



RESEARCH ARTICLE

Awareness of Patients Toward Warning Signs of Heart Attacks

Montadhar R. Al-zuhairy^{1*}, Mohammed Baqer Al- Jubouri²

¹Academic Nurse, Ministry of Health, Diyala Health Directorate, Iraq

² Associated Professor, College of Nursing, University of Baghdad

ARTICLE INFO	ABSTRACT
<p>Received: May 23, 2024 Accepted: Jun 26, 2024</p>	<p>The majority of heart attacks are distinguished by early warning signs that involve symptoms including prolonged or recurring chest discomfort in the central area, pain or discomfort in the arms or shoulder, pain or discomfort in the jaw, neck, or back, feelings of weakness, lightheadedness, or fainting, and difficulty breathing. Patients may not seek care that might lead to better results if they are unaware of the symptoms of acute myocardial infarctions. Improving the public's awareness of a heart attack's warning signs and symptoms can enhance survival and better outcomes. To evaluate the awareness of IHD patients toward warning signs of heart attacks and find out the association between demographic characteristics and awareness about warning signs of heart attacks. A cross-sectional study conducted on 165 IHD patients was selected by purposive sampling at cardiac care units for two months. Data was gathered by using a questionnaire. Descriptive and inferential statistics were used in data analysis. The study results show significant differences between the awareness score, educational level, and risk factors. There were no statistical correlations or differences between awareness scores with age, sex, occupation, residency, and smoking. The level of awareness is good among patients with IHD. The awareness of patients was affected by educational attainment and the experience with risk factors of HA, not affected by other demographic characteristics of patients. Using the results from policymakers to identify aspects of the problem and develop human resources for emergencies.</p>
<p>Keywords Awareness warning signs IHD patients</p>	
<p>*Corresponding Author: muntadhar.Rafed2202m@conursi ng.uobaghdad.edu.iq</p>	

INTRODUCTION

Cardiovascular diseases (CVDs) are complex diseases that are the primary contributors to global mortality. (Safad et al., 2023; Al-Ganmi et al., 2019; Al-Mayahi et al., 2023). CVDs account for about one-third of mortality worldwide (Mozaffarian et al., 2015). CVDs are non-communicable diseases (NCDs) that are chronic illnesses not caused by an infectious process, are not contagious, have prolonged courses, are difficult to cure, and may lack a fully effective treatment (Tabish, 2017). NCDs such as diabetes, cancer, and cardiovascular diseases (CVDs) are among the top ten global health disorders (Novelli et al., 2020). The pathophysiology of cardiovascular diseases CVDs, predominantly caused by atherosclerosis, involves the remodelling of blood vessels, leading to potential restrictions in blood flow that impact the heart and nervous system. (Benjamin et al., 2017). Heart failure, heart anomalies, coronary artery disease (CAD), stroke, hypertension, vascular disease, and ischemic heart disease (IHD) are conditions that fall under the generalized term CVDs (Shah Amran et al., 2022). The main risk factors for cardiovascular diseases (CVDs) include obesity,

diabetes mellitus (DM), smoking, leading a sedentary and unhealthy lifestyle, and having a genetic vulnerability (Minneboo et al., 2017).

Myocardial infarction (MI) is the major kind of ischemic heart disease (IHD), and an inequity distinguishes it between the myocardium's requirements and the availability of coronary blood flow (Alanazi et al., 2020). MI is the medical name for a heart attack HA (Author et al., 2023). Complications of HA include myocardial dysfunction, heart failure, arrhythmias, mechanical complications (free wall rupture, ventricular septal rupture, papillary muscle rupture), and Pericarditis (Ibanez et al., 2018). Within 30 min of ischemia, cardiomyocyte structural changes and edema develop, leading to progressive myocyte death after 3 h of ischemia (Jenča et al., 2021). There are so many people who are admitted due to HA; Most patients are died due to heart failure or IHD (Ibanez et al., 2018). Globally In 2019, 17.9 million deaths were due to CVDs, which represent about 32% of all deaths, the rate of mortality about 85% is caused by HA and strokes (Hussain et al., 2024). CVDs alone, In Iraq, account for 52.4% of all fatalities (Salih et al., 2021). Most cases of HA are characterized by warning signs that include chest discomfort in the middle of the chest that lasts for longer than a few minutes, or that disappears and returns; pain or discomfort in the arms or shoulder; pain or discomfort in the jaw, neck, or back; feeling weak, lightheaded, or faint; and shortness of breath (Narcisse et al., 2021). Breathing difficulties could happen with or without chest pain; other indications include the potential for cold sweats, nausea, or dizziness (Damluji et al., 2021). Many patients have warning signs and symptoms for hours, days, or even weeks previously (Reeder et al., 2022).

Patients can reduce their risk of deterioration and death by rapidly recognizing warning signs that may suggest a heart attack is happening and seeking timely treatment (Mcgaughey et al., 2017). According to the guidelines released by American Heart Association (AHA) and Heart Foundation, it is recommended that people who have symptoms of MI that last between 5 to 10 minutes (Jieyu et al., 2022), or less than 90 minutes, should seek medical attention immediately (Brieger et al., 2015). A delay in hospital admission for receiving emergent treatments is critical and dangerous to HA patient life and leads to a negative prognosis (Ahmed et al., 2020). It is estimated that more than 800,000 people suffer from MI each year, with 27% of them dying from it before reaching the hospital in most cases (Reed & Menon, 2022). In reality, after the onset of HA symptoms, a delay in reperfusion of 30 minutes causes a 1.5% increase in mortality (Ahmed et al., 2019). Every 30 minutes of delay raises one-year mortality by 7.5%, emphasizing the importance of early symptom recognition and appropriate timely response (Al Harbi et al., 2022).

