Original Article: Determining the life status of obese patients after coronary artery graft surgery

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ABSTRACT

Introduction: Our aim was to record preoperative and postoperative results in patients undergoing coronary artery bypass grafting, to examine the factors affecting reoperation, and to determine whether there is a gender difference in pre- and post-activity activity using the Duke Activity Status Index.

Material and Methods: 151 patients who underwent isolated coronary artery bypass grafting. The median time from baseline to return to work after Duke Success for women and men was 8.0 months. In addition to baseline scores at postoperative follow-up, the effects of 47 variables were analyzed with logistic ordinal models. The appropriate model for subsequent scores was determined by reverse selection, keeping the variables if they met the criteria for a P-value less than 0.05.

Results: Average scores on the Duke Activity Status Index (women, 21.5; men, 32.2; P < .001) and pretest scores (42.7 for women; 58.2 for men; P < .001) were lower in women than in men. Postoperative scores were lower in elderly patients with obstructive pulmonary disease, myocardial infarction, stroke, diabetes, vascular disease, severe postoperative pain, and return to the operating room. After adjusting for these factors, recovery scores remained lower for women (difference from men, 2.1 [95% confidence interval, 1.7-2.6]; P < .001).

Conclusion: A number of preoperative, surgical variables, and postoperative factors are associated with functional recovery after coronary revascularization. Additionally, after adjusting for these variables, female sexuality was later associated with lower performance.

Introduction

Today, coronary artery disease has become widespread due to changes in lifestyle and people's tendency to inappropriate habits. In addition to spending on care and economic costs, this disease is one of the most important causes of disability [1-3]. According to the World Health Organization, cardiovascular disease is the leading cause of death worldwide,

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accounting for 4% of these deaths in developing countries [4-6]. Unfortunately, due to the increasing prevalence of coronary artery disease, the use of coronary artery bypass graft surgery has also increased; The number of coronary artery bypass graft surgeries in the United States is estimated at 21,300 per year. Statistics also show that the majority of open heart surgeries in Iran are coronary artery bypass grafts. 16,000 to 18,000 people in Iran are undergoing this surgery, and this number is increasing(Figure 1) [7].

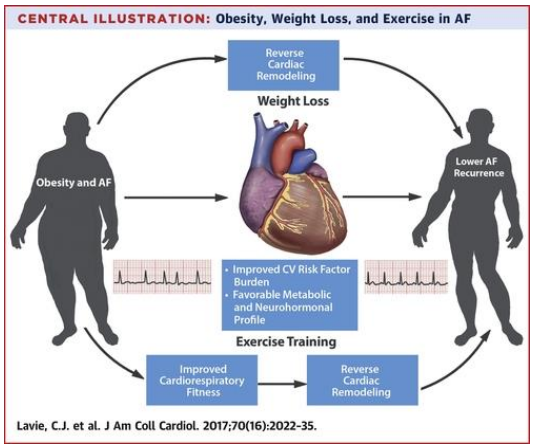

Figure 1: Obesety and CABG

There are several underlying factors associated with CAD, one of which is overweight and obesity [8-10]. The results of various studies show the fact that overweight and obesity lead to CAD. Therefore, many patients who undergo coronary artery bypass graft surgery due to coronary artery disease are obese or overweight [11-13]. Obesity and overweight can also increase the cost of surgery and damage to the community health system as an independent factor, as well as increase the length of hospital stay in intensive care units and heart surgery [14-16].

CABG can affect the independence of action of these people, many of whom are active workers in the community, which will ultimately affect the economy and health of the community as a result of this process [17-19]. Findings from studies on the ability of patients after coronary artery bypass graft surgery show that many patients have difficulty performing daily activities of life after surgery [20-22]. Returning to normal living conditions before surgery includes the ability to perform instrumental activities and daily living [4].

