research population included all patients with HF, their family caregivers, and physicians and nurses in HF clinics affiliated with Tehran University of Medical Sciences. The selection of participants was purposeful and continued until data saturation. Semi-structured interviews were used to collect data. The data were analyzed in MAXQDA2020 software using Braun and Clarke's thematic analysis approach.

Results: The themes of "reducing the threshold of self-resilience," "false beliefs and convictions," and "lack of knowledge and awareness" were identified as barriers to self-care.

Conclusions: Patients with HF often experience challenges such as activity limitations, fear of death, depression, fear of the future, and anxiety. These challenges can cause a reduction in the threshold of self-resilience in patients. Reduced self-resilience thresholds lead to non-adherence to self-care behaviors through reduced motivation to change lifestyle, feelings of hopelessness, and greater vulnerability to stress. According to the participants, some false beliefs of patients with HF were identified as barriers to self-care. They mentioned a lack of belief in the treatment of the disease with medication, an inability to follow a strict diet, the permanence of the symptoms of HF, a preference for using herbal remedies, and discontinuation of treatment due to feeling well. Study participants stated that the knowledge and awareness of patients with HF about the disease and self-care behaviors are low and inadequate. This knowledge deficit seems to be related to reasons such as inadequate explanations by healthcare professionals, the complexity of the disease and its treatment plan, and low literacy. However, sufficient knowledge and awareness play an important role in increasing motivation to adhere

to treatment, reducing anxiety, and improving quality of life. Developing supportive educational interventions and membership in peer-based support networks are recommended to promote mental health and increase awareness among patients with HF.

Keywords: Heart failure; Self-care; Thematic analysis

■Developing A Clinical Decision Support System for Detecting Cardiac Arrhythmias Using Electrocardiogram Signals

Sara Chopannejad [*1], Arash Roshanpoor [2], Alireza Ashrafi[3], Farahnaz Sadoughi [1]

[1]Department of Health Information Management, School of Health Management and Information Sciences, Iran University of Medical Sciences, Tehran, Iran

[2]Department of Computer, Yadegar-e-Imam Khomeini (RAH), Janat-Abad Branch, Islamic Azad University, Tehran, Iran

[3]Demisco, Sciences, Tehran, Iran

Corresponding authors: Department of Operating Room and Anesthesiology, School of Nursing and Midwifery, Zanjan University of Medical Sciences, Zanjan, Iran. E-mail: sarachopannejad@gmail.com

Abstract

Background: Cardiac arrhythmias increase the risk of cardiovascular complications and sudden death, leading to reduced quality of life, increased mortality, and higher healthcare costs. Diagnosing arrhythmias based on electrocardiogram (ECG) interpretation is complex and time-consuming. Deep learning can create effective approaches for arrhythmia classification.

Objectives: This study aims to develop a clinical decision support system for diagnosing ten types of cardiac arrhythmias and normal heart rhythm based on ECG signals.

Methods: This applied-developmental research was conducted quantitatively in two independent phases. In the first phase, 2,700 12-lead ECG recordings of 10 seconds duration, with a sampling frequency above 500 Hz, were collected non-randomly from medical centers in Isfahan and labeled by seven physicians. Based on the collected data, after denoising using the BLPS-LOESS-NLM method and balancing the data using the SMOTE_Tomek method, a hybrid CNN-BILSTM-BIGRU model was created using the Keras deep learning library (v2.11.0) and TensorFlow framework (version 2.11) in Python programming, based on cross-entropy focal loss and a multihead self-attention mechanism. In the second phase, a web-based decision support system was developed and evaluated by 16 individuals using the Persian version of the System Usability Scale (SUS) questionnaire, who were purposefully and non-randomly selected from medical centers in Isfahan.

Results: The web-based clinical decision support system for diagnosing cardiac arrhythmias based on ECG signals achieved an accuracy of 99.53% based on the probability averaging for each of the ten types of arrhythmias and normal sinus rhythm. The system's usability evaluation by users scored 72.96, indicating a need for minor improvements in the design and an acceptable user interface for the arrhythmia diagnosis decision support system based on ECG signals.

Conclusions: This decision support system is expected to assist physicians at various levels of medical education (medical students, general practitioners, cardiology residents, and cardiologists) in the process of ECG analysis and arrhythmia diagnosis. By reducing the error rate among physicians due to factors such as fatigue or limited experience and knowledge, it can improve diagnostic quality and reduce costs imposed on patients and medical centers.

Keywords: Decision Support System; Arrhythmia; Deep Learning; Electrocardiogram; Convolutional Neural Network; BILSTM; BIGRU; SMOTE-Tomek; System Usability Scale

■The Establishment of an in Vitro Cardiac Fibrosis Model for Mechanistic Studies

Yasaman Pourmehran [1,2*]

[1]Department of Stem Cells and Developmental Biology, Cell Science Research Center, Royan Institute for Stem Cell Biology and Technology, ACECR, Tehran, Iran

Corresponding author: University of Science and Culture, Tehran, Iran. E-mail: pourmehranyasaman@gmail.com

Abstract

Background: Heart injuries from multiple causes can result in pathological remodeling and fibrosis, which in turn promote the development of heart failure. An acute Myocardial Infarction leads to an increased proliferation of cardiac fibroblasts (CFs) and the transition to the myofibroblast phenotype. During this fibrotic phase, myofibroblasts begin to secrete elevated levels of collagens and other ECM proteins. Moreover, fibrogenic growth factors such as TGF-β, cytokines including TNF-α, IL-1, and IL-6, and neurohumoral pathways trigger fibrogenic signaling cascades, which further promote fibrosis.

Objectives: In this study, we aimed to establish an in vitro cardiac fibrosis model to provide a platform for mechanistic studies at the transcriptome and proteome level.

Methods: Human CFs were isolated from myocardial biopsies obtained during mitral valve replacement. The biopsies were cut into 1 mm^2 pieces and explanted on gelatin-coated plates. Explants were cultured overnight in FBS and thereafter, for one week in fibroblast culture media. Fibrosis induction was performed by employing four concentrations of Doxorubicin (DOX; 0.1, 0.25, 0.5, and 1 μM) for 72 hours, and it was assessed by immunostaining of smooth muscle actin (α-SMA) and analysis of secreted collagen content with a Sircol soluble collagen assay kit. Finally, cardiac fibrosis-related gene expressions were measured by qRT-PCR.