The mainstay of treatment in these patients is immediate reperfusion by the primary percutaneous coronary intervention (PCI) or, if not available promptly, by fibrinolytic therapy (Ibanez et al., 2018). Infarctio zone depends on ischemia time (The period during which the heart muscle lacks blood supply and oxygen); the most important way to diminish it and improve outcome remains a reduction in the ischemic time by reducing any delay and ensuring rapid revascularization in HA patients (Bøtker et al., 2020; Mustafa & Hassan, 2020). If reperfusion occurs within one hour of symptom onset, survival rates improve by 50% and by 23% if it occurs within three hours of symptom onset (Al Harbi et al., 2022).

Pre-hospital delays are caused by patients being late in calling an ambulance or getting transferred to the hospital; an awareness deficit about HA symptoms may be the reason for this delay, which increases death rates (Aye et al., 2023). Most people have identified chest pain as the primary HA symptom in studies done around the world; however, there is a shortage of awareness regarding further HA symptoms (Patel et al., 2018). The general population of the world lacks awareness of the uncommon presentation of HA and its recognition. Improving the public's understanding of the warning signs and symptoms of a heart attack can enhance survival and better outcomes (Patel et al., 2018). Patients may not seek care that might lead to better results if they are unaware of the

symptoms of acute myocardial infarctions and they are at risk for ischemic heart disease (Temu et al., 2017).

MATERIALS METHODS

Cross-sectional study design has been used in this study to find out the patient's awareness toward warning signs of heart attack. The study sample was selected through the non-probability (purposive) sampling method. The study sample consisted of patients with IHD who were admitted to cardiac units at Baquba Teaching Hospital and Al Khalis General Hospital. The minimum sample size was 174, which was calculated as a population of 1000, a confidence level of 85%, and a 5% margin of error. Participants include patients in both recent and past diagnoses. Patients who participated voluntarily were with different ages, male and female, with multiple levels of education, even the uneducated. Excluded are the patients with mental and neurological illness, Patients with blindness, and deafness in any age group.

The instrumentation was a questionnaire (Assessment of Awareness about Heart Attack among Adults) was used to evaluate awareness. The questionnaire consists of two parts: socio-demographic data form and awareness towards a heart attack in 22 items. There were 22 items in the questionnaire: two about the introduction, six about risk factors, eight about symptoms, four about options for diagnosis and treatment, and two about the complications of a HA. According to (Ali et al., 2022), each question had the same score (one point for each right response and zero otherwise). Subsequently, the total results were calculated. No, too bad knowledge was received by those who scored 0–11, while adequate to good knowledge was received by those who scored 12–22.

The questionnaire was in English language and then translated into the Arabic language by using Brislin's back-translation model after obtaining approval from the researcher who created the tool. Another expert reviewed and compared the original and back-translated English versions, and the concerns with inconsistencies were addressed. The final Arabic version of the questionnaire was delivered to 15 experts to find out their scientific notes. The experts varied from university professors and cardiologist physicians. Therefore, the instrument was considered valid after taking the comments and recommendations into consideration.

The interviewer-administered questionnaire was used to gather information from participants. The researcher provided the consent form and questionnaires to the patients after receiving approval to gather data. Before continuing, each participant who receives a questionnaire must sign the consent form. Filling out the questionnaire took approximately 5-6 minutes to complete. The researcher promised the study participants that their information would be kept secure and private, and the questionnaire was conducted in Arabic. The researcher reads the items aloud to the patient without clarification and collects the data in this manner to ensure the safety of the critically ill patient in the cardiac intensive care unit, as they are unable to spell them out themselves due to their critical health condition. This is done considering the ethical requirements of scientific research and the ethics committee. The participating patients had the choice to discontinue participation at any moment because it was entirely voluntary. The response rate was 94%, related to withdraw of some patients during the session.

Data was analyzed by using the Statistical Package of Social Sciences (SPSS) version 26. in which descriptive and inferential statistic measures were employed. descriptive statistics were used to describe the demographic variables, including frequency (F), percentage (%), mean score, and standard deviation. in addition to descriptive analysis, inferential data analysis techniques are applied for nonparametric data, including the spearman correlation test, to find the correlation between awareness score and age. chi-square test to find out the difference between demographic characteristics (sex, occupation, residency, risk factors, and smoking) with awareness score. The

differences between educational level and awareness score were analyzed statistically by the kruskal-wallis test.

