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The Psychosomatic Impact of Alcohol Consumption on Patients with Acute Coronary Syndrome

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Abstract: *Cardiovascular disease is estimated to be the leading cause of death worldwide (approximately one-third of all deaths). In 2024, the American Heart Association reported that approximately 128 million Americans over the age of 20 were diagnosed with acute myocardial infarction, heart failure, stroke, and high blood pressure. Also, in 2020, Eurostat reported that the main cause of death was represented by cardiovascular diseases representing almost a third of all deaths. In addition, excessive alcohol consumption is associated with an increased risk of cardiovascular diseases such as hypertension, myocarditis, decreased cardiac contractility, arrhythmias, thrombotic events, hypoxic acute respiratory failure, and stroke. The impact of alcohol on the cardiovascular system is dependent on the amount of alcohol consumed, thus, as alcohol consumption is constant, the risk of developing cardiovascular diseases increases, especially acute myocardial infarction. Cardiovascular emergencies, especially acute myocardial infarction and stroke, can significantly affect both the physical and mental health of patients. However, the psychological impact of these conditions is often neglected, even though studies show that they can lead to symptoms of anxiety, depression, or post-traumatic stress disorder (PTSD).*

Keywords: *cardiovascular emergencies; ethanol dependence; psychological impact*

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1. Introduction

Hyperlipidemia, smoking, hypertension, diabetes, and obesity have been identified as key modifiable risk factors for acute myocardial infarction (Culić, 2007). Additionally, psychosocial stress has been linked to an elevated risk of myocardial infarction (Charchar et al., 2024), while mental health conditions like depression are independent predictors of cardiovascular events (Li et al., 2023).

Research has also examined the role of certain exposures immediately preceding a myocardial event, highlighting factors such as intense physical activity (O'Keefe et al., 2012), extreme emotions (Li et al., 2023), and the use of substances like cocaine (Schwartz et al., 2010) or marijuana (Chami et al., 2019) as possible triggers for acute myocardial infarction.

Although extensive research has been conducted on the effects of regular alcohol consumption on the development of coronary heart disease, the effects of alcohol consumption immediately before coronary heart disease are still poorly understood. Some case reports in men suggest that acute alcohol consumption may be a significant trigger for acute myocardial infarction. (Parkinson et al., 2016; O'Keefe et al., 2014).

However, few studies have systematically investigated the role of alcohol exposure immediately before the onset of coronary heart disease symptoms. In contrast to light to moderate alcohol consumption, heavy drinking has been shown to increase mortality from all causes, including cardiovascular events. Acute and excessive alcohol intake is linked to the onset of acute arrhythmias and impaired ventricular function (O'Keefe et al., 2014; Tessitore et al., 2024).

Several mechanisms have been proposed to explain the immediate effects of excessive alcohol on the worsening of pre-existing coronary conditions (Kawano et al., 2010). These include heightened blood coagulation and a lowered threshold for ventricular fibrillation. While excessive alcohol consumption has been associated with elevated HDL levels, which are correlated with cardiovascular morbidity and mortality (O'Keefe et al., 2014; Piano et al., 2020; Piano et al., 2018), occasional heavy drinking has not demonstrated the same increase in HDL levels, which are linked to better cardiovascular outcomes.

Excessive alcohol intake is also linked to a higher risk of thrombosis, particularly following the cessation of a heavy drinking episode. This pattern appears to predispose individuals to structural changes in the myocardium and conduction system, along with lowering the threshold for ventricular fibrillation (Leong et al., 2014; Kawano et al., 2010).

Coronary vasospasm triggered by acute ethanol intoxication, along with a prothrombotic state and endothelial dysfunction, may be among the mechanisms responsible for acute coronary syndrome. Although the exact mechanisms by which alcohol induces coronary vasospasm are not fully understood, this effect can persist for up to 9 hours after excessive alcohol consumption, even when blood alcohol levels have returned to normal. Additionally, a decrease in plasma levels of prostaglandin F1α and cyclic guanosine monophosphate due to acute alcohol intoxication has been suggested to contribute to this phenomenon (Kawano et al., 2010; Lucas et al., 2005).

Several key factors are essential for accurately interpreting the health impacts of alcohol consumption, including how data was collected and analyzed, the quantity and concentration of alcohol consumed, the frequency of consumption, any specific drinking patterns, the type of alcohol consumed, and whether the study was prospective or based on aggregated data.

In medical practice, it is frequently observed that patients with cardiovascular conditions often also suffer from mental health issues. This connection increases the risk of cardiovascular morbidity and mortality, particularly among patients with depression. Individuals diagnosed with severe cardiovascular diseases, such as myocardial infarction, heart failure, or pulmonary thromboembolism, who also experience depression, face a greater risk of mortality within five years, even with proper treatment (Lane et al., 2000).

To understand how emotions and stress influence cardiovascular health, it is essential to know the neural circuits, neurochemical pathways, and the interactions between the brain and the

heart. The neural mechanisms that mediate emotional responses in the context of cardiovascular diseases are complex and involve interactions between various brain structures, neurotransmitters, and neuroendocrine systems.

The essential mechanisms that underline the importance of an integrative approach to treating cardiovascular diseases, considering not only physical factors but also emotional and psychological ones, include the limbic system, activation of the HPA axis, neurotransmitters, inflammation, and stress, connections between the brain and heart, and psychological impact.

The psychosomatic effects of alcohol consumption in patients with cardiovascular emergencies are mediated by complex neuroscientific mechanisms that involve both the central nervous system (CNS) and the cardiovascular system. Alcohol profoundly influences these two systems, causing dysregulations that can exacerbate or trigger acute cardiovascular issues such as hypertension, arrhythmias, heart failure, and even myocardial infarction.

Alcohol significantly affects the functioning of the autonomic nervous system, which regulates the activity of the heart and blood vessels. These changes can trigger or exacerbate a cardiovascular emergency. Thus, activation of the sympathetic nervous system can increase the risk of dangerous cardiac arrhythmias (e.g., atrial fibrillation or ventricular tachycardia). Alcohol inhibits the parasympathetic system, which normally helps to decrease heart rate and relax blood vessels. This can contribute to an imbalance between the sympathetic and parasympathetic systems, leading to uncontrolled increases in heart rate and blood pressure (Thomas H. Julian et al., 2020).