Results: Isolated fibroblasts expressed CF-specific proteins: Vimentin, Collagen a1, and CD90. Treatment with 0.1 and 0.25 μM of DOX did not significantly affect cell viability or cell apoptosis, whereas it provoked fibroblast activation. Myofibroblast induction was confirmed by staining

against α-SMA, which is a fibrosis-related biomarker. Furthermore, DOX-treated cells secreted more collagen into the culture medium (Figure 5). Finally, expression levels of α-SMA, TGF-β, and COL1 were significantly increased in induced cardiac fibroblasts.

Conclusions: Our results showed that a 0.25 μM concentration of DOX can activate CFs and promote their trans differentiation into myofibroblasts. This in vitro model of cardiac fibrosis can serve as a platform to study the underlying mechanisms of cardiac fibrosis, to evaluate the fibrosis-related transcriptional changes, and to develop novel therapeutic strategies.

Keywords: Cardiac Fibrosis; Cardiac Fibroblast; Myofibroblasts; Doxorubicin; Disease Modeling

■Protective Effects of Cydonia Oblonga Extract on Vascular Damage of Hypercholesterolemic Rabbits

Aref Delkhosh[1], Masoud Delashoub[2*]

[1]Department of Agriculture, Minab Higher Education Center, University of Hormozgan, Bandar Abbas, Iran

[2]Department of Basic Sciences, Faculty of Veterinary Medicine, Tabriz Medical Sciences, Islamic Azad University, Tabriz, Iran

Corresponding author: Department of Basic Sciences, Faculty of Veterinary Medicine, Tabriz Medical Sciences, Islamic Azad University, Tabriz, Iran. E-mail:masoud-delashoub@iaut.ac.ir

Abstract

Background: High cholesterol is one of the most important factors in the development of atherosclerosis in animals and humans. Cydonia Oblonga extract is used for the treatment and prevention of various diseases in humans.

Objectives: Our aim was to investigate the protective effects of Cydonia Oblonga extract on vascular damage in hypercholesterolemic rabbits.

Methods: In this experimental study, 20 New Zealand adult rabbits were randomly divided into 4 groups (n = 5): Control (normal diet), hypercholesterolemic (8-week high-fat diet), hypercholesterolemia + extract (200 mg/kg i.p for 2 weeks), and extract group (200 mg/kg i.p). At the end of the study, blood samples were taken from the ear vein. To prepare tissue samples, the animals were anesthetized with chloroform.

Results: The results showed that after consuming the high-fat diet, in the hypercholesterolemic group, serum and LDL cholesterol levels increased, and alkaline phosphatase and HDL levels decreased significantly compared to the control group. There was a significant decrease in the hypercholesterolemia + Cydonia Oblonga group compared to the hypercholesterolemia group.

Conclusions: The results of the present study showed that consumption of Cydonia Oblonga extract, following a high-fat diet, can have protective effects on rabbit vascular tissue.

Keywords: Cydonia Oblonga; Vessel; Hypercholesterolemia; Rabbit

■SOCS3 as a Key Biomarker and Therapeutic Target in Age-Related Atherosclerosis and Chronic Inflammation: Insights from Gene Expression Analysis"

F. Rahimzadeh[1], S.A. Shahzadeh Fazeli[2*], A. Amiri-Yekta [2], Y. Tahamtani[3]

[1]Department of Molecular Cell Biology-Genetics, Faculty of Basic Sciences and Advanced Technologies in Biology, University of Science and Culture, Tehran, Iran

[2]Department of Genetics, Reproductive Biomedicine Research Center, Royan Institute for Reproductive Biomedicine, ACECR, Tehran, Iran

[3]Department of Stem Cells and Developmental Biology, Cell Science Research Center, Royan Institute for Stem Cell Biology and Technology, ACECR, Tehran, Iran

Corresponding author: Department of Genetics, Reproductive Biomedicine Research Center, Royan Institute for Reproductive Biomedicine, ACECR, Tehran, Iran. Email: shfazeli@yahoo.com

Abstract

Background: Atherosclerosis is a serious disease that causes coronary heart disease and claims the lives of approximately 20 million people worldwide each year. It is also a chronic inflammatory disease. Aging, through immune system decline (immunosenescence) and chronic low-grade inflammation (inflammaging), increases susceptibility to atherosclerosis and cardiovascular disease (CVD).

Methods: To achieve the study objectives, first, a gene expression dataset (GSE237029) was downloaded from GEO, based on the Affymetrix GPL570 platform. The GSE237029 dataset contained five blood samples from older volunteers (age: 75 - 89 years) and four blood samples from middle-aged volunteers (age: 35 - 50 years). The original microarray data from the GSE237029 dataset were analyzed using GEO2R to identify differentially expressed genes (DEGs) between peripheral blood mononuclear cell samples of middle-aged and older individuals. An adjusted P-value < 0.05 and |logFC| > 2 were used as the cut-off criteria. Next, Kyoto Encyclopedia of Genes and Genomes (KEGG) pathway analysis was performed on the DEGs using Metascape software. The sixteen DEGs were input into STRING software to construct and visualize the protein-protein interaction (PPI) network and to retrieve interacting genes. Cytoscape software, a free visualization tool, was then utilized to map PPI networks, screen for hub genes, and identify enriched pathways. The top hub genes, with a connection degree of > 7, were selected. Cytoscape was specifically used to visualize the PPI networks and highlight the hub genes and associated enrichment pathways.

Results: Sixteen DEGs were used as input into STRING, and the expression of hub genes in old and middle-aged peripheral blood mononuclear cells was analyzed. It was found that the SOCS3 gene was highly expressed in the blood samples of older individuals.

Conclusions: These findings highlight the importance that SOCS3 is closely associated with atherosclerosis, with its upregulation contributing to disease progression by regulating inflammatory cytokines like IL-6 and TNF-α. The

expression of SOCS3 and the phosphorylation of JAK2 and STAT3 were significantly up-regulated in atherosclerosis. It promotes inflammatory responses and enhances macrophage differentiation, increasing the risk of acute myocardial infarction (AMI). Given its age-related upregulation and role in inflammation, SOCS3 may serve as a biomarker and therapeutic target for preventing, diagnosing, and treating age-related coronary artery disease and heart attacks.