Ethical consideration: Permission was obtained from the original researcher to use the instrument used to conduct the study. The study data collection started after obtaining formal permission from the required authorities, beginning with the approval of the Council of the Nursing College/University of Baghdad on 22/11/2023. Scientific Research Ethics and Sobriety Committee, University of Baghdad, College of Nursing granted an ethics form with ID number 02- 22/11/2023. The researcher provided an extensive summary of the study to the Iraqi Ministry of Planning (Central Statistical Organization), including the objectives and methods. The researcher provided a comprehensive study overview to the Diyala Health Directorate Training and Development Centre to acquire official authorization to conduct the study. The last stage involved obtaining permission to gather the data from Baquba Educational Hospital and Al Khalis General Hospital. The researcher ensured that ethical standards were followed by obtaining informed consent from all patients without revealing their identities. The study's objectives were clearly explained to each patient, and they were informed that the questionnaire findings would only be used for research purposes. Participants were also informed of their autonomy and right to decline participation. Both written and verbal consent were obtained from each study participant.

RESULTS

The results showed that the mean age of patients with average age was 60.04 years old. Concerning the patient's sex, the higher percentage were male (68.7%). The total mean score was 17.03, therefore as the scoring of scale (0-11 poor awareness, 12-22 adequate to good awareness), The level of awareness of patients is good. Regarding the educational level, a higher percentage of patients completed primary school (34.3%). Referring to employment status, the highest percentage of patients were retirees (30.7%). Concerning to residences, the percent of patients were sequentially urban (57.8 %). The study results showed that the highest percent of patients were with three or more risk factors 36.1%, while the smokers patients were with the highest percent, 53%.

Table 1: IHD patient's sociodemographic characteristics (N = 165)

		Frequency	Percent
Age	Mean (SD):60.04 ± 11.753		
sex	Male	114	69.1%
	female	51	30.9%
	Total	165	100.0%
Educational level	Un educated	43	26.1%
	Primary	57	34.5%
	Secondary	29	17.6%
	Diploma	20	12.1%
	Bachelor	13	7.9%
	Post graduate	3	1.8%
	Total	165	100.0%

Occupation	Employee	32	19.4%
	Un employee	17	10.3%
	Free work	21	12.7%
	Retired	51	30.9%
	Housekeeper	44	26.7%
	Total	165	100.0%
Residency	Urban	96	58.2%
	Rural	69	41.8%
	Total	165	100.0%
Risk factors	Non	15	9.1%
	HT	10	6.1%
	DM	7	4.2%
	Hyperlipidemia	1	0.6%
	Combination of two risk actors	64	38.8%
	A combination of three and more	68	41.2%
	Total	165	100.0%
Smoking	Currently smoker	61	37.0%
	Ex-smoker	25	15.2%
	Non-smoker	79	47.9%
	Total	165	100.0%
Cigarette Number	Mean(SD):35.72 ± 21.712		
Smoking duration(year)	Mean(SD):28.70 ± 12.581		

Table 2: Correlation Between Patient's Age and Awareness Toward Warning Signs of Heart Attack

			Awareness	Age
Spearman's rho	awareness	Correlation Coefficient	1.000	-.028-
		Sig.	.	0.717
		N	165	165

The study results display that there is no statistically significant correlation between patient's age (p value = 0.717), and their awareness toward warning signs of heart attack

Table 3: Differences in patients' awareness between sex, occupation, residency, risk factors, and smoking groups.

Chi-Square Tests			
sex	Value	df	Significance
Pearson Chi-Square	21.090	15	0.134
N	165		
Occupation			
Pearson Chi-Square	74.585	60	0.097
N	165		
Residency			
Pearson Chi-Square	17.804	15	0.273
N	165		
Risk factors			
Pearson Chi-Square	169.137	90	0.000
N	165		
smoking			
Pearson Chi-Square	33.987	30	0.281
N	165		

The study results display that there are no statistically significant differences between male and female patient's (p value = 0.134) with awareness level toward warning signs of heart attack. There no a statistically significant difference in patient's awareness toward warning signs of heart attack between occupation groups (p value = 0.097). There no a statistically significant difference in patients' awareness toward warning signs of heart attack between residency, (p value =0.273). There a statistically significant difference in patient's awareness toward warning signs of heart attack

between self-reported risk factors groups, (p value = .000). There is no a statistically significant difference in patient's awareness toward warning signs of heart attack between smokers and nonsmokers, (p value = 0.281).

Table 4: Difference in patient's awareness toward warning signs of heart attack between educational levels groups.

Test Statistics	
	awareness
Kruskal-Wallis H	13.360
df	5
Sig.	0.020

Variable: Educational level

The study results shows, there a statistically significant difference in patients awareness toward warning signs of heart attack between educational level groups (p value = 0.020) .

DISCUSSION

The data analysis findings showed the distribution of samples according to demographic characteristics, which revealed that the mean total age of patients was 60 years. This finding is consistent with studies showing the average of respondents' age was between 59 -65 years(Al-Shammary & Al-Gersha, 2014; Hassan, 2015; Hussein & Mohammed, 2022; Omar & Mansour, 2014). Another research conducted by Banharak et al.(2018) found that the average age of the responders was 55- 64, with a significant proportion of patients being 65 years and older . Concerning sex, the percentage of male patients was 69.1% and females was 30.9%. Research conducted by Gao et al.(2021) found that CVDs are often less common in women compared to men. Other studies found that when examining MI, there is evidence that males have a higher prevalence than females, with males accounting for around 67% of MI ((Al-Ganmi et al.(2020); Khafel & Yousif, 2019; Majid Mousa, 2020).