Alcohol alters the functioning of neurotransmitters in the brain, directly affecting psychosomatic and cardiovascular responses. It enhances the effects of GABA on the central nervous system (CNS), contributing to the states of relaxation and sedation observed during alcohol consumption. However, these effects can become dangerous with excessive consumption, leading to CNS depression, loss of consciousness, or even coma. In the long term, chronic alcohol consumption affects sensitivity to GABA, contributing to dependence and severe withdrawal symptoms (Dina N. Ali et al., 2024).

Alcohol inhibits the activity of glutamate, the main excitatory neurotransmitter, which contributes to the impairment of the brain's ability to respond appropriately to stimuli. This inhibition can lead to dysregulation of cardiovascular responses, including the mechanisms that control blood pressure and heart rate.

The hypothalamic-pituitary-adrenal (HPA) axis is activated in stressful situations. This leads to the release of hormones such as cortisol, which can affect the cardiovascular system by increasing blood pressure and heart rate. Chronic emotional stress can lead to dysfunctions of the HPA axis, contributing to cardiovascular conditions. Dysregulation of the HPA axis in alcoholism is associated with an increased susceptibility to depression, anxiety, and other mood disorders. Long-term disruption of the endocrine system can significantly affect the mental and emotional state of individuals dependent on alcohol (Assaker et al., 2021).

Chronic or excessive alcohol consumption increases oxidative stress and inflammation in the body, negatively affecting the vascular wall (endothelium) and contributing to the development of atherosclerosis, and instability of atherosclerotic plaques. It ultimately can trigger acute cardiac events such as myocardial infarction or stroke.

Alcohol also impacts the limbic system, a complex brain structure that plays a crucial role in regulating emotions, behavior, motivation, memory, and other fundamental cognitive functions. It is located deep within the brain and includes several interconnected structures, such as the hippocampus, amygdala, thalamus, hypothalamus, and other regions. Negative emotions or psychological stress induced by alcohol consumption can amplify cardiovascular responses. This is particularly dangerous in cases of cardiac emergencies, as stress and anxiety can intensify sympathetic activity and increase the risk of arrhythmias or hypertensive crises. (Assaker et al, 2021).

Consequently, alcohol consumption, especially in situations of cardiovascular emergencies, activates a series of neuroscientific mechanisms that increase the risk for the patient. The direct effects on the autonomic nervous system, neurotransmitters, and the hypothalamic-pituitary-adrenal (HPA) axis, along with emotional effects and oxidative stress, can lead to severe cardiovascular complications, including arrhythmias, hypertensive crises, and myocardial infarction. Therefore, managing alcohol consumption in patients with cardiovascular conditions or in emergencies is crucial.

Evaluating emotional distress profiles in patients experiencing cardiovascular emergencies can offer valuable insights into the psychological effects of these events and help guide appropriate care and support. Furthermore, several studies have highlighted the potential benefits of addressing the psychological impact of cardiovascular emergencies, showing improvements in both physical health outcomes and overall quality of life (Celano et al., 2018).

Emotional distress profiles are valuable tools for assessing the psychological impact of cardiovascular emergencies. These profiles typically evaluate symptoms of depression, anxiety, and PTSD in patients who have experienced a cardiovascular event. By identifying individuals at higher risk for psychological symptoms, healthcare providers can implement targeted interventions to improve mental health outcomes and overall patient care (Li et al., 2023; Webster et al., 2012).

Patients who suffer a heart attack have significantly higher rates of depression and anxiety, as well as an increased risk of developing post-traumatic stress disorder, compared to the general population (Frangogiannis, 2015; Celano et al., 2018). These findings highlight the need to consider the emotional and psychological impact of cardiovascular emergencies and to address these factors as part of comprehensive patient care.

Experiencing emotions is an essential part of human life, yet individuals differ in how frequently and intensely they experience them. Emotional affect is commonly categorized into two main types: positive affectivity and negative affectivity. These can be measured through retrospective questionnaires like PANAS, DES, and PANA-X, which assess both positive and negative emotional experiences (Watson et al., 1988).

Low levels of positive affect and high levels of negative affect are associated with negative emotions like sadness and anxiety. Emotional affect can be understood as having both broad dimensions and subdimensions, defined by specific emotions or moods that may persist over time (Watson et al., 1988).

2. Methods

This study aims to investigate the relationship between alcohol intoxication and cardiovascular emergencies, utilizing case data from the Emergency Department (UPU) of "Sfântul Ap. Andrei" Emergency Hospital in Galați. It also offers an overview of the psychological impact of cardiovascular emergencies, with a focus on emotional distress profiles. By addressing both physical and emotional factors, we seek to improve patient outcomes and enhance the overall quality of care provided for cardiovascular emergencies.

The impact of alcohol on the cardiovascular system varies depending on the amount consumed. While moderate consumption may offer some benefits, excessive intake is associated with numerous risks to heart health. With this understanding, we aim to analyze the effects of alcohol consumption on both cardiovascular and mental health among patients who presented to the Emergency Department of "Sf. Apostol Andrei" County Hospital in Galați, Romania.

The first study to provide insights into the psychological impact of cardiovascular emergencies is observational and cross-sectional. The sample size was calculated using Cochran's formula for an infinite population (1):

$$N_o = Z^2.p.(1-p) \quad (1)$$

e^2

where:

- N_o: Required sample size.
- Z-score, which corresponds to the desired confidence level. Common Z-scores include:
  - 1.96 for a 95% confidence level
  - 1.64 for a 90% confidence level
  - 2.576 for a 99% confidence level
  - **p**: Estimated proportion of the population that has the attribute of interest. If unknown, a common practice is to use p=0.5p = 0.5p=0.5 for maximum sample size.
  - **e**: Margin of error (also called the precision), which is the desired level of accuracy for the estimate.

Based on this formula, the sample size was calculated to be 385, as follows (2):

$$N_o = \frac{(1,96)^2.0,5.(1-0,5)}{(0,05)^2} = \frac{0,9604}{0,0025} \approx 384,16 \quad (2)$$

Justification for Sample Size: The sample size of 722 patients ensures sufficient statistical power to detect significant differences and associations within the data. This size allows for detailed subgroup analyses (e.g., by sex, age) and enhances the precision of estimates.

The sample comprises patients with cardiovascular emergencies at the Emergency County Hospital "Sf. Ap. Andrei" in Galați. This enhances the external validity of the study's results. Given the observational and cross-sectional design, the sample size is feasible and practical for the field and available research resources.

The final database included data from both observation sheets (pre-hospital medical records and emergency department presentation sheets) and a 39-item questionnaire designed to assess specific questions related to the emotional distress profile. This questionnaire was administered to patients experiencing cardiovascular emergencies who were admitted to the Emergency County Hospital "Sf. Ap. Andrei" in Galați between January 1, 2015, and December 31, 2019. The resulting summary tables comprised characteristics of 722 patients, aged 19 to 94 years.