Keywords: Atherosclerosis; SOCS3; Aging; Myocardial Infarction

■The Effect of the 5A Self-management Model on Treatment Adherence and Self-care in Patients Undergoing Coronary Artery Bypass Graft Surgery: Protocol Study

Fatemeh Tajizadegan, Mohsen Shahriari*, Leila Mardanian Dehkordi, Mohsen Hosseini

[1]School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran

[2]Department of Medical-Surgical Nursing, School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran

[3]Department of Medical-Surgical Nursing, School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran

[4]Department Epidemiology and Biostatistics, School of Health and Statistics, Isfahan University of Medical Sciences, Isfahan, Iran

Corresponding author: Email: shahriari@nm.mui.ac.ir

Abstract

Background: Coronary artery bypass grafting (CABG) is recognized as one of the most effective treatments for coronary artery disease (CAD). However, the long-term success of CABG depends on the extent of patients' adherence to treatment and self-care practices. Utilizing patient-centered self-management programs may be effective in improving adherence to treatment and self-care by fostering desirable behaviors.

Objectives: This study aims to investigate the impact of the 5A self-management model on treatment adherence and self-care among patients undergoing Coronary Artery Bypass Grafting at Shahid Chamran Hospital.

Methods: This study will be a two-group randomized clinical trial conducted on 60 patients undergoing CABG surgery at Shahid Chamran Hospital in Isfahan. Patients will be selected based on inclusion criteria and then randomly assigned to either the intervention group or the control group, with 30 patients in each group. The intervention group will receive a self-management program based on the 5A model, which includes the stages of assess, advise, agree, assist, and arrange, over a period of two months. The control group will receive routine care. Data will be collected using demographic information forms and the standard adherence to treatment questionnaire by Madanloo, as well as a self-care questionnaire for patients undergoing CABG. Data analysis will be performed using descriptive and inferential statistics with SPSS software version 26.

Results:

XX

Conclusions: It is expected that by employing a suitable educational model, such as the 5A model, appropriate strategies can be implemented to enhance patient engagement in self-care and promote treatment adherence among individuals who have undergone coronary artery bypass graft surgery. Such approaches can yield beneficial outcomes for both the patient and their family, as well as for the healthcare delivery system.

Keywords: 5A Self-management Model; Treatment Adherence; Self-care; Coronary Artery Bypass Graft Surgery

■Lubipirstone Reduces Cardiomyopathy in HFHFD-Induced Metabolic Syndrome Through Repair of the Intestinal Permeability Barrier

Mina Sadat Izadi[1*], Maedeh Ghasemi[1], Maryam Derakhshan[1], Forouzan Sadeghi Mahalli[1]

[1]Department of Physiology, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran

Corresponding author: Department of Physiology, School of Medicine, Isfahan University of Medical Sciences, Iran. E-mail: minna.izadi@gmail.com

Abstract

Background: There seems to be a possible reciprocal relationship between gut dysfunction and heart disease.

Objectives: This study aimed to determine the efficiency of Lubiprostone (L) in intestinal permeability barrier restoration to decrease cardiac complications in metabolic syndrome.

Methods: Male Wistar rats were randomly divided into normal diet (ND), high-fat high-fructose diet (HFHFD), HFHFD-Vehicle (V), HFHFD-Bile acid (B), HFHFD-L, and HFHFD-BL groups. They were fed their respective diets for 8 weeks, followed by drug administration (10 μg/kg, gavage) for 10 days. Finally, blood was collected to measure cardiac injury markers, including lactate dehydrogenase (LDH), creatine kinase myocardial band (CK-MB), and cardiac troponin-I (cTnI) plasma levels. Furthermore, cardiac tissue damage was assessed by a pathologist.

Results: The LDH plasma level was significantly increased in HFHFD and HFHFD-V groups compared to the ND group ($P < 0.001$). Meanwhile, it was significantly decreased in HFHFD-B, HFHFD-L, and HFHFD-BL groups compared to HFHFD and HFHFD-V groups ($P < 0.001$). Only the CK-MB was significantly decreased in HFHFD-BL compared to the HFHFD group ($P < 0.05$). The cTnI plasma level was significantly increased in HFHFD, HFHFD-V, HFHFD-B, and HFHFD-BL groups compared to the ND group ($P < 0.001$). Also, the cTnI decrement was seen in HFHFD-BL compared to the HFHFD group ($P < 0.05$). In addition, the plasma cTnI concentration was significantly declined in HFHFD-L compared to ND ($P < 0.05$), HFHFD, HFHFD-V, and HFHFD-B groups ($P < 0.001$). The ventricular wall thickness was significantly increased in all HFHFD-fed rats compared to ND-fed rats

(P < 0.001). In contrast, it was significantly declined in the HFHFD-BL group compared to HFHFD-L (P < 0.05) and HFHFD, HFHFD-V, HFHFD-B groups (P < 0.001). The pathological survey showed that inflammation and fibrosis were severely seen in the HFHFD group, while signs of myocardiopathy were not observed in the HFHFD-BL group.

Conclusions: Altogether, it seems that Lubiprostone can improve cardiomyopathy in HFHFD-induced metabolic syndrome through intestinal permeability barrier mending.

Keywords: Lubipirstone; Cardiomyopathy; Metabolic Syndrome; High-Fat High-Fructose Diet

■The Study of the Relationship Between Pain Onset Time Interval and Referring of Patients with MI (Myocardial infarction) to Khatami Al Anbia Hospital of Zahedan, Iran

Anishe Sanchooli[1*], Anahita Sarabandib[2]

[1]Department of Nursing, Faculty of Nursing and Midwifery, Zahedan University of Medical Science, Zahedan, Iran

[2]Density Student, School of Dentistry, Zahedan University of Medical Sciences, Zahedan, Iran

**Corresponding author*: Department of Nursing, Faculty of Nursing and Midwifery, Zahedan University of Medical Science, Zahedan, Iran. Email: anishesanchooli@gmail.com

Abstract

Background: Coronary artery diseases are one of the important health problems in the world.

Objectives: Although considerable progress has been made to decrease mortality, they are still the leading cause of death in many countries. One of the most effective factors on patients' mortality is the interval between pain onset time and referring to the hospital.

Methods: This is a cross-sectional study in which 213 patients were examined who had been diagnosed with heart failure. Data gathering took 18 months. The data gathering tool was a designed checklist which was filled out by an experienced nurse during interviews, and the obtained results were recorded in files.

Results: Results of the study showed that 70% of patients were women and only 30% were men. Forty-eight percent of them were illiterate, and the patients' mean age and standard deviation was 58.3 ± 12.6. The mean ± SD of pain onset time until referring to the hospital was 12.1 ± 2.1. Statistical tests showed a significant correlation between sex and the mean of referring time (P < 0.05), but the relation between age and referring time was not significant.

Conclusions: The obtained results of the study indicated a considerable delay in patients referring to the hospital, considering that the best effect of drugs is in the first 30 minutes of chest pain and the highest mortality rate also happens in the first hours. Thus, based on these results, it is necessary to pay attention to chest pain and to provide public training and instruction to cope with it.