The current study shows the total mean score of patient's awareness toward warning signs of heart attack was (17.03); according to the scoring of the questionnaire, the awareness level of patients is good. This finding is consistent with a study conducted by Lee et al. 2021) shows a good level of awareness of the symptoms of heart attack. This result can be interpreted from two perspectives. The first perspective suggests that the average age of the sample, which is 60 years old, indicates that patients have likely experienced either personal or community-based experiences with heart-related issues throughout their lifetimes. This exposure may enhance their awareness of heart attack symptoms, as demonstrated by research conducted by Spalletta et al .(2022), who reported that the cumulative experience of life events was related to a higher awareness of both age-related gains and age-related losses. On the other hand, the second perspective highlights the educational backgrounds within the sample, ranging from secondary schools, diplomas, and bachelor's degrees to master's and doctoral studies. This educational diversity can also contribute to increased awareness, as evidenced by study that revealed the presence of an interaction effect between education and awareness (Contador et al., 2016). By considering both perspectives, the result of good awareness is clarified.

They were considering the current results that showed no statistical significance between patient's age and their awareness toward warning signs of heart attack. These findings consistent with the

research conducted by Ali et al. (2022) that stated no relation was noted between awareness and age. Another study conducted by Rasool et al. (2019), found the awareness did not seem to vary across ages. Regarding sex, the current study revealed that there are no statistically significant differences between male and female patients with awareness levels toward warning signs of heart attack. These results were confirmed by a study conducted by Sharma et al. (2021), who reported there was no difference in terms of awareness in males and females toward warning signs of heart attack. Another research conducted by Rasool et al. (2019) found there are no significant differences between males and females regarding awareness of heart attack. Interpretation of these results could be that heart attacks have become a prevalent health issue affecting both men and women (with varying incidence rates), it appears that knowledge resources are equally accessible to both, as research conducted by Escoffery (2018) found the adults are using the Internet for health activities, no significant differences were observed between sexes and individual or total electronic-health literacy scores. The cognitive abilities the same with male and female as revealed by a study conducted by Jäncke (2018) found there is currently a lack of a direct and strong correlation between these neuroscientific findings and real-life behavior as well as cognition.

Regarding occupation, the current research results clarified there is no statistically significant difference in occupation groups with patients' awareness of warning signs of a heart attack. The result that emerged from the conducted research resembles a study conducted by Taher et al. (2021) shows there is no significant differences between awareness score with occupation. Another research conducted by (Ahmed et al., 2020) found there were no statistically significant differences by employment status. Interpreting the current study results reveals that the percentage of housewives and retirees together constitutes 59% of the total proportion of other categories. Additionally, as indicated by a study conducted by Simonsson et al. (2021) found that awareness is not correlated with occupation or its type; it identified retirees and housekeepers among the group.

Concerning residency, the current study shows there was no statistically significant difference in patients' awareness of warning signs of heart attack between urban and rural. Research conducted by Tran & Tran. (2019) found there were similar levels of awareness for rural and urban residents. Another research conducted by Jastrzębska & Gałczyński (2019) found there was no statistically significant difference in the level of knowledge between the inhabitants of cities and villages. Regarding risk factors, the research findings indicate that there is a statistically significant difference in patients' awareness toward warning signs of heart attack between risk factors groups. These findings are similar to research conducted by Patel et al. (2018) confirmed that there were statistical differences between risk factors and awareness toward warning signs of heart attack. Another research supported the results conducted by Bray et al. (2023) found there was statistical differences between risk factors and awareness toward warning signs of heart attack. Explanations for the current research results, which revealed that patients with two or more risk factors exhibited higher awareness compared to those with only one risk factor or non. This suggests that patients, through their experience with risk factors or chronic diseases gain awareness through their encounters with these diseases, they perceive these conditions as potentially leading to heart attacks if not controlled. Magdy & Elsayed. (2024) titled does educational level affect the outcome of myocardial infarction? found that medical awareness is shaped through general education represented in exposure to similar conditions before himself or with a relative or belonging to the medical field by occupation.

In concerning to smoking, the current study revealed there is no statistically significant difference in patients' awareness toward warning signs of heart attack between smokers and nonsmokers. Research conducted by Taher et al. (2021) shows there are no significant differences between smoking habits and awareness of warning signs of heart attack. Another research conducted by (Fahs et al., 2017) found there are no significant differences between smoking habits and awareness of warning signs of heart attack. The interpretation of the current research results is that smokers, even though aware of the health risks and heart diseases associated with smoking, continue the habit.

However, the difference lies in their willingness and determination to quit smoking. Thus, a systematic review and meta-analysis of randomized and nonrandomized studies found that school or local community-based programs improved knowledge and attitude toward smoking behaviors among adolescents and young adults but had a small effect size on smoking behaviors (Song & Park, 2021). Therefore, awareness tends to converge between smokers and non-smokers.