The study utilized a systematic sampling approach, selecting each patient who met the inclusion criteria. This method ensures that the sample is random and representative while being practical for a hospital setting.

The methodology addresses several key aspects, including study design, data collection, sampling design, bias control, validity, and reliability.

Inclusion Criteria:

- Patients diagnosed with cardiovascular emergencies (e.g., acute myocardial infarction, stroke).
- Adult patients (aged ≥18 years).
- Patients who provided informed consent to participate in the study.
- Patients admitted to the Emergency County Hospital "Sf. Ap. Andrei" in Galați during the study period.
- Patients capable of understanding and completing the questionnaire.

Exclusion Criteria:

- Patients aged <18 years.
- Patients with incomplete or missing data in the questionnaire.
- Patients with severe cognitive impairments or mental disorders that hindered reliable completion of the questionnaire.

- Patients who did not provide informed consent.
- Patients who were not hospitalized during the study period.

Statistical analysis was performed SPSS software v.26 and Microsoft Excel 2019. The Profile of Emotional Distress (PDA) scale contains 39 special items designed to identify and assess functional, dysfunctional negative, and positive emotions (Appendix 1).

These items facilitate the calculation of an overall emergent score, which is determined by summing the scores of all items. In addition, separate scores can be calculated for functional negative affect, dysfunctional negative affect, anxiety, sadness, and depression. For direct ratings, ratings range from "not at all" (1) to "very much" (5), while for reverse ratings, ratings are reversed and range from "not at all" (5) to "Will be in the range of " very".It was used in this study because it effectively measures both negative and positive functional emotions categorized as “worry/anxiety” and “sadness/depression”.

This scale allows you to calculate not only an overall stress score but also individual scores for negative emotions such as 'worry', 'anxiety', 'sadness', and 'depression'.

To control for bias in this study, several measures were implemented. A systematic sampling method was employed to ensure that each eligible patient had an equal opportunity to be included in the study. This approach minimized the risk of selection bias and helped ensure a representative sample of the target population.

The questionnaire was administered in a controlled hospital environment, minimizing the likelihood of response bias. Patients completed the questionnaire in the presence of trained staff who could clarify any misunderstandings and ensure accurate responses.

Standardized questionnaires with validated items were used to maintain consistency in data collection. Employing both direct and reverse scoring for the items helped reduce the risk of information bias, ensuring that the measurements accurately reflect the psychological impact of cardiovascular emergencies.

To ensure high internal validity, the study accounted for potential confounding variables, including age, gender, and comorbidities. Statistical tests, such as chi-square tests, were utilized to examine the relationship between these variables and levels of distress, confirming that the observed effects were attributable to the variables of interest.

Regarding external validity, which pertains to the generalizability of the study findings to other populations and settings, the sample size of 722 patients—characterized by a diverse demographic profile—was considered sufficiently large to extend the findings to a broader population of patients experiencing cardiovascular emergencies. Conducting the study in a real-world hospital setting further enhances the applicability of the results to similar healthcare environments.

To ensure high reliability, the Profile of Affective Distress (PDA) questionnaire—a validated instrument recognized for its reliability in measuring affective distress—was utilized. The consistency of this instrument has been confirmed in prior research. Furthermore, healthcare professionals administering the questionnaire received training to guarantee uniformity in data collection procedures, thereby minimizing variations in how the questionnaire was presented and completed. Data were meticulously recorded and analyzed using SPSS v. 26 and Microsoft Excel 2019, ensuring accuracy and consistency in the statistical evaluation.

The second study examined the relationship between alcohol intoxication and cardiovascular emergencies, focusing on cases treated in the Emergency Department of Galați Emergency Hospital “Saint Apostle Andrew.”

Out of a total of 3,346 patients with a primary diagnosis of alcohol intoxication, 3,145 were excluded from the study for various reasons: 853 patients had their blood alcohol levels tested at the request of the police due to involvement in traffic incidents; 86 patients left the Emergency Department voluntarily without medical consent; 1,024 patients had no additional medical complaints; and 1,182 presented with medical issues unrelated to cardiac pathology alongside acute ethanol intoxication.

The evaluation of sex distribution within the study group revealed a higher prevalence of males (72.85%) compared to females (27.15%). The age range of participants spanned from a minimum of 19 years to a maximum of 94 years. Socio-demographically, the study cohort was predominantly composed of individuals from urban areas (60.67%), with only 39.33% coming from rural backgrounds.

The objective of this study was to assess the level of emotional distress among patients presenting with cardiovascular emergencies. To achieve this, the application of the PDA questionnaire was evaluated based on three parameters: total distress score, functional negative emotions, and dysfunctional negative emotions.

We calculate the total distress score, from the PDA questionnaire. We found that the majority of subjects experienced a high level of distress, with 92.2% reporting high distress levels, while 7.8% indicated very high distress levels.

The prevalence of dysfunctional negative emotions within the study group was also assessed, revealing a nearly equal distribution between high levels (50.1%) and very high levels (49.9%) of dysfunctional negative emotions.

In terms of functional negative emotions, the study found a high prevalence, with 81% of participants reporting a high level of functional negative emotions. Additionally, 15.1% of subjects exhibited a moderate level of functional negative emotions, while only 3.9% reported very high levels.

These findings underscore the significant emotional distress experienced by patients with cardiovascular emergencies, highlighting the need for integrated psychological support in clinical settings.

Further, we explored the association between distress scores and the gender of the subjects to determine whether specific levels of distress were more frequently associated with males or females. The results indicated a higher prevalence of high distress levels among men (67.26%) compared to women (24.96%). Additionally, men showed a greater prevalence of very high distress levels (5.68%).

Men also reported higher levels of functional negative emotions, with 59.08% experiencing high levels, while this figure was only 21.91% for women. Furthermore, men had the highest prevalence of moderate (10.95%) and very high (2.91%) levels of functional negative emotions compared to women (22.8%).

A symmetric distribution was observed among men regarding the prevalence of high (36.36%) and very high (36.61%) levels of dysfunctional negative emotions. Notably, no very low levels of negative emotions were reported among male subjects.