Everyday life activities refer to the patient's ability to perform activities such as eating, dressing, and using the bathroom and walking. While instrumental activities 4 mostly include those activities that are defined in relation to the patient's presence in society and his return to work. These activities include the use of mobile phones, the use of means of transportation, and the ability to perform financial calculations [5].

According to different studies, different factors can affect the daily functioning of patients after CABG surgery. Age, sex, body mass index, level of education, living status (single, with spouse, with spouse and children) [23], underlying diseases, cognitive status before and after surgery, anxiety and depression, patients' beliefs about their disease, existence Support system, type of surgery (with and without pump) and intraoperative risk factors (temperature during pump [24], aortic clamping time and duration of pump use) are factors that can affect the functional status and in various studies [5].

Obviously, patients' ability to perform care related to daily life activities after heart surgery

is reduced and the patient needs time to return to preoperative conditions [25-27]. Obesity and overweight may add to this time frame and have profound effects on the patient and his family, as well as society, due to labor involvement. It seems that by determining how able to perform daily life activities and identifying the factors that affect it, it is possible to design appropriate care and rehabilitation programs to return these patients to the community more quickly [6]. Therefore, this study was performed to determine the status of daily activities and tools of life and related factors in overweight and obese patients who have undergone coronary artery bypass graft surgery [28-30].

Material and Methods

Study design: This research is a cross-sectional study of analytical type. The population of this study includes obese and overweight patients who underwent CABG surgery and are hospitalized in the cardiac surgery wards of Shahid Madani Hospital affiliated to Tabriz University of Medical Sciences, which is the only referral center for these patients. Available sampling was performed during the period of 2016. According to the inclusion criteria, 151 patients were interviewed, of whom 84 were overweight or obese based on body mass index, which was calculated according to height and weight recorded in the medical record. Taking other inclusion criteria entered the research. People with body mass index 25 to 29.9 as overweight patients, 30 to 34.9 as patients with first degree obesity and people with body mass index 35 to 39.9 as patients with second degree obesity and people with Body mass index of 40 and above was considered as patients with grade 3 obesity.

Inclusion and Exclusion criteria: The characteristics of the study units were patients who did not have a history of neurological and cerebrovascular disorders, a history of taking drugs that affect the nervous system, did not undergo emergency surgery and at the same time with coronary artery bypass graft surgery, surgery They also did not have carotid arteries. The absence of any physical-physical problems (movement disorders, speech, hearing and visual disorders) based on the contents of the file and the patient's statements and the signing of informed consent were other criteria for entering the study. The sample size has not been determined for the present study; Because this study is part of a larger study that was conducted to determine the ability to perform daily activities and tools of life in patients undergoing coronary artery bypass graft surgery in general, about two-thirds of the units in the study, ie 84 people They had a body mass index of more than 25 and were considered obese and overweight in this study.

Methodology: In order to collect information in this study, a questionnaire consisting of four sections of demographic and disease-related characteristics, Charlson underlying disease index 5, Katz index 6 and Luton 7 daily life tool scale was used. The first part of the questionnaire had two sections: demographic characteristics and indicators related to the disease; So that the first part contains questions about age, sex, marital status, education, occupation, life status, body mass index and the second part contains questions about smoking and drug use history, patient medications, left ventricular outflow fraction Duration of connection to the pump, duration of aortic clamp, temperature of the pump during operation, duration of intubation and presence in the intensive care unit, arterial blood oxygen saturation at the last ABG in the intensive care unit and carotid artery occlusion. The second part of the questionnaire included the Charlesson Comorbidity Index, which contained 19 questions about the presence of underlying