As for the educational level, the study results revealed that there a statistically significant difference in patients' awareness toward warning signs of heart attack between educational level groups. Research conducted by Boateng et al.(2017) indicate the knowledge levels of CVDs, risk factors, and warning signs were mainly varied by education levels. Another research conducted by Rasool et al.(2019) found people with higher education had a better understanding of the symptoms of ischemic heart disease . A similar result was found in research conducted by Fahs et al.(2017) which found there were significant differences between educational levels and awareness of warning signs of H.A Interpretation of the current study's results, educational attainment provides individuals with valuable tools to enhance awareness through the ability to learn, read, engage in literacy, and engage in scientific thinking, as shown through research conducted by Kelli et al.(2019) found many studies believe the level of education plays a major role in the outcome of different medical conditions. Another research supported the result conducted by Magdy & Elsayed(2024) titled does educational level affect the outcome of myocardial infarction? stated that medical awareness is shaped through general education represented in school and scientific degrees and awareness of the functions of the available medical services .

CONCLUSION

In conclusion, the study revealed that the level of awareness is good among patients with IHD. The educational level and the abundance of risk factors of HA are closely related to increasing awareness among patients, patients with three or more risk factors were more aware than others. The results indicate that awareness increases in relation to educational level, personal and relatives' experiences with HA risk factors throughout life's journey, not just through information. Other factors such as gender, age, residence, occupational status, and smoking were not correlated with the level of awareness.

Limitations

The critical condition of the patients and the psychological state they are experiencing, some of them do not accept to talk or participate in the research, and sometimes there is opposition from relatives and healthcare staff to preserve the patient's health despite official approvals from decision-makers. Patient withdrawal may occur in the middle or at the end of the session before completion due to sudden symptoms, most notably chest pain and Tachycardia. The delay and refusal of some specialized healthcare institutions to facilitate the research task led the researcher to specify certain healthcare institutions and prevented them from conducting it at a national level, in addition to the limited timeframe allotted for the study.

Recommendations

Regarding the findings, it is recommended to conduct research at a national level to increase the generalizability of the results. Conducting a study to assess the level of awareness among the general population in addition to HA patients in the country in order to develop appropriate solutions based on the need. Conducting qualitative or mixed research to understand patients' perception and cognition of warning signs of heart attacks and how to deal with them, reaching the psychological and cognitive aspects of patients beyond the theoretical aspect. The study results serve as a database for healthcare decision-makers in the country to develop an appropriate plan to address the issue, such as implementing educational campaigns or training healthcare personnel responsible for community education.

REFERENCES

- Ahmed, A. A. A., Al-Shami, A. M., Jamshed, S., & Fata Nahas, A. R. (2019). Development of questionnaire on awareness and action towards symptoms and risk factors of heart attack and stroke among a Malaysian population. *BMC Public Health*, *19*(1). <https://doi.org/10.1186/s12889-019-7596-1>
- Ahmed, A. A. A., Al-Shami, A. M., Jamshed, S., Nahas, A. R. F., & Ibrahim, M. I. M. (2020). Public awareness of and action towards heart attack symptoms: An exploratory study. *International Journal of Environmental Research and Public Health*, *17*(23), 1–16. <https://doi.org/10.3390/ijerph17238982>
- Al Harbi, K. M., Alluhidan, W. A., Almatroudi, M. I., Almuhanha, N. I., & Alotaibi, N. M. (2022). Knowledge and Attitude of General People Towards Symptoms of Heart Attack and the Impact of Delay Time in Riyadh, Saudi Arabia. *Cureus*. <https://doi.org/10.7759/cureus.32758>
- Alanazi, A., Alghanim, M. H., Alamer, A. J., Alshaqaqiq, M. A., Al Busaeed, M. M., Hussain Alahmed, A., Alali, A. I., Almazyadi, H., Alharbi, W. F., Nasser, I. A., Alotaibi, K. F., & Althagafi, M. A. (n.d.). Acute Myocardial Infarction Patients' Knowledge Regarding the Modifiable Risk Factors of Heart Disease. Available Online *Www.Ijpras. Com International Journal of Pharmaceutical Research & Allied Sciences*, *2020*(2), 210–216. www.ijpras.com
- Al-Ganmi, A. H. A., Al-Fayyadh, S., Abd Ali, M. B. H., Alotaibi, A. M., Gholizadeh, L., & Perry, L. (2019). Medication adherence and predictive factors in patients with cardiovascular disease: A comparison study between Australia and Iraq. *Collegian*, *26*(3), 355–365. <https://doi.org/10.1016/j.colegn.2018.10.002>
- Al-Ganmi, A. H. A., Alotaibi, A., Gholizadeh, L., & Perry, L. (2020). Medication adherence and predictive factors in patients with cardiovascular disease: A cross-sectional study. *Nursing and Health Sciences*, *22*(2), 454–463. <https://doi.org/10.1111/nhs.12681>
- Ali, K., Haq, N. ul, Fatima, M., Uddin, S. M., Saood, M., & Nasim, A. (2022). Development of Questionnaire for the Assessment of Awareness about Heart Attack among Adults in Quetta Pakistan. *Journal of Advances in Medical and Pharmaceutical Sciences*, 1–10. <https://doi.org/10.9734/jamps/2022/v24i230282>
- Al-Mayahi, A. M. M., Al-Jubouri, M. B., & Jaafar, S. A. (2023). Healthy lifestyle behaviors and risk of cardiovascular diseases among nursing faculty during COVID-19 Pandemic. *Revista Brasileira de Enfermagem*, *76*. <https://doi.org/10.1590/0034-7167-2022-0372>
- Al-Shammary, Y. K. A., & Al-Gersha, K. A. M. (2014). Satisfaction of Patients, Coronary Arteries in Related to Nursing and Medical Care. In *Iraqi National Journal of Nursing Specialties*, *27*, (2).
- Author, C., Nayak, L. A., Homepage, J., & Shabaraya, A. R. (2023). Labetalol for the treatment of pregnancy induced hypertension: a brief review. *International Journal in Pharmaceutical Sciences 1*. 78-87. <https://doi.org/10.5281/zenodo.10259558>
- Aye, Y. N., Mai, A. S., Zhang, A., Lim, O. Z. H., Lin, N., Ng, C. H., Chan, M. Y., Yip, J., Loh, P. H., & Chew, N. W. S. (2023). Acute myocardial infarction and myocarditis following COVID-19 vaccination. In *QJM: An International Journal of Medicine* *116*(4), 279–283. Oxford University Press. <https://doi.org/10.1093/qjmed/hcab252>
- Banharak, S., Zahrlı, T., Matsuo, H., of Sociology, P., & Methodology, R. (2017). Public knowledge about risk factors, symptoms, and first decision-making public knowledge about risk factors, symptoms, and first decision-making in response to symptoms of heart attack among lay people. In *Pacific Rim Int J Nurs Res*, *22*(1).
- Benjamin, E. J., Blaha, M. J., Chiuve, S. E., Cushman, M., Das, S. R., Deo, R., De Ferranti, S. D., Floyd, J., Fornage, M., Gillespie, C., Isasi, C. R., Jim'nez, M. C., Jordan, L. C., Judd, S. E., Lackland, D., Lichtman, J. H., Lisabeth, L., Liu, S., Longenecker, C. T., ... Muntner, P. (2017). Heart disease and stroke statistics'2017 update: a report from the american heart association. In *Circulation*, *135*(10), 146–603. Lippincott Williams and Wilkins. <https://doi.org/10.1161/CIR.0000000000000485>