Neuronal and physiological responses to stress vary significantly between men and women, influenced by hormonal factors and structural differences in the brain, which also affect cardiovascular responses to stress. Sexual hormones play a major role in how the brain responds to stress. Estrogen, predominantly found in women, has a protective effect against stress by reducing the reactivity of the hypothalamic-pituitary-adrenal (HPA) axis. In contrast, testosterone and other hormones present in men can amplify the fight-or-flight response mediated by the HPA axis and the sympathetic nervous system. During stress, women tend to have a more pronounced response in the limbic system, the part of the brain responsible for processing emotions, making them more vulnerable to anxiety and depression. In contrast, men tend to activate areas associated with motor and aggressive responses more intensely. (Jill et al., 2010).

In the long term, women are more susceptible to developing anxiety and depression-related disorders, partly due to the continuous activation of the limbic system and the HPA axis. On the other hand, men are more prone to stress-induced cardiovascular diseases, such as hypertension and coronary heart disease (Dart et al., 2002).

To assess whether there was a significant relationship between the presented variables, specific statistical tests were conducted. The chi-square test of independence was employed to

investigate the dependence relationship between the subjects' gender and their overall level of distress, with chi-square values interpreted using an alpha value of 0.05.

The results did not indicate any statistically significant relationship between the gender of the subjects and their total distress level (χ^2 = .002, CI = 95%, p = .964). Similarly, no statistically significant relationship was found between gender and functional negative emotions (χ^2 = .072, CI = 95%, p = 0.965) or dysfunctional emotions (χ^2 = .123, CI = 95%, p = 0.725).

While men displayed higher overall distress levels and functional negative emotions, the statistical analysis did not indicate significant relationships between gender and the levels of distress or emotional states. This suggests that, although trends may be observed, they do not result in statistically significant differences within the study population.

Table 1. Correlation between subjects' gender and distress and negative emotion scores

Type of level	Male	Female
Distress		
High level	67.26%	24.96%
Very High level	5.68%	2.1%
Functional negative emotions		
Medium level	10.95%	4.16%
High level	59.08%	21.91%
Very high level	2.91%	0.99%
Dysfunctional negative emotions		
High level	36.24%	13.86%
Very high level	36.61%	13.19%

Two relationships were identified with p-values close to the desired threshold, indicating a potential dependent relationship. These are between the primary diagnosis and functional negative emotions (χ^2 = 33.126, CI = 95%, p = 0.06) and the presence of other cardiac pathologies and functional negative emotions (χ^2 = 132.425, CI = 95%, p = 0.055).

To further explore these relationships, effect sizes (Cramér's V) and confidence intervals for significant findings were calculated. The results indicated a Cramér's V value of 0.215, suggesting a small to medium effect size. The 95% confidence interval for Cramér's V ranged from 0.159 to 0.271. This small to medium effect size suggests a potential relationship between the primary diagnosis and the levels of functional negative emotions experienced by patients. Specifically, certain diagnoses may be associated with higher levels of functional negative emotions, such as worry and anxiety. This could be attributed to the severity or nature of the specific cardiovascular condition affecting the patients' psychological responses.

The analysis also examined the relationship between the presence of other cardiac pathologies and functional negative emotions. Here, Cramér's V was found to be 0.303, indicating a medium effect size. The 95% confidence interval for Cramér's V ranged from 0.250 to 0.356. This medium effect size suggests a significant relationship between the presence of additional cardiac conditions and higher levels of functional negative emotions. Patients with multiple cardiac issues may experience increased functional negative emotions due to the combined stress and anxiety of managing several health conditions simultaneously.

Table 2. Chi-Square Tests Between Subjects' Levels of Distress and Negative Emotions Observed in the Group by Gender, Primary Diagnosis, and Presence of Other Cardiac, Neurological, or Psychiatric Pathologies

Chi-square Test			
Gender and Interpretation of total distress score	Pearson Chi-Square	Degree of freedom	Asymptotic Significance (2-sided)
Gender Interpretation of total distress score	.002	1	.964
Gender and Interpretation of functional negative emotions	.072	2	.965
Gender and Interpretation of dysfunctional negative emotions	.123	1	.725
Main diagnosis and Interpretation of dysfunctional negative emotions	4.575	11	.950
Main diagnosis and Interpretation of functional negative emotions	33.126	22	.060
Main diagnosis and Interpretation of total distress score	11.283	11	.420
Other cardiac pathologies and Interpretation of total distress score	45.115	54	.800
Other cardiac pathologies and Interpretation of FNE	132.425	108	.055
Other cardiac pathologies and Interpretation of DNE	56.725	54	.374
Other neurological pathologies and Interpretation of FNE	6.382	8	.605
Other neurological pathologies and Interpretation of DNE	6.512	8	.590
Other psychiatric pathologies and Interpretation of FNE	3.000	1	.083
Other psychiatric pathologies and Interpretation of DNE	.750	1	.386

The chi-square test indicated a potential relationship between the primary diagnosis and functional negative emotions ($p = 0.060$). The effect size, with a Cramér's V of 0.215, suggests a small to medium relationship. This finding implies that certain cardiovascular diagnoses may be associated with higher levels of functional negative emotions, such as worry and anxiety. The severity or specific nature of the cardiovascular condition could contribute to the increased psychological stress observed in these patients.

Similarly, the presence of other cardiac pathologies showed a potential relationship with functional negative emotions, with a p-value of 0.055. The medium effect size, indicated by a Cramér's V of 0.303, suggests a stronger association compared to the primary diagnosis. This finding highlights that patients with multiple cardiac conditions are more likely to experience increased functional negative emotions. The combined stress and anxiety from managing multiple health issues can be a significant factor contributing to higher levels of psychological distress in these patients.

Among the 201 patients included in the study, 134 were men, resulting in a male-to-female ratio of 2:1 (Figure 1).

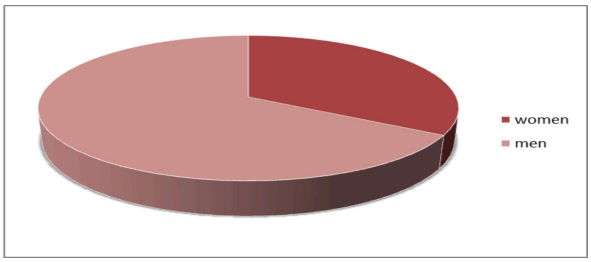

Figure 1. Classification of patients according to gender

The age range of the patients was 18 to 87 years, with a mean age of 42 years. The age distribution of the patients showed a marked decline towards middle age groups, with 49% (n = 98) falling between the ages of 41 and 60 (Figure 2).