diseases, the scores of which were divided into four categories (0, 2-1, 3-4, 5 and more). The third and fourth sections of the questionnaire contained 3 questions about how to perform daily activities of life using the Katz index tool and the scale of daily activities of Luton's life tools. The Katz questionnaire had seven parts, each of which had three answers, which were divided independently, in need of help and dependency. Scoring was zero to 2; The independent part was awarded 2 points, the need for assistance 1 point and the affiliate zero points. The overall score was zero to 14, which was divided into three categories: zero to 6 completely dependent, 7 to 10 in need of assistance, and 11 to 14 independent. The ability to perform daily instrumental activities was divided through the Lawton scale - which had 9 parts and each part had three answers, independently, in need of help and dependency - and the scoring was as before zero to 2 and the total score between zero and 18 to It was divided into three categories: 0 to 8 dependents, 9 to 13 in need of assistance and 14 to 18 independents. Data collection tools were used in two stages (before and one month after surgery) in Rasht Heart Specialized Educational and Medical Center, affiliated to Guilan University of Medical Sciences. In this way, after the approval of the ethics committee and the research council of Guilan University of Medical Sciences, the researcher selected the units with inclusion criteria through available sampling and after providing the necessary explanations about the objectives of the research, how to answer the questionnaire and The confidentiality of the information also required their written consent to participate in the investigation. Also, all the steps of data collection were performed by the researcher and in all cases, the expressions of the instruments examined by the researcher were read to the patient.

Data analysis: The collected data were analyzed using SPSS software version 19 and using descriptive statistics tests (frequency distribution, mean and standard deviation) and inferential statistics (Chi-square, Fisher test, Spearman correlation coefficient). And logistic regression analysis) were analyzed. $P < 0.05$ was considered as a significant level for all inferential tests. The dependent variable of research, ie the status of daily activities and tools of life, is a qualitative ranking variable that has three categories (independent, needing help, dependent). Due to the fact that the number of completely dependent people was less frequent, for data analysis, two dependent and needy classes were merged and considered as two independent classes, dependent and needy classes.

Ethical Considerations: It is worth mentioning that the whole process of the present study was carried out after the approval and approval of the ethics committee of Tabriz University of Medical Sciences.

Results

Findings of this study showed that most of the units were in the age group of 65 years and below (79.8%), the minimum age was 40 and the maximum was 76 years (59.66 ±8.1). Most of the samples were male (59.5%) and married (98.8%) and had primary education (34.5%), had a left ventricular outflow fraction of less than 50% (82.1%), and had more than two children. (76.2%), has more than three vessels (72.6%), no smoking (67.9%) and drugs (78.6%) and no carotid artery occlusion (70.2%) They were. Also, most of the studied units have living conditions with spouse and children (94%), no job (54.8%), have a Charlson index score of 1-2 (51.2%), have arterial oxygen saturation after surgery 85 ml Meters of mercury and less (92.9%), has less than three days of hospitalization in the intensive care unit

(79.8%), has intubation for more than eight hours (65.5%) and has a temperature of 30-30 degrees At the time of being placed on the cardiopulmonary pump (92.9%), the duration of the aortic clamp was less than 60 minutes (92.9%) and the duration of using the pump was less than 90 minutes (91.7%). . They also had a history of taking antiplatelet drugs (90.5%), anti-fat drugs (95.2%), angiotensin inhibitors (81%), beta-blockers (81%) and nitrates (69%)(Figure 2).

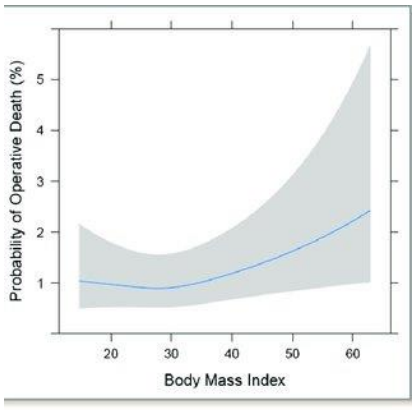

Figure 2: Mortality rate in Obese in CABG candidate

According to the research findings, the majority of the studied units were in the category of overweight patients (61.9%) and none of the studied patients were in the category of patients with third degree obesity. Due to the fact that in the preoperative stage, none of the patients studied were in need of help and dependents and all units were independent, it was not possible to perform the test to determine the relationship, but considering that 35.7% of the units In the postoperative stage, they needed help to perform daily life activities. The results showed that there was no statistically significant relationship between body mass index and daily life activities. Also, in determining the relationship between body mass index with the status of instrumental activities of daily life before and one month after surgery, the results showed that there is no statistically significant relationship between body mass index and the status of instrumental activities of daily life(Figure 3).