Keywords: Pain Onset; Time Interval; MI

■Dietary Fats and Oils Intake and the Risk and Severity of Premature CAD

Bahar Darouei[1], Reza Amani-Beni[1], Faezeh Tabes[2], Noushin Mohammadifard[1*]

[1]Isfahan Cardiovascular Research Center, Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran.

[2]Interventional Cardiology Research Center, Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran.

**Corresponding author*: Isfahan Cardiovascular Research Center, Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran. Email: noushinmohammadifard@gmail.com

Abstract

Background: Oils and fats are essential dietary factors that play an important role in the incidence of premature coronary artery disease (PCAD). The characteristics of PCAD vary among ethnic populations.

Objectives: Considering Iran's ethnically diverse population, we aimed to investigate the association between oil and fat intake and the risk and severity of PCAD in different ethnic groups in Iran.

Methods: As part of the ongoing Iran-premature coronary artery disease (I-PAD) research, this case-control investigation examined Iranian patients from diverse ethnic backgrounds, including Fars, Azari, Kurd, Bakhtiari, and Qashqaei, as well as the overall population. This multi-center study included women aged ≤ 70 years and men aged ≤ 60 years with the aforementioned ethnicities and PCAD. A validated Food Frequency Questionnaire (FFQ) was utilized to collect data on hydrogenated vegetable oil (HVO) intake, non-HVO, and animal fat intake. The Fat Consumption Index (FCI) was calculated using responses from six questions, with higher scores reflecting increased saturated fat intake. The consumption of these fats and FCI were categorized as >median and median, respectively, as a reference. Odds ratios (OR) and 95% confidence intervals (CI) were calculated using univariate and multivariate logistic regressions adjusted for demographic, lifestyle, and comorbidity variables.

Results: The study comprised 3,255 participants (2,071 cases and 1,184 controls), with 44.9% females and a mean ± standard deviation age of 53.72 ± 7.76. In the fully adjusted model, non-HVOs significantly reduced the risk of PCAD by 65% (OR = 0.35; 95% CI: 0.28 - 0.42) in the whole population, 71% in Fars (OR = 0.29; 95% CI: 0.28 - 0.39), 62% in Azari (OR = 0.38; 95% CI: 0.22 - 0.66), 75% in Kurd (OR = 0.25; 95% CI: 0.16 - 0.41), 75% in Qashqaei (OR = 0.25; 95% CI: 0.11 - 0.58), and 79% in Bakhtiari (OR = 0.21; 95% CI: 0.10 - 0.45). Non - HVOs also significantly reduced the severity of PCAD by 76% in the whole population (OR = 0.24, 95% CI: 0.21 - 0.27). However, no significant association was observed between HVOs, animal fat, and FCI or the risk of PCAD and its severity.

Conclusions: These findings indicate that non-HVOs may protect heart health, and replacing them with alternative fats may reduce the risk of PCAD. Given the impact of diet on disease prevalence, further research is essential to guide nutrition-focused public health intervention.

Keywords: Dietary Fats; Oils; Coronary Artery Disease; Case-Control; Ethnic Group

■Design, Implementation, and Evaluation of ACAFiB-APP, a Clinical Decision Support System for Anticoagulant Considerations in Patients with Atrial Fibrillation

Ramin Ansari[1, 2*], Soha Namazi[1, 2], Keyhan Mohammadi[1, 2], Reza Mollazadeh[3], Eisa Rezaei [4], Ali Asghar Safaei[5], Mahboobeh Khabaz Mafinejad[6]

[1]Department of Clinical Pharmacy, School of Pharmacy, Tehran University of Medical Sciences (TUMS), Tehran, Iran

[2]Research Center for Rational Use of Drugs, Tehran University of Medical Sciences (TUMS), Tehran, Iran

[3]Department of Cardiology, School of Medicine, Imam Khomeini Hospital Complex (IKHC), Tehran University of Medical Sciences (TUMS), Tehran, Iran

[4]Department of Medical Education, Virtual University of Medical Sciences, Tehran, Iran

[5]Department of Medical Informatics, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran

[6]Department of Medical Education, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

Corresponding author: Department of Clinical Pharmacy, School of Pharmacy, Tehran University of Medical Sciences (TUMS), Tehran, Iran. Email: ansariramin94@gmail.com

Abstract

Background: Patients with atrial fibrillation are 3-fold more prone to thromboembolic events.

Objectives: In this study, a clinical decision support system (CDSS) was developed to select anticoagulant drugs, considering comorbidities, laboratory data, and concurrent medications. The system is based on an interpretation of the globally accepted clinical guidelines.

Methods: A semi-structured interview was conducted to extract cardiologists' needs in practice. Then the required data were extracted from the latest guidelines until 2024 and confirmed by the expert panel. Using Microsoft Visio, each scenario and corresponding rules were modeled. The Dart programming language, the Flutter framework, and the Visual Studio editor were used to develop the application. To investigate the clinical efficacy of the app in clinical practice, 30 pharmacotherapy and cardiology residents participated in a before-and-after quasi-experimental study using 15 complicated clinical scenarios regarding anticoagulant selection in patients with AF. In the first exam, the participants answered the clinical scenarios using their knowledge and were allowed to search in references freely. The participants were just allowed to use ACAFiB-APP in the second exam. The level of confidence for the selected answers for each clinical scenario was also recorded. Finally, the uMARS questionnaire was used to evaluate the application quality.

Results: The selection of the anticoagulants was reported to be the most challenging domain by 78.6% of the experts. The application was developed using ASP.NET with the Microsoft SQL Server database platform (https://www.acafib.ir/#/login). This CDSS is called ACAFiB-APP, which stands for Anticoagulant in AF Application. The user goes through various calculators and obtains the required data to determine one or more comorbidities. Finally, ACAFiB-APP will represent the proper anticoagulant options with dosing and related considerations. A 3-point improvement in the second exam (P-value < 0.001, effect size: 1.71) and a statistically remarkable improvement in the confidence level were observed. All of the sections in the uMARS questionnaire were acceptable.

Conclusions: The CDSS will facilitate the informed selection of anticoagulants for complicated AF cases by considering the patient clinical scenario, as the efficacy confirmed in this study. ACAFiB-APP will appear in the market soon to simplify clinical judgment for complicated AF cases in practice.