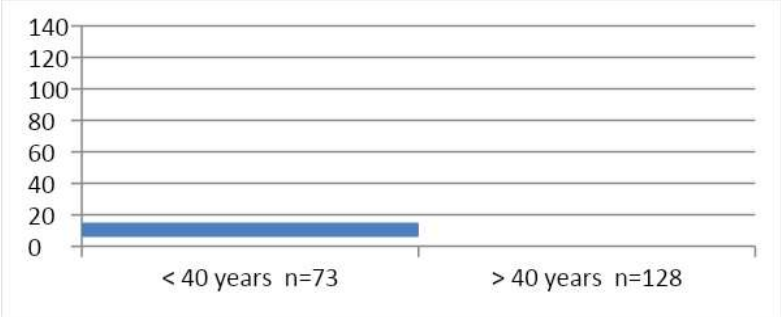

Figure 2. Classification of patients included in the study according to age

Most cases (87%) were transported to the emergency department by ambulance, 1.8% by relatives, 4.3% by police, and 6.8% by a mobile emergency team (including an emergency physician and at least one nurse capable of providing advanced life support) (Figure 3). Patients brought in by ambulance had higher blood alcohol levels compared to those transported by relatives.

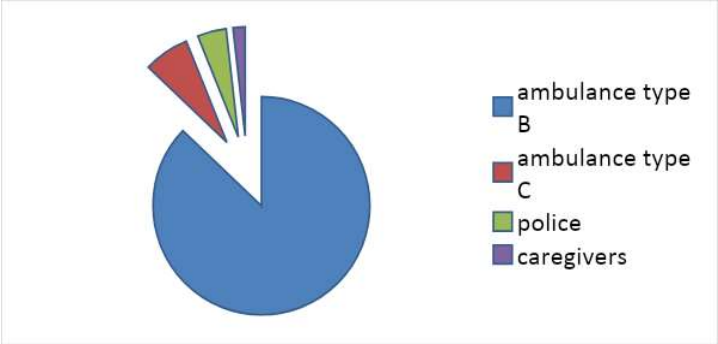

Figure 3. Mode of presentation in the emergency department

The presentations of patients with alcohol intoxication were analyzed by month, day of the week, and time of day. There was an even distribution of presentations throughout the day, with only two hours between 7 and 9 a.m. showing fewer patients. Additionally, no significant daily or monthly differences in patient attendance were noted.

Approximately 47% (n = 94) of patients presented with retrosternal pain, describing it as pressure-like and radiating bilaterally to the arms. About 33% of patients reported pleuritic pain (Figure 4).

The average heart rate (HR) of the patients was 92 beats per minute ± 24 beats per minute. The average systolic blood pressure (SBP) was 113 ± 25 mmHg, while the average diastolic blood pressure (DBP) was 73 ± 12 mmHg.

The majority of patients presenting with chest pain and acute ethanol intoxication in the emergency department were smokers (73%; n = 149). The most common comorbidities among these patients were hypertension (35%; n = 74) and diabetes mellitus (31%; n = 56).

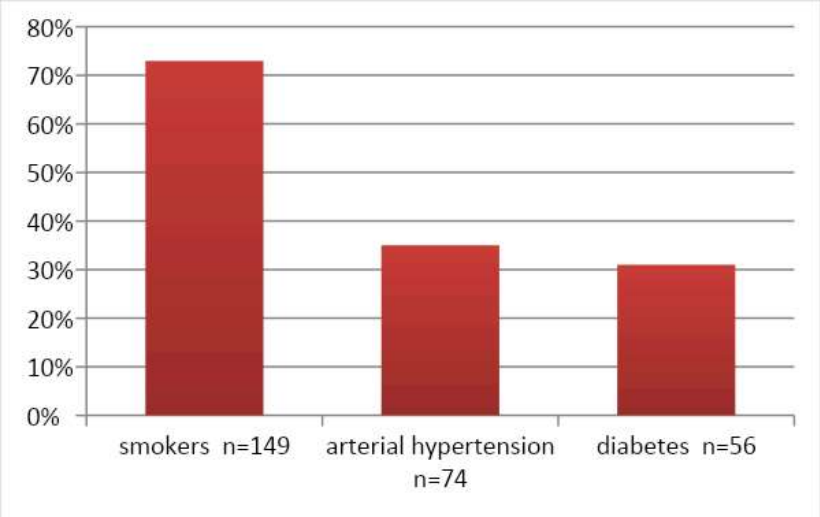

Figure 4. Associated comorbidities

Approximately 53% (n = 107) of patients had normal sinus rhythm on ECG upon admission; 28% (n = 56) presented with ST-elevation myocardial infarction (STEMI) on ECG, while 19% (n = 38) had acute coronary syndrome without ST elevation (NSTEMI) at presentation.

Most patients (82%; n = 165) were attended to by medical staff within five minutes of arrival. The majority of patients (89%; n = 179) underwent ECGs within 5-10 minutes of presenting to the emergency department, and approximately 97% (n = 195) received Troponin I results within 15-20 minutes of arrival. Six patients (3%) were thrombolysed in the emergency department, all of whom were diagnosed with STEMI and transported by ambulance. Four of these thrombolyzed patients were over 40 years old and male. All were admitted to the cardiology department and underwent percutaneous coronary intervention (PCI). Tragically, eight patients (4%) died within 24 hours of admission.

Around 11% (n = 22) of patients were admitted to the intensive care unit (ICU), while about 43% (n = 86) were hospitalized in the general ward. Four percent (n = 8) died in the emergency department, and 39% (n = 78) were discharged from the emergency department.

Clinico-epidemiological factors significantly associated with 24-hour mortality included male sex, ambulance transport, and comorbidities such as coronary artery disease and congestive heart failure. Airway threats, hypoxia, and hypotension were prevalent among most participants who died within 24 hours.

There is a complex relationship between psychiatric disorders, chronic alcohol consumption, and cardiovascular diseases, with each influencing one another in a way that can exacerbate the overall health status of the affected individual. Chronic alcohol consumption is often associated with psychiatric disorders such as depression, anxiety, and personality disorders. Individuals suffering from mental health disorders tend to use alcohol as a coping mechanism, and in turn, alcohol exacerbates psychological symptoms. Additionally, alcohol consumption can worsen psychiatric disorders because it interferes with neurotransmitters such as serotonin and dopamine, contributing to emotional instability and increasing the risk of suicide and risky behaviors. (Jill et al., 2010).

Psychiatric disorders increase alcohol consumption, and alcohol, in turn, worsens cardiac and mental health issues. Cardiovascular diseases further exacerbate psychiatric symptoms, leading to a downward spiral of overall health decline. This complex relationship between the three components creates a very high risk of premature mortality (Wang et al., 2007).