- Boateng, D., Wekesah, F., Browne, J. L., Agyemang, C., Agyei-Baffour, P., De-Graft Aikins, A., Smit, H. A., Grobbee, D. E., & Klipstein-Grobusch, K. (2017). Knowledge and awareness of and perception towards cardiovascular disease risk in sub-Saharan Africa: A systematic review. *PLoS ONE*, *12*(12). <https://doi.org/10.1371/journal.pone.0189264>
- Bøtker, H. E., Cabrera-Fuentes, H. A., Ruiz-Meana, M., Heusch, G., & Ovize, M. (2020). Translational issues for mitoprotective agents as adjunct to reperfusion therapy in patients with ST-segment elevation myocardial infarction. In *Journal of Cellular and Molecular Medicine*, *24*(5), 2717–2729. Blackwell Publishing Inc. <https://doi.org/10.1111/jcmm.14953>
- Bray, J., Howell, S., Nehme, Z., Buttery, A., Stub, D., Cartledge, S., & Finn, J. (2023). Declining public awareness of heart attack warning symptoms in the years following an Australian public awareness campaign: a cross-sectional study. *Heart Lung and Circulation*, *32*(4), 497–505. <https://doi.org/10.1016/j.hlc.2023.01.010>
- Brieger, D. B., Chew, D. P. B., Redfern, J., Ellis, C., Briffa, T. G., Howell, T. E., Aliprandi-Costa, B., Astley, C. M., Gamble, G., Carr, B., Hammett, C. J. K., Board, N., & French, J. K. (2015). Survival after an acute coronary syndrome: 18-month outcomes from the Australian and New Zealand SNAPSHOT ACS study. *Medical Journal of Australia*, *203*(9), 368.e1-368.e9. <https://doi.org/10.5694/mja15.00504>
- Cam Escoffery, Gender similarities and differences for e-health behaviors among us adults. *Telemedicine and e-Health*, *24*(5), 335-343.
- Contador, I., Fernández-Calvo, B., Ramos, F., Mograbi, D. C., & Morris, R. G. (2016). Interaction effect of awareness and educational attainment on the benefits of multicomponent intervention for persons with mild Alzheimer's disease. *Archives of Clinical Neuropsychology*, *31*(8), 1037–1042. <https://doi.org/10.1093/arclin/acw074>
- Damluji, A. A., Van Diepen, S., Katz, J. N., Menon, V., Tamis-Holland, J. E., Bakitas, M., Cohen, M. G., Balsam, L. B., & Chikwe, J. (2021). Mechanical complications of acute myocardial infarction: a scientific statement from the American Heart Association. In *Circulation*, *144*(2), 16–35. Lippincott Williams and Wilkins. <https://doi.org/10.1161/CIR.0000000000000985>
- Fahs, I., Khalife, Z., Malaeb, D., Iskandarani, M., & Salameh, P. (2017). The prevalence and awareness of cardiovascular diseases risk factors among the Lebanese population: a prospective study comparing urban to rural populations. *Cardiology Research and Practice*. <https://doi.org/10.1155/2017/3530902>
- Gao, X. Y., Amin Ali, A., Shaban Hassan, H., & Anwar, E. M. (2021). Improving the accuracy for analyzing heart diseases prediction based on the ensemble method. *Complexity*. <https://doi.org/10.1155/2021/6663455>
- Hassan, S. M. (2015). Detection of Hypertension among Cardiac Diseases Inpatients at Kirkuk City Hospitals. In *Iraqi National Journal of Nursing Specialties*, *28*(1)
- Hussain, M. M., Rafi, U., Imran, A., Rehman, M. U., & Abbas, S. K. (2024). Risk factors associated with cardiovascular disorders. *Pakistan BioMedical Journal*, 03–10. <https://doi.org/10.54393/pbmj.v7i02.1034>
- Hussein, Z. K., & Mohammed, W. K. (2022). Association between enhancing learning needs and demographic characteristic of patients with myocardial infarction In *2022 Iraqi National Journal of Nursing Specialties*, *35*(2)
- Ibanez, B., James, S., Agewall, S., Antunes, M. J., Bucciarelli-Ducci, C., Bueno, H., Caforio, A. L. P., Crea, F., Goudevenos, J. A., Halvorsen, S., Hindricks, G., Kastrati, A., Lenzen, M. J., Prescott, E., Roffi, M., Valgimigli, M., Varenhorst, C., Vranckx, P., Widimský, P., ... Gale, C. P. (2018). 2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation. In *European Heart Journal*, *39*(2), 119–177. Oxford University Press. <https://doi.org/10.1093/eurheartj/ehx393>
- Jäncke, L. (2018). Sex/gender differences in cognition, neurophysiology, and neuroanatomy. In *F1000Research*, *7*. F1000 Research Ltd. <https://doi.org/10.12688/f1000research.13917.1>