Keywords: Atrial Fibrillation; Anticoagulant; Clinical Decision Support System; Digital Health

■Comparison of Electrocardiogram Changes in Patients Before and After Infection with COVID-19

Najmeh GhiyasiHafezy[1], Seyyed Mostafa Seyyed Hosseini[1*], Masoud Mirzaei[1], and Mohammad Taghi Sarban[1]

[1]Yazd Cardiovascular Research Center, Non-communicable Diseases Research Institute, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

Corresponding author: Yazd Cardiovascular Research Center, Non-communicable Diseases Research Institute, Shahid Sadoughi University of Medical Sciences, Yazd, Iran. Email: m.seyedhossaini@gmail.com

Abstract

Objectives: Since electrocardiography (ECG) is a simple, non-invasive, and widely used method for assessing cardiac function, in this study, we decided to investigate ECG changes before and after recovery from COVID-19 infection.

Methods: This descriptive cross-sectional study was conducted prospectively in Yazd city in 2020 - 2021. In this study, all patients with COVID-19 (confirmed with positive PCR) who participated in the Yazd Health Study (YaHS) were selected through census. Demographic data and ECG results of patients before and after COVID-19 infection were recorded and analyzed.

Results: In this study, which was conducted on 63 patients with COVID-19, the mean age of the patients was 53.34 years, and 60.3% of them were male. The most common risk factors were hyperlipidemia (33.3%), hypertension (30.2%), and diabetes mellitus (25.4%). 6.3% of patients had a history of CCU hospitalization, and 4.8% of them had a history of PCI. Examination of electrocardiographic changes showed that heart rate increased significantly after infection (P < 0.001), but the rhythm and axis of the heart did not change significantly. ST segment and T wave morphology were significantly different before and after infection with COVID-19 (P-value = 0.006). PR, QT intervals, and other waves did not significantly change after infection. The burden of bundle branch blocks and other arrhythmias also did not change before and after infection.

Conclusions: This study showed that ECG changes after COVID-19 were common and mainly included tachycardia and ST-T changes.

Keywords: COVID-19, Electrocardiogram, Arrhythmia, Heart

■The Effect of Teach-Back Training on Self-Care and Readmission of Patients with Heart Failure

Anahita sarabandi[1*], Anishe sanchooli[2], Hediyeh mesbahi[3]

[1]Density Student, School of Dentistry, Zahedan University of Medical Sciences, Zahedan, Iran

[2]Department of Nursing, Faculty of Nursing and Midwifery, Zahedan University of Medical Science, Zahedan, Iran

[3]Zahedan University of Medical Sciences, Zahedan, Iran

*Corresponding author: Density Student, School of Dentistry, Zahedan University of Medical Sciences, Zahedan, Iran. Anahitasarabandi80@gmail.com

Abstract

Background: Teach-back training is one of the interactive teaching methods that assess the learner's understanding by asking questions and providing a proper educational context for behavior change. Involving patients with heart failure in treatment is a top priority.

Objectives: Accordingly, the present study aimed to explore the effect of teach-back training on self-care and readmission of patients with heart failure.

Methods: The present quasi-experimental study was conducted on 80 patients with heart failure in the coronary care unit (CCU) and post coronary care unit (PCCU) of teaching hospitals affiliated with Zahedan University of Medical Sciences in southeastern Iran in 2019. The patients were selected via the convenience sampling method and randomly placed into two groups: intervention and control. In the intervention group, self-care training was performed individually using the teach-back method in four sessions, each lasting 30 to 60 minutes. In contrast, the participants in the control group conventionally received self-care training. The instruments used to collect the data were the demographic information form and the european heart failure self care behavior (EHFSCB) scale. The EHFSCB was completed by the participants in the two groups in two stages: Before and three months after the intervention. The number of readmissions and the number of visits to the doctor at the end of the third month after discharge were recorded for all patients by directly asking the patients. The collected data were analyzed using SPSS-22 software, the independent samples t-test, paired-samples t-test, and chi-square test at a significant level of $P < 0.05$.

Results: After three months, the mean scores of total self-care behaviors during the intervention were significantly different between the two groups ($P < 0.001$). Besides, the average number of readmissions due to heart disease three months after the intervention showed the positive effect of the intervention in reducing readmissions in patients in the intervention group ($P = 0.002$).

Conclusions: This study showed that teach-back training could positively affect self-care behaviors and reduce the number of readmissions of patients with heart failure. Therefore, it is recommended that nurses use this training method to teach self-care behaviors to heart patients.

Keywords: Teach-Back Training; Self-Care; Readmission; Heart Failure

■Assessing Optimal Cut-off Values of the Weight-Adjusted-Waist Index for Predicting Cardiovascular Outcomes in a Large Long-Term Cohort of Adults

Fatemeh Sabeti[2*], Davood Shafie[2], Maryam Heidarpour[3]

[1]Isfahan Cardiovascular Research Center, Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran

[2]Heart Failure Research Center, Cardiovascular Research Institute, Isfahan University of Medical Science, Isfahan, Iran

[3]Isfahan Endocrine and Metabolism Research Center, Isfahan University of Medical Sciences, Isfahan, Iran

Abstract

Background: Cardiovascular disease (CVD) continues to be a significant global health concern, with obesity recognized as a key risk factor. Traditionally, obesity is assessed using Body Mass Index (BMI) and waist circumference (WC) as the primary anthropometric measures. However, the limitations of these conventional indices have prompted the invention of novel indices such as the Weight-Adjusted-Waist Index (WWI). Despite its promise, the predictive value of WWI for cardiovascular outcomes — particularly in Middle Eastern populations — remains uncertain.

Objectives: This study aimed to identify the optimal cut-off values of WWI for CVD outcomes within a large cohort of Iranian adults.

Methods: The study followed 6,504 participants from three regions in central Iran over 17 years. Receiver operating characteristic (ROC) curves were generated to determine the WWI cut-off points for CVD outcomes (including myocardial infarction, stroke, unstable angina, and sudden cardiac death), along with the area under the curve (AUC). Optimum cut-off points were identified considering sensitivity, specificity, and the Youden index. Cox proportional hazard models were employed to evaluate the relationship between WWI and the outcomes. Both crude and adjusted hazard ratios (HRs) were calculated.