A history of chronic alcohol consumption was reported in 83% of all included patients, and 60.3% had a history of psychiatric disorder or prior psychiatric hospitalization. Among these patients, 109 (54%) had both chronic alcohol consumption and a history of psychiatric disorders.

Additionally, 38 patients (19%) had multiple visits to the emergency department during the study period, averaging 2.6 visits each, with a range from 2 to 10 visits. The highest rates of recurrence were observed in the age groups of 41-50 and 51-60 years.

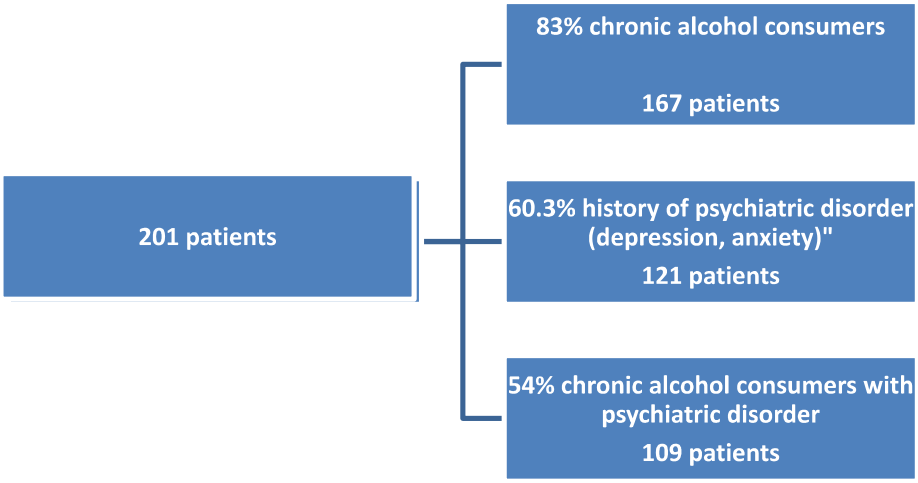

Figure 5. Prevalence of Chronic Alcohol Consumption and Psychiatric Disorders

At the time of the emergency visit, 62 patients (31%) had sustained a head injury, and 92 patients (46%) had injuries to their extremities. Out of the 3,346 patients, 1,104 (33.9%) were immediately referred for psychiatric care within the emergency department.

Alcohol can cause arrhythmias, particularly atrial fibrillation, which is a heart rhythm disorder characterized by irregular heartbeats. This condition can be triggered by excessive alcohol consumption and is associated with an increased risk of stroke and other cardiovascular complications. Long-term alcohol consumption can lead to alcoholic cardiomyopathy, a condition in which the heart muscle becomes weak and fails to function effectively. This can result in heart failure, arrhythmias, and even sudden cardiac death (Assaker et al., 2021).

Among the 201 patients with acute ethanol intoxication included in the study, atrial fibrillation was identified in 26 patients. Of these, 12 had chronic atrial fibrillation, with 7 being inadequately treated. For 9 patients, atrial fibrillation was diagnosed for the first time. Additionally, three patients experienced episodes of non-sustained ventricular tachycardia, while two patients had sustained ventricular tachycardia, which was successfully converted to sinus rhythm following external electrical shock.

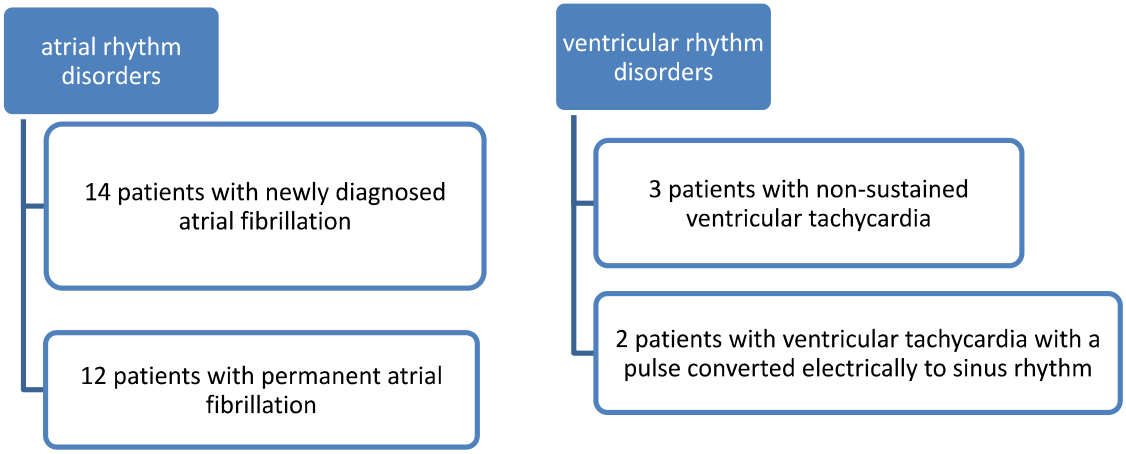

Figure 6. Cardiac Rhythm Disorders Associated with Alcohol Consumption

3. Discussions

Studies have consistently demonstrated that patients experiencing cardiovascular emergencies encounter significant levels of emotional distress, which can adversely affect their overall health outcomes. Our findings align with previous research indicating elevated distress levels among patients with cardiovascular conditions (Celano et al., 2016; Coughlin, 2011; Celano et al., 2018).

Interestingly, we observed notable discrepancies in distress levels between male and female patients, revealing that men were more likely to experience high levels of distress and functional negative emotions compared to their female counterparts. This disparity has important clinical implications, highlighting the need for tailored interventions that consider gender differences in emotional responses to cardiovascular events. These findings resonate with prior studies that have reported gender differences in emotional stress among cardiovascular patients (Bjerkeset et al., 2005).

Understanding these differences is crucial for healthcare providers, as it may inform the development of targeted psychological support strategies to enhance patient care and improve outcomes for both men and women facing cardiovascular emergencies. Further research is warranted to explore the underlying factors contributing to these gender disparities in emotional distress and to develop interventions that effectively address the specific needs of these populations.

In our study, a significant difference in distress levels was observed between genders: 67.26% of men reported high levels of distress, compared to only 24.96% of women. Moreover, very high levels of distress were noted in 5.68% of men versus 2.1% of women. This disparity suggests that gender-specific factors may play a role in shaping psychological responses to cardiovascular emergencies, potentially guiding the development of tailored interventions aimed at alleviating emotional distress in these populations.