- Jenča, D., Melenovský, V., Stehlik, J., Staněk, V., Kettner, J., Kautzner, J., Adámková, V., & Wohlfahrt, P. (2021). Heart failure after myocardial infarction: incidence and predictors. In *ESC Heart Failure*, 8, (1), 222–237. Wiley-Blackwell. <https://doi.org/10.1002/ehf2.13144>
- Jieyu, M., Huixian, L., Yu, W., & Willmer, M. (2022). Influencing factors of delayed medical treatment in patients with acute myocardial infarction: A Descriptive Review (Dissertation). Retrieved from <https://urn.kb.se/resolve?urn=urn:nbn:se:hig:diva-38783>
- Kelli, H. M., Mehta, A., Tahhan, A. S., Liu, C., Kim, J. H., Dong, T. A., Dhindsa, D. S., Ghazzal, B., Choudhary, M. K., Sandesara, P. B., Hayek, S. S., Topel, M. L., Alkholder, A. A., Martini, M. A., Sidoti, A., Ko, Y. A., Lewis, T. T., Vaccarino, V., Sperling, L. S., & Quyyumi, A. A. (2019). Low educational attainment is a predictor of adverse outcomes in patients with coronary artery disease. *Journal of the American Heart Association*, 8(17). <https://doi.org/10.1161/JAHA.119.013165>
- Khafel, M. A. L., & Yousif, H. (2019). Determination of the cardiac patient's knowledge toward using anticoagulant medications at missan governorate hospitals . In *Iraqi National Journal of Nursing Specialties*, 32(1).
- Lee, C., Chow, C. M., Yan, A. T., Moe, G. W., Tu, J. V., & Chu, J. Y. (2021). Awareness of Warning Symptoms of Heart Disease and Stroke: Results of a Follow-up Study of the Chinese Canadian Cardiovascular Health Project. *CJC Open*, 3(6), 741–750. <https://doi.org/10.1016/j.cjco.2021.01.014>
- Tabish, S. A. (2017). Lifestyle diseases: consequences, characteristics, causes and control. *J Cardiol Curr Res*, 9(3), <https://doi.org/10.15406/jccr.2017.09.00326>
- Magdy, A., & Elsayed, A. (n.d.). " Does Educational level Affect the Outcome of Myocardial Infarction? " *Infarction? "[Master's Thesis, the American University in Cairo]. AUC Knowledge Fountain.*<https://fount.aucegypt.edu/etds/2223>
- Majid Mousa, A. (2020). Effectiveness of an Instructional Program Concerning Healthy Lifestyle on Patients' Attitudes after Percutaneous Coronary Intervention at Cardiac Centers in Baghdad City. In *Iraqi National Journal of Nursing Specialties*, 33(1).
- McGaughey, J., O'Halloran, P., Porter, S., & Blackwood, B. (2017). Early warning systems and rapid response to the deteriorating patient in hospital: a systematic realist review. *Journal of advanced nursing*, 73(12), 2877-2891.
- Minneboo, M., Lachman, S., Snijder, M. B., Vehmeijer, J. T., Jørstad, H. T., & Peters, R. J. G. (2017). Risk factor control in secondary prevention of cardiovascular disease: Results from the multi-ethnic HELIUS study. *Netherlands Heart Journal*, 25(4), 250–257. <https://doi.org/10.1007/s12471-017-0956-5>
- Taher, T. M. J., Alfadhul, S. A. L., Shwekh, A. S., & Sarray, F. T. R. (2021). Knowledge and awareness on cardiovascular diseases among the Iraqi population. *Int. Res. J. Sci. Technol*, 1(2), 1-11.
- Mozaffarian, D., Benjamin, E. J., Go, A. S., Arnett, D. K., Blaha, M. J., Cushman, M., Das, S. R., De Ferranti, S., Després, J.-P., Fullerton, H. J., Howard, V. J., Huffman, M. D., Isasi, C. R., Monik, J., Jiménez, C., Judd, S. E., Kissela, B. M., Lichtman, J. H., Lisabeth, L. D., ... Turner, M. B. (2015). Heart Disease and Stroke Statistics-2016 Update A Report from the American Heart Association. In *Circulation* (Vol. 133). <http://my.americanheart.org/statements>
- Mustafa, M. A. A. K., & Hassan, H. S. (2020). Effectiveness of nursing intervention on early complications for patients undergoing coronary catheterization. *International Journal of Pharmaceutical Research*, 12(2), 2271–2280. <https://doi.org/10.31838/ijpr/2020.12.02.0307>
- Novelli, G., Biancolella, M., Latini, A., Spallone, A., Borgiani, P., & Papaluca, M. (2020). Precision medicine in non-communicable diseases. In *High-Throughput*, 9(1). MDPI AG. <https://doi.org/10.3390/ht9010003>
- Omar, I. A., & Mansour, K. A. (2014). Assessment of the Risk Factors of Coronary Artery Diseases in Al-Nasiriyah City . In *Iraqi National Journal of Nursing Specialties*, 27(1).