Results: A total of 6,504 participants (mean age 51.0 ± 11.7 years; 51.29% female) were enrolled at baseline, and 5,585 cases were eventually included in our analysis. The calculated cut-off point for CVD outcomes in the total cohort was 11.31 (sensitivity: 60.88%, specificity: 50.16%). Also, the cut-off points for female and male subcategories were 11.87 (sensitivity: 64.57%, specificity: 50.10%) and 10.92 (sensitivity: 65.50%, specificity: 54.43%), respectively. Receiver operating characteristic curve analysis (AUC vs. 0.5) showed a statistically significant p-value of less than 0.001 in the total study population, as well as in males and females. Univariate Cox regression reported hazard ratios (HRs) of 1.43 (95% CI: 1.16 - 1.76, $P < 0.001$) for females, and 1.88 (95% CI: 1.56 - 2.27, $P < 0.001$) for males. However, after adjusting for age, smoking, and hypertension, the adjusted HR was statistically significant only for the male subcategory with an HR of 1.29 (95% CI: 1.06 - 1.57) with a P-value of < 0.05.

Conclusions: WWI exhibited limited ability as an independent predictor of cardiovascular outcomes among our

cohort. Further research must clarify the role of WWI in cardiovascular risk assessment and prevention.
Keywords: Cohort; Cardiovascular Outcome, Obesity

■Investigating the Relationship Between Health Literacy with Self-efficacy among Heart Failure Patient

Zahra Azizi[1*], Leila Ranjbar[1], Akram Sadat Montazeri[2], Azam Zare[3]

[1]Student Research Committee, Fasa University of Medical Sciences, Fasa, Iran

[2]Nursing research center, Gorgan University of Medical Sciences, Gorgan, Iran

[3]School of Nursing, Fasa University of Medical Sciences, Fasa, Iran

Corresponding author: Student Research Committee, Fasa University of Medical Sciences, Fasa, Iran. aziziatoosa79@gmail.com

Abstract

Background: Due to the chronic nature of the disease, patients with heart failure suffer from impaired self-efficacy and complications of the disease. Insufficient health literacy is a major barrier to self-efficacy in patients with heart failure.
Objectives: This study aimed to investigate the association between health literacy and self-efficacy among heart failure patients.
Methods: This cross-sectional study was carried out on 193 patients with heart failure who were referred to two hospitals in Fars province through the convenience sampling method in 2023. The data collection tools were the cardiac self-efficacy questionnaire of Sullivan et al. (1998) and the heart failure-specific health literacy scale. Data were analyzed using descriptive statistics, Pearson's correlation coefficient, and multiple linear regression analysis on SPSS software version 21.
Results: More than half of the patients had a high level of self-efficacy (63.7%). The highest and lowest health literacy scores were related to functional health literacy (8.33 ± 3.67) and critical health literacy (4.21 ± 3.91), respectively. The results showed a significant positive correlation between health literacy and self-efficacy ($r = 0.27$, $P < 0.001$). Also, only age was a better predictor of self-efficacy in patients with heart failure, and there is a negative relationship between them ($r = -0.113$, $P = 0.001$).
Conclusions: The findings showed that health literacy was an important predictor of self-efficacy among patients with heart failure. It seems necessary to design effective interventions to improve patients' skills for analyzing critical information.
Keywords: Health Literacy; Self-efficacy; Heart Failure; Patient

■Machine Learning-Based Prediction Models for Distinguishing Cardiogenic from Non-cardiogenic Syncope in the Emergency Department

Saeed Safari[1,2], Sobhan Shafiei1,[3,*]

[1]Research Center for Trauma in Police Operations, Directorate of Health, Rescue & Treatment, Police Headquarter, Tehran, Iran

[2]Men's Health and Reproductive Health Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran

[3]Department of Statistics, Faculty of Mathematics and Computer, Shahid Bahonar University of Kerman, Kerman, Iran

Corresponding author: Research Center for Trauma in Police Operations, Directorate of Health, Rescue & Treatment, Police Headquarter, Tehran, Iran. Email: sobhan.shafiei@gmail.com

Abstract

Background: With the development of machine learning algorithms (ML) in the last decades, these algorithms have become one of the critical components of precision medicine that enhance the diagnosis and classification of risk. Identifying the underlying etiology of syncope provides valuable prognostic information and speeds up treatment implementation.
Objectives: This study aimed to evaluate the ability of supervised ML classifiers to distinguish cardiac syncope from non-cardiac syncope and to compare them with logistic regression (LR) as a traditional statistical method.
Methods: All patients aged > 18 years presenting to the emergency departments (EDs) of two hospitals in Tehran up to 24 hours after the onset of syncope from March 2018 to March 2019 participated in this cross-sectional study. Considering the patients' current clinical status, demographic characteristics, medical history, diagnoses, drug history, and laboratory test values, we used eight classification models to classify the syncope and evaluate their performance. We applied a random forest algorithm to get the most significant features. Also, we utilized the Shapley Additive exPlanations (SHAP) methodology to understand the relationship between the patient's features and the model's predictions.
Results: 300 patients (64.67% male) with a mean age of 56.38 ± 19.11 years were enrolled in this study. Among them, the source of syncope in 133 (44.33%) patients was cardiac. In the test cohort, the area under the ROC curve (AUC ± SD) of the Gaussian process, random forest, support vector machine, multi-layer perceptron, and k-nearest neighbor algorithms was 0.99 ± 0.01, 0.99 ± 0.01, 0.99 ± 0.01, 0.97 ± 0.02, and 0.97 ± 0.03, respectively, in differentiating the cardiac syncope. Nonetheless, the AUC ± SD of LR was 0.80 ± 0.07. All the models had precision and recall above 0.96, except for the LR model, which had precision and recall of 0.75 ± 0.05 and 0.75 ± 0.05, respectively. All in all, the Gaussian process, random forest, support vector machine, multi-layer perceptron, and k-nearest neighbor classifiers had almost the same performance in syncope discrimination; however, the Gaussian process performed slightly better than other models. According to SHAP analysis, history of vascular diseases, age, QRS duration, systolic blood pressure, and heart rate were the most predictive factors of cardiac syncope.
Conclusions: Experimental results reveal that ML classifiers, which can capture the nonlinear relationships and correlations among predictors, have high accuracy in dif-

ferentiating the syncope source and outperform the LR model. Using ML-based classifiers may improve patient management, clinical practice, and overall outcomes, reducing the cost of inappropriate treatment and hospitalization.

Keywords: Cardiac; Classification; Decision Processes; Machine Learning; Syncope

■Acute Coronary Syndrome (ACS) as a Rare Manifestation of Pheochromocytoma: A Case Series

Yalda Safaei[1], Amir Khosropour[1], Seyed Kianoosh Hosseini[1*]

[1]Cardiovascular Research Center, Hamadan University of Medical Sciences, Hamadan, Iran

Corresponding author: Cardiovascular Research Center, Hamadan University of Medical Sciences, Hamadan, Iran.