Understanding these variations in emotional distress between genders can enhance clinical practices and interventions. By customizing support services to meet the distinct needs of male and female patients, healthcare providers can improve overall care and health outcomes. Future research should delve deeper into the underlying causes of these disparities and explore targeted strategies to effectively mitigate distress in both groups.

Several factors may contribute to the observed gender discrepancies in emotional distress levels. Cultural and social norms often dictate that men should present themselves as strong and stoic, which can exacerbate their psychological distress. Consequently, men might be less inclined to seek emotional support or engage in discussions about their feelings, resulting in higher reported levels of suffering.

Biological factors, including hormonal differences, could also play a role in shaping stress responses. For instance, testosterone is linked to aggressive and risk-taking behaviors, potentially influencing how men experience and report distress. In contrast, women are generally more likely to seek medical assistance and emotional support, which may help mitigate the levels of distress they experience. This proactive approach to healthcare can contribute to lower reported suffering among female patients (Lane et al., 2000; Bjerkeset et al., 2005).

The observed gender differences in distress levels highlight the necessity for tailored interventions. For male patients, strategies should focus on promoting emotional expression and providing accessible mental health support that aligns with their coping mechanisms. This can involve creating environments where men feel safe to discuss their feelings and experiences. For female patients, it's essential to ensure ongoing support and encourage proactive health-seeking behaviors, fostering a culture where women feel empowered to address their emotional needs.

Healthcare providers should incorporate regular psychological assessments for distress in male patients experiencing cardiovascular emergencies. Acknowledging the higher likelihood of

suffering among men can lead to timely mental health interventions, ultimately improving overall patient outcomes.

Further research is warranted to delve into the mechanisms underlying these gender differences in distress levels. Longitudinal studies could shed light on how emotional distress evolves and the long-term effects of gender-specific interventions on both psychological and physical health outcomes.

Regarding age distribution, the study found that most patients fell within the 50-75 age range, which aligns with the typical demographic affected by cardiovascular diseases (Gheini et al., 2022). This finding underscores the importance of targeted health strategies for this age group, particularly in recognizing the emotional and psychological aspects associated with cardiovascular emergencies. By addressing these factors, healthcare systems can enhance care for older adults and improve overall health outcomes in this vulnerable population.

The findings from our study regarding the prevalence of emotional distress in patients with cardiovascular emergencies corroborate existing literature on the psychological challenges faced by these patients. For instance, Garcia et al. found that a substantial 85% of patients with acute coronary syndrome experienced psychological distress, with anxiety being the predominant concern (Garcia et al., 2023). Similarly, Tully et al. reported that 69% of individuals who suffered an acute myocardial infarction experienced psychological distress, highlighting depression as the most frequently reported type (Tully et al., 2014).

Interestingly, while our study revealed significant relationships between gender and emotional distress, the meta-analysis conducted by Grace et al. suggested no gender differences in anxiety and depression among patients with coronary artery disease (Grace et al., 2015). This discrepancy indicates that while some studies may find a lack of difference, our research highlights the importance of understanding gender-specific emotional responses to cardiovascular emergencies.

Additionally, our findings regarding the association between primary diagnosis and functional negative emotions, along with the presence of other cardiac pathologies and functional negative emotions, are consistent with research by Taylor et al., who identified a correlation between disease severity and psychological distress in patients with cardiovascular conditions (Taylor et al., 2022). This relationship emphasizes the need for comprehensive care that addresses both physical and emotional health, particularly in patients with more severe or complex cardiovascular issues.

Overall, these findings underscore the critical importance of integrating psychological assessments and interventions into the management of patients presenting with cardiovascular emergencies. By recognizing the emotional distress experienced by these individuals, healthcare providers can develop more effective, holistic treatment plans that enhance overall patient outcomes.

While light to moderate alcohol consumption has been associated with some protective and potentially beneficial effects on cardiovascular health, our study illustrates a U-shaped (non-linear) relationship between alcohol consumption levels and the risk of acute coronary syndrome. This finding indicates that excessive alcohol intake is correlated with increased morbidity and mortality due to cardiac conditions.

The coexistence of harmful habits, such as concurrent alcohol use and smoking, is prevalent in the general population. This underscores the necessity for public health initiatives aimed at educating individuals about the detrimental impact of excessive alcohol consumption on the risk of acute myocardial infarction. Raising awareness could play a significant role in reducing the incidence of this life-threatening condition.

Although additional research is needed to further elucidate the acute harmful effects of alcohol on the onset of acute myocardial infarction and cardiac rhythm disorders, it remains crucial for the population to adhere to safe drinking guidelines. These guidelines suggest a limit of 10–30 grams of alcohol per day for men and 10–20 grams for women, as endorsed by various European

societies and organizations dedicated to cardiovascular disease prevention (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2024). However, establishing clear recommendations for alcohol consumption presents challenges and extreme caution is warranted in defining acceptable limits.

In conclusion, the prevalence of psychological distress among patients with cardiovascular diseases is significant and has been reinforced by recent studies. Depression is estimated to be three times more common in cardiac patients compared to the general population, with anxiety levels being even more pronounced in those experiencing acute cardiac events, such as myocardial infarction and angina, or requiring surgical interventions. The emotional ramifications of these conditions extend not only to the patients themselves but also to their families, highlighting the critical need for comprehensive care that addresses both physical and mental health aspects (Hughes et al., 2022).

The findings of this study underscore the significant prevalence of emotional distress in patients experiencing cardiovascular emergencies, with men demonstrating a higher likelihood of enduring severe suffering and functional negative emotions. This highlights a critical area of concern in the management of cardiovascular patients, suggesting that emotional well-being must be prioritized alongside physical health.

In clinical practice, specialists involved in cardiac rehabilitation have a pivotal role in addressing the psychosocial risk factors that these patients face. Effective psychosocial management should be an integral aspect of outpatient cardiac rehabilitation programs. This management includes comprehensive psychosocial assessments, the implementation of psychotherapeutic interventions, consistent outcome measurement, and coordinated care among health professionals. However, the inconsistent availability of behavioral health specialists poses a significant barrier to this integration, as the literature does not always provide clear, effective intervention tools (Hughes et al., 2022).

Given the heightened vulnerability of chronic cardiovascular patients to anxiety and depression, routine screening for these conditions is essential. High-quality medical practice necessitates adherence to established guidelines, such as those recommending screening for the three primary symptoms of depression—sadness, lack of energy, and loss of interest or pleasure—as outlined in the International Classification of Diseases, 10th Revision (ICD-10) (ICD-10 Version, 2019).