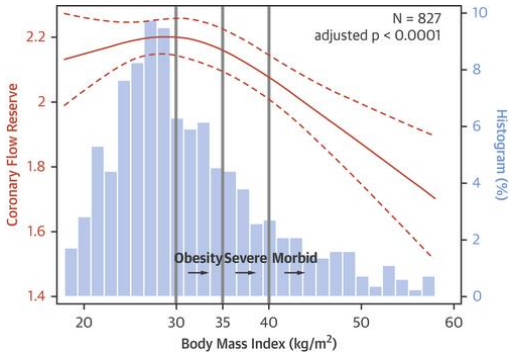

Figure 3: Life style and Survival after CABG

In the relationship between determining individual-social and disease-related factors with the status of daily activities of preoperative life, Chi-square and Fisher tests showed no significant relationship between individual-social and disease-related variables with the status of daily life activities. Did not. Also in the one month postoperative stage, Chi-square and

Fisher test showed the level of education (P=0.02), duration of aortic clamp during surgery (P=0.002), duration of use of cardiopulmonary pump. (P=0. 003) and the use of beta-blocker family drugs (P=0.04) had a statistically significant relationship with the daily life activities of obese and overweight people. At one month postoperative stage, chi-square test showed that sex (P=0.04), occupation (P=0.002), level of education (P = 0.04), smoking (P=0.01) And carotid artery involvement (P=0.02) were statistically related to the status of instrumental activities of daily living(Figure 4).

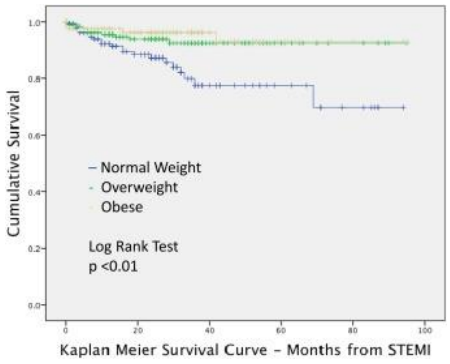

Figure 4: Kaplan Meier result for Survival rate

Due to the fact that the majority of the studied units were independent in terms of daily life activities in the one-month stage after surgery, it was not possible to use the model to determine the predictors of patient dependence. For everyday life instrumental activities, variables with P <0.25 were entered into the Backward: LR logistic regression model. In this model, the dependent variable was considered as both independent and dependent (or in need of help) and then this model showed the variables of gender (P = 0.004, OR = 10.51, 15.41 - 2.15) and carotid artery involvement (P= 0.01, OR=1.12, 0.79 - 1.19) Predictors of daily life instrumental activities in obese and overweight patients Were after coronary artery bypass graft surgery; So that men were 1.5 times better able than women to perform the tools of daily life one month after surgery. Also, people with carotid artery involvement showed 1.5 times less ability to perform daily instrumental activities one month after surgery than people without carotid artery involvement.

Discussion

The aim of this study was to determine the status of daily activities and life tools in overweight and obese patients after coronary artery bypass graft surgery, and related factors. The findings of this study showed that in the one-month postoperative phase, the study units, which consisted of obese or overweight people, were independent to carry out their daily activities of life, while they were instrumental in performing activities [31-33]. In everyday life, most of them need help and dependence. This finding is consistent with the results of several studies in this regard. Also, due to the fact that most of the research units were male and were in the age range of 59 years, and due to the fact that in the culture of Iran [34-36], economic responsibility and family livelihood are the responsibility of men, these people have to return to work. Given that the instrumental activities of life include those activities that are related to work and society, the patient and society may be harmed economically [37-39]; Therefore, it seems necessary to pay attention to the lifestyle of these people and maintain weight in the normal range [8].