Abstract

Background: The most common manifestation of Pheochromocytoma is hypertension, but it has presented with acute coronary syndrome (ACS) in very few cases.

Objectives:

The aim of this case series is to assist healthcare providers in diagnosing and managing similar cases.

Methods: In this case series, we will review the findings, including history and physical examinations, electrocardiography, imaging, and paraclinical tests, eventually leading us to diagnose three patients with Pheochromocytoma presenting with ACS, an uncommon manifestation.

Results: Between July 2022 and February 2024, three patients were referred by cardiologists from peripheral facilities to our center with the initial diagnosis of ACS. The patients consisted of two males and a female, with a mean age of 42 years. Two of the cases were referred as acute myocardial infarction requesting primary percutaneous coronary intervention (PCI), and the third one as an ACS for urgent coronary angiography. They all presented with acute severe chest pain at rest. They had severe hypertension on physical examination, with an average systolic blood pressure (BP) of 170 mmHg and diastolic BP of 110 mmHg. The first electrocardiogram showed ST-segment depression in two of the cases and ST-segment elevation in the other. Cardiac troponin levels were positive in all patients. The primary echocardiography showed a reduced ejection fraction of 25-30% in one case with abnormal wall motion, while the other two were reported normal. Coronary angiography was performed on two patients and a CT angiography on the third, which showed no significant occlusions. The patients' symptoms and follow-up echocardiography gradually improved within days, and the BP was managed with medications. An abdominopelvic CT scan identified a mass in all our patients. Mean urine metanephrine was significantly elevated at 2666 μg/day, above the normal range. The surgical excision of the mass was performed, and biopsy confirmed our diagnosis. The patients were assessed for follow-up a few months later, showing no signs and symptoms related to Pheochromocytoma.

Conclusions: In conclusion, this case series illustrates an uncommon symptom of Pheochromocytoma, mimicking ACS; therefore, a high index of suspicion for Pheochromocytoma is required in similar cases as it can be lethal, yet potentially curable.

Keywords: Hypertension; Pheochromocytoma; Hypertension Crisis; Acute Coronary Syndrome

■The Effect of 12 Weeks Isometric Handgrip Exercise on sICAM-1 and VCAM-1 in Hypertensive Women

Elham Shakoor[1*], Mohsen Salesi[2], Payman Izadpanah[3]

[1]Department of Exercise Physiology, Faculty of Sport Sciences, Alzahra University, Tehran, Iran

[2]Department of Sport Sciences, School of Education and Psychology, Shiraz University, Shiraz, Iran

[3]Department of Cardiology, Cardiovascular Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

Corresponding author: Department of Exercise Physiology, Faculty of Sport Sciences, Alzahra University, Tehran, Iran. Email: E.shakoor@Alzahra.ac.ir

Abstract

Background: Cell adhesion molecules (CAMs) are a subset of cell surface proteins that include intracellular adhesion molecule-1 (ICAM-1) and vascular cell adhesion molecule-1 (VCAM-1). They are considered biomarkers in inflammatory and cardiovascular diseases. They play an important role in the development of endothelial dysfunction or atherosclerosis in hypertensive patients. Given the rising incidence of high blood pressure and its associated complications, preventing and managing it is crucial. Exercise is a non-pharmacological method for treating hypertension.

Objectives: The purpose of this study is to evaluate the effect of 12 weeks of Isometric Handgrip (IHG) Exercise on sICAM-1 and VCAM-1 in women with hypertension.

Methods: In this semi-experimental study, 30 women with an average age of 45 ± 5 years with only prehypertension to first-degree hypertension (systolic blood pressure 138 ± 2 mmHg and diastolic blood pressure 89 ± 2 mmHg) without any underlying disease were randomly divided into two groups (IHG = 15, control = 15). The IHG Exercise protocol consisted of 4 × 2 min isometric contractions at 30% of Maximal Voluntary Contraction (MVC), separated by 2 minutes' rest, overall session with the non-dominant hand unilaterally; and during this period, the control group was without any specific sports activities. Factors sICAM-1 and VCAM-1 were investigated before and after 12 weeks in women with high blood pressure. A two-way ANOVA was used for data analysis with a significance level ($P < 0.05$).

Results: The results indicated a significant decrease in sICAM-1 (17%) and VCAM-1 (23%) in the IHG training group compared to the control group ($P < 0.05$).

Conclusions: Isometric handgrip exercises improve the

inflammatory profile and endothelial function of women with hypertension. As a result, performing these exercises can be very useful in the prevention and treatment of complications associated with high blood pressure in these patients.

Keywords: Hypertension; Isometric Exercise; Intercellular Adhesion Molecule 1 (ICAM-1); Vascular Cell Adhesion Molecule 1 (VCAM-1)

■Serum Ferritin Levels as a Biomarker of Symptom Severity in Heart Failure: A Cross-Sectional Study on Association with Disease Progression and Hospitalization Duration

Aziz Kassani[1*], Neda Sabzivand[2], Mona Jahanpour[3]

[1]Department of Community Medicine, School of Medicine, Dezful University of Medical Sciences, Dezful, Iran. kassani.aziz@gmail.com

[2]Department of Cardiology, School of Medicine, Dezful University of Medical Sciences, Dezful, Iran.

[3]Department of Cardiology, School of Medicine, Dezful University of Medical Sciences, Dezful, Iran.

Abstract

Background:
Cardiovascular diseases, particularly heart failure (HF), continue to be a leading cause of mortality despite significant therapeutic advancements.
Objectives:
This study explores the relationship between serum ferritin levels, the severity of HF symptoms, and hospitalization duration, aiming to assess ferritin's potential as a biomarker for disease progression.
Methods:
A cross-sectional study was conducted at Ganjavian Hospital, Dezful University of Medical Sciences in Dezful city, Iran, involving 100 HF patients admitted from July to September 2020. Comprehensive assessments included measurements of serum ferritin, serum iron, total iron-binding capacity (TIBC), creatinine, and blood urea nitrogen (BUN). Statistical analyses were performed to evaluate correlations and differences between groups..
Results:
Among the 100 patients (34 women and 66 men), the mean age was 65.21 years. Forty-nine patients exhibited a severe reduction in left ventricular ejection fraction (EF), while 51 had a moderate reduction. There were significant differences in age and ferritin levels between EF groups (P = 0.01), with no notable disparities in other variables. Positive correlations were identified between age and BUN/creatinine (P = 0.04), between BUN and serum iron (P = 0.01), and between sodium and serum iron (P = 0.02). Negative associations were recorded between sodium and potassium (P = 0.01) and between serum iron and both erythrocyte sedimentation rate (ESR) and TIBC (P = 0.01). Notably, ferritin levels did not correlate with the duration of hospitalization (r = 0.06, P = 0.54).
Conclusions:
The findings indicate a significant association between serum ferritin levels and the severity of HF symptoms, suggesting its potential role as an independent risk factor in disease progression. However, ferritin did not predict the length of hospitalization. Further research is necessary to establish definitive conclusions regarding ferritin's prognostic value in HF management.