- Patel, A., Fang, J., Gillespie, C., Odom, E., Luncheon, C., & Ayala, C. (2018). Awareness of Heart Attack Signs and Symptoms and Calling 9-1-1 Among U.S. Adults. In *Journal of the American College of Cardiology*, 71(7), 808–809. Elsevier USA. <https://doi.org/10.1016/j.jacc.2017.10.104>
- Rasool, S. M., Asad, Z., Bhatti, A. A., Kulsoom, A., Chaudhary, N. A., Rasool, A. S., & Sadiq, A. (2019). Assessment of knowledge of symptoms of ischemic heart disease in population visiting a tertiary care hospital in pakistan. *Cureus*. <https://doi.org/10.7759/cureus.5482>
- Reed, G. W., & Menon, V. (2022). Reducing the incidence and mortality from myocardial infarction. In *The Lancet Public Health*, 7(3), e202–e203. Elsevier Ltd. [https://doi.org/10.1016/S2468-2667\(22\)00027-5](https://doi.org/10.1016/S2468-2667(22)00027-5)
- Reeder, K. M., Peek, G. M., & Nazir, N. (2022). Prehospitalization Symptom Perceptions, Lay Consultations, and Treatment-Seeking for Acute Decompensating Heart Failure: Implications for Nursing Practice. *Critical Care Nursing Clinics of North America*, 34(2), 129-140.
- Safad, R., Isam, H., & Shakir, H. (n.d.). Effect of six-minute walk test on health-related quality of life in patients undergoing coronary artery bypass graft surgery. In *Rawal Medical Journal*, 48(3).
- Salih, S. O., Moramarco, S., Di Giovanni, D., Qadir, S. A., Alsilefane, H. H., Basa, F. B., & Gialloreti, L. E. (2021). Ten-year mortality trends and natural causes of death in the iraqi kurdistan. *The Open Public Health Journal*, 14(1), 264–271. <https://doi.org/10.2174/1874944502114010264>
- Shah Amran, M., Binte Bahar, N., & Akash, S(2022). Perspective chapter: physiology and pathology of the cardiovascular system.in *Novel Pathogenesis and Treatments for Cardiovascular Disease*. IntechOpen..
- Sharma, A., Vidusha, K., Suresh, H., Ajan, M. J., Saravanan, K., Dhamania, M., Nisha, B., & Wani, R. T. (2021). Global awareness of myocardial infarction symptoms in general population: a systematic review and meta-analysis. In *Korean Circulation Journal*, 51(10). Korean Society of Cardiology. <https://doi.org/10.4070/KCJ.2021.0100>
- Simonsson, O., Fisher, S., & Martin, M. (2021). Awareness and experience of mindfulness in britain. *Sociological Research Online*, 26(4), 833–852. <https://doi.org/10.1177/1360780420980761>
- Song, R., & Park, M. (2021). Meta-Analysis of the effects of smoking prevention programs for young adolescents. *Child Health Nursing Research*, 27(2), 95–110. <https://doi.org/10.4094/chnr.2021.27.2.95>
- Spalletta, G., Kai, A., Chau, C., Cao, Y., Rupprecht, F. S., Rupprecht, Sabatini, W., Sabatini, S., Diehl, M., Gerstorf, D., Kaspar, R., Schilling, O. K., & Wahl, H.-W. (n.d.). *OPEN ACCESS EDITED BY Awareness of age-related change in the context of major life events*.
- Temu, T. M., Bahiru, E., Bukachi, F., Bloomfield, G. S., Muiruri, P., & Farquhar, C. (2017). Lay beliefs about hypertension among HIV-infected adults in Kenya. *Open Heart*, 4(1). <https://doi.org/10.1136/openhrt-2016-000570>
- Tran, P., & Tran, L. (2019). Influence of rurality on the awareness of myocardial infarction symptoms in the US. *Therapeutic Advances in Cardiovascular Disease*, 13. <https://doi.org/10.1177/1753944719891691>