Also, the findings of this study showed that most of the units studied in this study had different underlying diseases. This increases the risk of the patient returning to the hospital for readmission and complications after surgery. A combination of these factors may pose a financial and economic problem for the patient, health care systems, and the community. In line with the findings of this study on more complications after surgery, overweight and obese patients usually have more underlying diseases such as diabetes [40-42].

The findings of this study showed that in the one-month postoperative phase, there was a statistically significant relationship between patients' daily life activities and education, duration of aortic cross-clamp, duration of cardiopulmonary pump use and beta-blocker family medications [10].

It seems that the long duration of aortic clamp and the use of cardiopulmonary pump during surgery leads to complications such as neurological complications in the patient that can increase the ability of patients to perform daily activities during the short postoperative period. Affect surgery. Also, many obese or overweight people have fatty plaques on their arterial walls, and this possibility for the cerebral arteries can increase the risk of postoperative cognitive complications, which in turn can affect the patient's ability to perform activity. Be effective in everyday life. Perhaps it can be analyzed that taking a drug from the beta-receptor blocking family lowers blood pressure[11]. Decreased blood pressure and decreased oxygen supply to the brain may cause cognitive impairment in individuals, and of course impaired cognitive status can lead to impaired patients' ability to perform daily activities of life. Also, having an education can help in learning post-operative training as soon as possible and using various educational resources to learn care appropriate to the post-surgery conditions and thus accelerate the recovery process [43].

Conclusion

The findings of this study showed that in the one-month postoperative phase, the study units, which consisted of obese or overweight people, were independent to carry out their daily activities of life, while they were instrumental in performing activities. In everyday life, most of them need help and dependence.

References

[1]Abdollahi MH, Foruzan-Nia K, Behjati M, Bagheri B, Khanbabayi-Gol M, Dareshiri S and et al. The effect of preoperative intravenous paracetamol administration on postoperative fever in pediatrics cardiac surgery. Nigerian medical journal: journal of the Nigeria Medical Association. **2014**; 55(5): 379. [Google Scholar], [Publisher]

[2]Birmangi S, A Review of the Effect of Corona on the Human Brain – Short Review, Eurasian Journal of Chemical, Medicinal and Petroleum Research, **2022**, 1 (3), 80-87 [Crossref], [Google Scholar], [Publisher]

[3]Ebadian B, Fathi A, Khodadad S. Comparison of the effect of four different abutment screw torques on screw loosening in single implant-supported prosthesis after the application of mechanical loading. International Journal of Dentistry. **2021**;19;2021: 3595064.[Google Scholar], [Publisher]

[4]Eghdam-Zamiri R, Gol MK. Effects of ginger capsule on treatment of nausea and vomiting in patients receiving cisplatin undergoing mastectomy: a randomized clinical trial. The Iranian Journal of Obstetrics, Gynecology and Infertility. **2020**;22(11): 15-21. [Crossref], [Google Scholar], [Publisher]

[5]Elmi A, Rouhani A, Irajian M, Iman MB, Tabrizi A. Comparison results of acromioclavicular dislocation treatment by screw with and without coracoclavicular

ligamentous repair. Medical Journal of Tabriz University of Medical Sciences. **2017**; 39(2): 46-51. [Google Scholar], [Publisher]

[6]Esmaeilzadeh AA, et al., Correction: Recent advances on the electrochemical and optical biosensing strategies for monitoring microRNA-21: a review, Analytical Methods, **2023** [Crossref], [Google Scholar], [Publisher]

[7]Esmaeilzadeh AA, et al., Cytotoxic study of green synthesized pure and Ag-doped α-Fe2O3 nanoparticles on breast cancer (MCF-7) cell line, Nanomedicine Research Journal, **2022** 7 (4), 370-377 [Crossref], [Google Scholar], [Publisher]