Keywords: Serum Ferritin, Heart Failure, Hospitalization

■Impact of Empagliflozin on Cardiovascular Outcomes and Epicardial Adipose Tissue in Type 2 Diabetes Patients with Acute Myocardial Infarction: A Randomized Placebo-Controlled Trial

Zahra Kalantari[1], Reza Madadi[1*]

[1]Department of Cardiology, Zanjan University of Medical Sciences, Zanjan, Iran

drrezamadadi@zums.ac.ir

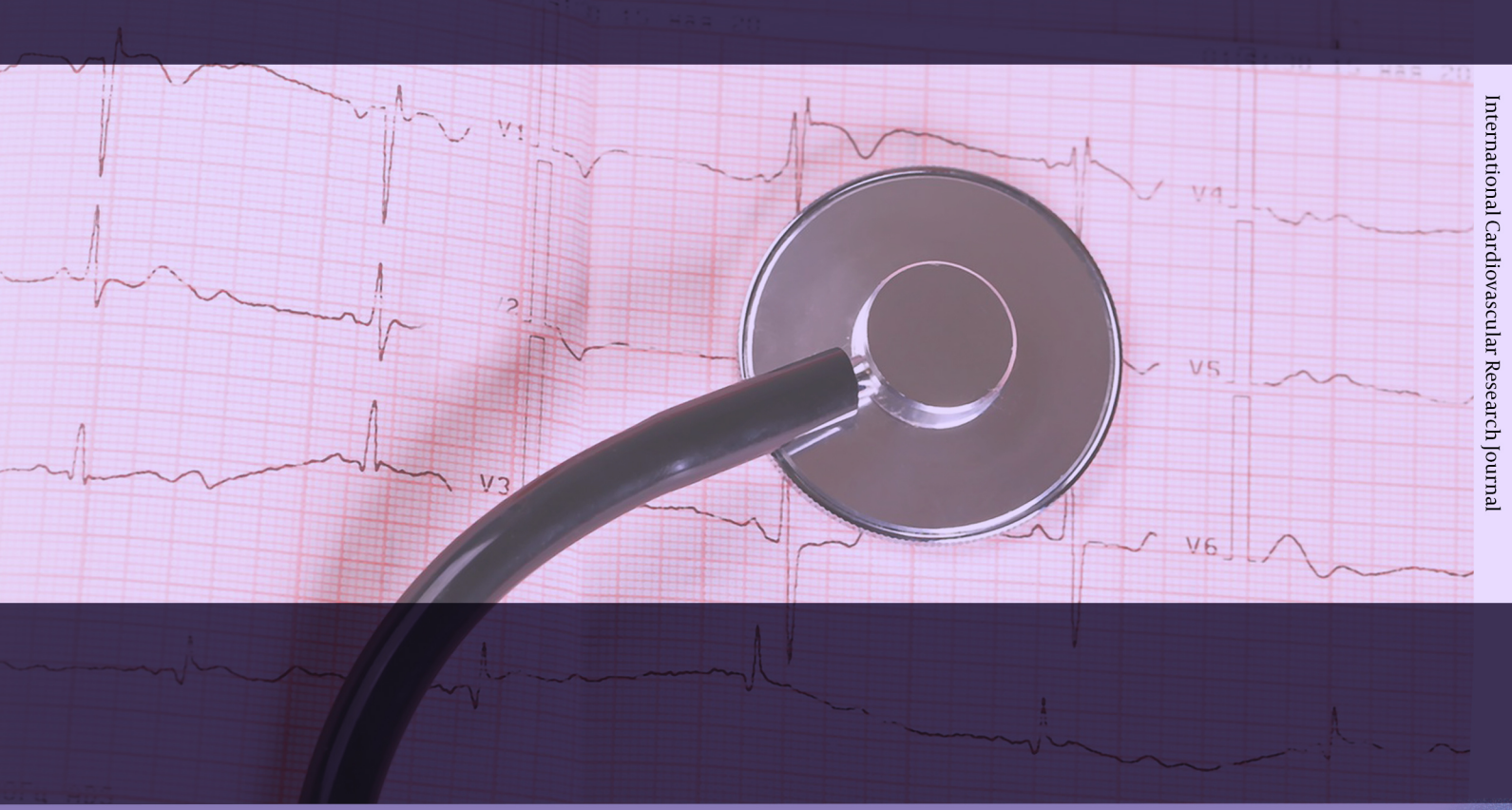
Objectives: This study aimed to investigate the effect of empagliflozin on cardiovascular outcomes and epicardial adipose tissue (EAT) in patients with type 2 diabetes mellitus (T2DM) and acute myocardial infarction (MI).
Methods: This double-blind, randomized, placebo-controlled trial enrolled 179 patients with T2DM and ST-elevation MI. Participants were randomly assigned to receive either 10 mg of empagliflozin or a placebo daily for three months. Baseline and post-treatment assessments included laboratory tests, echocardiography, and clinical follow-ups. The primary outcomes were evaluated using analysis of covariance (ANCOVA), with statistical significance set at $P < 0.05$.
Results: At the end of the three-month follow-up, the empagliflozin group exhibited a significant reduction in EAT thickness compared to the placebo group (0.33 ± 0.08 cm vs. 0.43 ± 0.10 cm, $P < 0.0001$). However, no statistically significant differences were observed in mortality (15.6% vs. 14.6%, P = 0.859) or rehospitalization rates (86.7% vs. 88.8%, P = 0.669) between the two groups. Other echocardiographic parameters, including ejection fraction (EF) and myocardial global longitudinal strain (mGLS), remained comparable between groups.
Conclusions: Empagliflozin demonstrated a significant reduction in EAT thickness, suggesting potential benefits in lowering local myocardial inflammation and metabolic burden. However, despite these promising metabolic effects, empagliflozin did not significantly influence cardiovascular outcomes, including mortality and rehospitalization, within the short-term follow-up. Long-term studies are warranted to evaluate its sustained impact on cardiovascular events.

Keywords: Empagliflozin; Cardiovascular Outcomes; Acute Myocardial Infarction

INDEX

INDEX

INDEX



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