The medical literature advocates for the use of the "yes/no" version of the two-question Patient Health Questionnaire (PHQ-2), which has been recognized as one of the simplest and most effective tools for identifying depressive disorders in primary care settings according to the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV). The American Heart Association (AHA) and the American Psychiatric Association (APA) guidelines specifically recommend PHQ-2 screening for all patients diagnosed with coronary artery disease. A positive result from this screening can lead to the initiation of therapeutic interventions, which might otherwise have been overlooked without such screening (Patient Health Questionnaire [PHQ-9 & PHQ-2]).

Incorporating these screening measures into routine care can facilitate early identification of psychological distress, ultimately leading to improved patient outcomes and better overall management of cardiovascular health.

4. Conclusions

In conclusion, depression linked to cardiovascular emergencies is prevalent yet frequently underdiagnosed and undertreated. Healthcare providers must pay careful and appropriate attention to the psychological suffering experienced by these patients, as addressing mental health is integral to cardiovascular recovery. Effective management of emotional distress can significantly enhance patients' ability to adapt to lifestyle changes and improve their overall quality of life.

Psychosocial interventions should be made available to all patients with cardiovascular diseases. These interventions can include:

- **Counseling for Stress Management**: Providing patients with tools and strategies to cope with stress can help mitigate emotional distress and promote mental well-being.
- **Creating a Supportive Environment**: Fostering an environment that encourages open communication about mental health can empower patients to seek help and share their experiences.
- **Education on Exercise Programs**: Informing patients about the benefits of physical activity and encouraging them to participate in structured exercise programs can not only improve cardiovascular health but also enhance mood and reduce symptoms of depression.

By integrating these psychosocial interventions into standard care practices, healthcare professionals can promote comprehensive recovery strategies that address both the physical and psychological aspects of cardiovascular health, ultimately leading to better patient outcomes and enhanced quality of life.

5. Limitations of the Study:

- The cross-sectional design of the study limits the ability to draw causal inferences about the relationship between cardiovascular emergencies and emotional suffering.
- Conducting the study at a single hospital may limit the generalization of the results to other settings or populations.
- Although measures were taken to minimize response bias, the self-reported nature of the questionnaire could introduce some distortion in responses.
- While the sample size was large, the study's conclusions may not be generalizable to populations outside the specific demographic and geographic context of the hospital.

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Annexx 1

To assess your stress level over the past 2 weeks, please complete the following questionnaire.

Age: _____
Gender: F/M
Initials: _____
Environment: Urban/Rural
Below is a list of words that describe emotions you may experience in different situations. For each word, mark the response that fits by placing an "X" on the answer sheet.
In the past 2 weeks, you have felt…

PDA Questionnaire

Number	Type of emotion	Very much	Much	Medium	Very little	Not at all
1.	Optimist	Not at all	Very little	Medium	Much	Very much
2.	Tense	Not at all	Very little	Medium	Much	Very much
3.	Sad	Not at all	Very little	Medium	Much	Very much
4.	Melancholic	Not at all	Very little	Medium	Much	Very much
5.	Cheerful	Very much	Much	Medium	Very little	Not at all
6.	Enthusiastic	Not at all	Very little	Medium	Much	Very much
7.	Worried	Not at all	Very little	Medium	Much	Very much
8.	Bitter	Very much	Much	Medium	Very little	Not at all
9.	Happy	Very much	Much	Medium	Very little	Not at all
10.	Well-disposed	Not at all	Very little	Medium	Much	Very much
11.	Anxious	Not at all	Very little	Medium	Much	Very much
12.	Despondent	Very much	Much	Medium	Very little	Not at all
13.	Joyful	Not at all	Very little	Medium	Much	Very much
14.	Concerned	Very much	Much	Medium	Very little	Not at all
15.	Flights	Not at all	Very little	Medium	Much	Very much
16.	Scared	Very much	Much	Medium	Very little	Not at all
17.	Content	Not at all	Very little	Medium	Much	Very much
18.	Annoyed	Not at all	Very little	Medium	Much	Very much
19.	Stubborn	Very much	Much	Medium	Very little	Not at all
20.	Satisfied	Not at all	Very little	Medium	Much	Very much
21.	Saddened	Not at all	Very little	Medium	Much	Very much
22.	Terrified	Not at all	Very little	Medium	Much	Very much
23.	Nervous	Very much	Much	Medium	Very little	Not at all
24.	Excited	Not at all	Very little	Medium	Much	Very much
25.	Useless	Not at all	Very little	Medium	Much	Very much
26.	Grieving	Not at all	Very little	Medium	Much	Very much
27.	Alarmed	Not at all	Very little	Medium	Much	Very much
28.	Panicked	Not at all	Very little	Medium	Much	Very much
29.	Angry	Not at all	Very little	Medium	Much	Very much
30.	Distraught	Very much	Much	Medium	Very little	Not at all
31.	Jovial	Not at all	Very little	Medium	Much	Very much
32.	Desperate	Very much	Much	Medium	Very little	Not at all
33.	Dynamic	Not at all	Very little	Medium	Much	Very much
34.	Restless	Not at all	Very little	Medium	Much	Very much
35.	Frightened	Very much	Much	Medium	Very little	Not at all
36.	Full of vitality	Not at all	Very little	Medium	Much	Very much
37.	Disappointed	Not at all	Very little	Medium	Much	Very much
38.	Hopeless	Not at all	Very little	Medium	Much	Very much
39.	Depressed	Not at all	Very little	Medium	Much	Very much

Annex 2
Cut-off Points for Affective Dysfunction Profile

	Total PDA	
Class	Description	Cut-off
I	Very low level of distress	≤ 28
II	Low level of distress	29-39
III	Medium level of distress	40-56
IV	High level of distress	57-86
V	Very high level of distress	≥ 87
	Dysfunctional PDA	
I	Very low level of dysfunctional negative emotions	≤ 14
II	Low level of dysfunctional negative emotions	15-17
III	Medium level of dysfunctional negative emotions	18-25
IV	High level of dysfunctional negative emotions	26-42
V	Very high level of dysfunctional negative emotions	≥ 43
	Functional PDA for women	
I	Very low level of functional negative emotions	≤ 15
II	Low level of functional negative emotions	16-22
III	Medium level of functional negative emotions	23-31
IV	High level of functional negative emotions	32-43
	Functional PDA for men	
I	Very low level of functional negative emotions	≤ 14
II	Low level of functional negative emotions	15-22
III	Medium level of functional negative emotions	23-30
IV	High level of functional negative emotions	31-43
V	Very high level of functional negative emotions	≥ 43