[8]Esmaeilzadeh AA, et al., Recent advances on electrochemical and optical biosensing strategies for monitoring of microRNA-21: A review, Analytical Methods, **2022** 15 (1), 132-132 [Crossref], [Google Scholar], [Publisher]

[9]Esmaeilzadeh AA, et al., Study of Silybin in Plant Effective Substance for use in targeted liposomal nanoparticles in the treatment of liver cancer, Archives of Pharmacy Practice, **2020** 11 (1), 35 [Google Scholar], [Publisher]

[10] Esmaeilzadeh, AA, et al., Identify Biomarkers and Design Effective Multi-Target Drugs in Ovarian Cancer: Hit Network-Target Sets Model Optimizing, Biology, **2022**, 11 (12), 1851 [Crossref], [Google Scholar], [Publisher]

[11] Gheisari R, Doroodizadeh T, Estakhri F, Tadbir A, Soufdoost R, Mosaddad S. Association between blood groups and odontogenic lesions: a preliminary report. Journal of Stomatology. **2019**;72(6):269-73. [Crossref], [Google Scholar], [Publisher]

[12] Gheisari R, Resalati F, Mahmoudi S, Golkari A, Mosaddad SA. Do Different Modes of Delivering Postoperative Instructions to Patients Help Reduce the Side Effects of Tooth Extraction? A Randomized Clinical Trial. Journal of Oral and Maxillofacial Surgery. **2018**;76(8):1652.e1-.e7.[Crossref], [Google Scholar], [Publisher]

[13] Haghdoost M, Mousavi S, Gol MK, Montazer M. Frequency of Chlamydia trachomatis Infection in Spontaneous Abortion of Infertile Women During First Pregnancy Referred to Tabriz University of Medical Sciences by Nested PCR Method in 2015. International Journal of Women's Health and Reproduction Sciences. **2019**; 7(4): 526-30. [Google Scholar], [Publisher]

[14] Hasanpour Dehkordi A, Khaji L, Sakhaei Shahreza MH, Mashak Z, Safarpoor Dehkordi F, Safaee Y, Hosseinzadeh A, Alavi I, Ghasemi E, Rabiei-Faradonbeh M. One-year prevalence of antimicrobial susceptibility pattern of methicillin-resistant Staphylococcus aureus recovered from raw meat. Tropical Biomedicine. **2017**;34(2):396-404. [Crossref], [Google Scholar], [Publisher]

[15] Irajian M, Beheshtirooy A. Assessment of Frequency of Long Bone Osteomyelitis in Traumatic Patients Undergoing Orthopedic Surgery in Imam Reza (AS) Hospital-Tabriz. International Journal of Current Microbiology and Applied Sciences. **2016**;5(1): 818-825.[Google Scholar], [Publisher]

[16] Irajian M, Faridaalaee G. Establishing a field hospital; a report on a disaster maneuver. Iranian Journal of Emergency Medicine. **2016**;3(3): 115-118. [Crossref], [Google Scholar], [Publisher]

[17] Khaji L, Shahreza MH. SCCmec types in methicillin-resistant Staphylococcus aureus strains of various types of milk. Electronic Journal of Biology. **2016**;13:1. [Google Scholar], [Publisher]

[18] Mahmoodpoor A, Hamishehkar H, Fattahi V, Sanaie S, Arora P, Nader ND. Urinary versus plasma neutrophil gelatinase-associated lipocalin (NGAL) as a predictor of mortality for acute kidney injury in intensive care unit patients. Journal of Clinical Anesthesia.**2018**; 14: 12-17.[Crossref], [Google Scholar], [Publisher]

[19] Mahmoodpoor A, Hamishehkar H, Shadvar K, Sanaie S, Iranpour A, Fattahi V.

Validity of bedside blood glucose measurement in critically ill patients with intensive insulin therapy. Indian Journal of Critical Care Medicine.**2016**; 20(11): 653. [Crossref], [Google Scholar], [Publisher]

[20] Margy S, A Review of the Effect of Brain imaging- Short Review, Eurasian Journal of Chemical, Medicinal and Petroleum Research, **2022**, 1 (3), 88-99 [Google Scholar], [Publisher]

[21] Mashak Z, Jafariaskari S, Alavi I, Sakhaei Shahreza M, Safarpoor Dehkordi F. Phenotypic and genotypic assessment of antibiotic resistance and genotyping of vacA, cagA, iceA, oipA, cagE, and babA2 alleles of Helicobacter pylori bacteria isolated from raw meat. Infection and Drug Resistance. **2020** 29:257-72. [Crossref], [Google Scholar], [Publisher]

[22] Mobaraki-Asl N, Ghavami Z, Gol MK. Development and validation of a cultural competence questionnaire for health promotion of Iranian midwives. Journal of education and health promotion. **2019**;8:179. [Crossref], [Google Scholar], [Publisher]

[23] Mokhtari Ardekani AB, et al., miR-122 dysregulation is associated with type 2 diabetes mellitus-induced dyslipidemia and hyperglycemia independently of its rs17669 variant, BioMed Research International, **2022**, Article ID 5744008, [Crossref], [Google Scholar], [Publisher]

[24] Mosharraf R, Molaei P, Fathi A, Isler S. Investigating the Effect of Nonrigid Connectors on the Success of Tooth-and-Implant-Supported Fixed Partial Prostheses in Maxillary Anterior Region: A Finite Element Analysis (FEA). International Journal of Dentistry. **2021**; 12;2021: 5977994.[Crossref], [Google Scholar], [Publisher]

[25] Movassagi R, Montazer M, Mahmoodpoor A, Fattahi V, Iranpour A, Sanaie S. Comparison of pressure vs. volume-controlled ventilation on oxygenation parameters of obese patients undergoing laparoscopic cholecystectomy. Pakistan journal of medical sciences.**2017**; 33(5): 1117 .[Crossref], [Google Scholar], [Publisher]

[26] Nazari B, Amani L, Ghaderi L, Gol MK. Effects of probiotics on prevalence of ventilator-associated pneumonia in multitrauma patients hospitalized in neurosurgical intensive care unit: a randomized clinical trial. Trauma Monthly.2020; 25(6): 262-268. [Crossref], [Google Scholar], [Publisher]

[27] Ranjbar R, Safarpoor Dehkordi F, Sakhaei Shahreza MH, Rahimi E. Prevalence, identification of virulence factors, O-serogroups and antibiotic resistance properties of Shiga-toxin producing Escherichia coli strains isolated from raw milk and traditional dairy products. Antimicrobial Resistance & Infection Control. **2018**;7(1):1-1. [Crossref], [Google Scholar], [Publisher]

[28] Ranjbar R, Shahreza MH, Rahimi E, Jonaidi-Jafari N. Methicillin-resistant Staphylococcus aureus isolates from Iranian restaurant food samples: Panton-Valentine Leukocidin, SCCmec phenotypes and antimicrobial resistance. Tropical Journal of Pharmaceutical Research. **2017** 7;16(8):1939-49. [Crossref], [Google Scholar], [Publisher]

[29] Ranjbar R, Shahreza MH. Prevalence, antibiotic-resistance properties and enterotoxin gene profile of Bacillus cereus strains isolated from milk-based baby foods. Tropical Journal of Pharmaceutical Research. **2017** 7;16(8):1931-7. [Crossref], [Google Scholar], [Publisher]

[30] Saliminasab M, Jabbari H, Farahmand H, Asadi M, Soleimani M, Fathi A. Study of antibacterial performance of synthesized silver nanoparticles on Streptococcus mutans bacteria. Nanomedicine Research Journal. **2022** 1; 7(4): 391-6.[Google Scholar], [Publisher]

[31] Sarejloo SH, et al., Neutrophil-to-Lymphocyte Ratio and Early Neurological Deterioration in Stroke Patients: A Systematic Review and Meta-Analysis, **2022**, Article ID 8656864 [Crossref], [Google Scholar], [Publisher]

[32] Shahreza MH, Rahimi E, Momtaz H. Shiga-toxigenic Escherichia coli in ready-to-eat food staffs: Prevalence and distribution of putative virulence factors. Microbiology Research. **2017** 22;8(2):7244. [Crossref], [Google Scholar], [Publisher]

[33] Shahreza MS, Dehkordi NG, Nassar MF, Al-Saedi RM. Genotyping of Campylobacter jejuni isolates from raw meat of animal species. Academic Journal of Health Sciences: Medicina balear. **2022**;47(4):52-7. [Crossref], [Google Scholar], [Publisher]

[34] Shahreza MS, Dehkordi NG, Nassar MF, Al-Saedi RM. Virulence characters and linotyping of Pseudomonas aeruginosa isolated from meat and assessment of the antimicrobial effects of Zataria multiflora against isolates. Academic Journal of Health Sciencies: Medicina Balear. **2022**. 37(4): 11-16. [Google Scholar], [Publisher]

[35] Shahreza MS. Ready To Eat Food Samples As Reservoirs Of Shiga Toxigenic Escherichia Coli. Journal of Pharmaceutical Negative Results. 2022 31:9761-6. [Crossref], [Google Scholar], [Publisher]

[36] Shahreza, M. H. S., & Soltani, A. Genotyping and antibiotic resistance of methicillin-resistant staphylococcus aureus strains isolated from raw and frozen meat samples and assessment of the antimicrobial effects of origanum vulgare against MRSA isolates. International Journal of Health Sciences, **2022**, 6(S6), 4840–4852. [Google Scholar], [Publisher]

[37] Shahreza, M. S., & Afshari, H. Ribotyping and assessment of toxigenic genes of clostridium difficile strains isolated from raw meat. International Journal of Health Sciences, **2022**, 6(S6), 4853–4863. [Crossref], [Google Scholar], [Publisher]

[38] Tahmasebi E, Alam M, Yazdanian M, Tebyanian H, Yazdanian A, Seifalian A, et al. Current biocompatible materials in oral regeneration: a comprehensive overview of composite materials. Journal of Materials Research and Technology. **2020**;9(5):11731-55. [Crossref], [Google Scholar], [Publisher]

[39] Torkan S, Shahreza MH. VacA, CagA, IceA and OipA genotype status of Helicobacter pylori isolated from biopsy samples from Iranian dogs. Tropical Journal of Pharmaceutical Research. **2016** 4;15(2):377-84. [Crossref], [Google Scholar], [Publisher]

[40] Tosan F, Rahnama N, Sakhaei D, Fathi AH, Yari A. Effects of doping metal nanoparticles in hydroxyapatite in Improving the physical and chemical properties of dental implants. Nanomedicine Research Journal. **2021**;1;6(4):327-36. [Crossref], [Google Scholar], [Publisher]

[41] Yahaghi E, Khamesipour F, Mashayekhi F, Safarpoor Dehkordi F, Sakhaei MH, Masoudimanesh M, Khameneie MK. Helicobacter pylori in vegetables and salads: genotyping and antimicrobial resistance properties. BioMed Research International. **2014** 12;2014: 757941. [Crossref], [Google Scholar], [Publisher]

[42] Yazdanian M, Rahmani A, Tahmasebi E, Tebyanian H, Yazdanian A, Mosaddad SA. Current and Advanced Nanomaterials in Dentistry as Regeneration Agents: An Update. Mini Reviews in Medicinal Chemistry. **2021**;21(7):899-918. [Crossref], [Google Scholar], [Publisher]

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