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Research paper

Exploring The Intersection: Depression Social Functioning and Unexplained Chest Pain in Adolescence

Dr. Yedida Sravya [1] *, Dr. K. Dinesh [1], Dr. K. Rangasamy [2]

[1] Post Graduate Student Department of pediatrics, Vinayaka mission's Kirupananda Variyar medical college and hospitals, Vinayaka mission's Research foundation (DU), salem, Tamilnadu
[2] Professor and HOD Department of pediatrics, Vinayaka mission's Kirupananda Variyar medical college and hospitals, Vinayaka mission's Research foundation (DU), salem, Tamilnadu
**Corresponding author E-mail: rimmi.aktu.edu@gmail.com*

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Abstract

Background: Adolescence represents a critical developmental stage marked by complex physical, emotional, and social changes. Among the several health concerns encountered during this period, unexplained chest pain (UCP) remains a significant issue, often leading to anxiety for both adolescents and their families. While cardiac causes dominate the differential in adults, adolescent chest pain frequently involves psychosomatic, functional, and psychological factors, including depression and social dysfunction.
Aim and Objective: The present study aimed to examine the association between unexplained chest pain, depression, and social functioning in adolescents, and to identify contributing somatic and psychosocial factors that may affect their overall well-being.
Materials and Methods: This cross-sectional observational study was conducted over six months in the Department of Paediatrics, VMKVMCH, Salem. A total of 200 adolescents aged 10–12 years presenting to the pediatric OPD with unexplained chest pain were enrolled after obtaining informed consent and ethical clearance. After ruling out organic causes through history, clinical examination, ECG, chest X-ray, and relevant investigations, participants underwent HEADSSS assessment followed by Paediatric Quality of Life Inventory (PedsQL) scoring. Adolescents with poor quality of life scores were further assessed by a clinical psychologist for depression and anxiety. Data were analyzed using SPSS version 29.0.
Results: Among the 200 adolescents, a considerable proportion demonstrated significant depression and impaired social functioning associated with unexplained chest pain. Additional somatic complaints such as sleep disturbances, headaches, and stress factors were also commonly identified. Social domains including academic performance, peer relationships, and family functioning were notably affected.
Conclusion: Unexplained chest pain in adolescents is frequently associated with depression and impaired social functioning, significantly impacting their psychological well-being. Comprehensive psychosocial assessments like HEADSSS and structured evaluations such as PedsQL are essential for early identification and holistic management. Addressing both physical and emotional dimensions is critical in improving outcomes and resilience among adolescents experiencing UCP.

Keywords: *Adolescence; Unexplained Chest Pain; Depression; Social Functioning; HEADSSS; Paediatric Quality of Life Inventory.*

1. Introduction

Adolescence is a complex developmental phase characterized by significant biological, psychological, emotional, and social transformations. During this transitional stage, individuals face numerous physical and mental health challenges as they navigate the path from childhood to adulthood [1]. Among the various medical complaints encountered in adolescence, chest pain represents a particularly distressing and frequently reported symptom. Although often benign, unexplained chest pain (UCP) generates substantial anxiety for adolescents and their families, prompting repeated clinical consultations and extensive diagnostic evaluations [2].
Unlike adults, where chest pain is often immediately associated with cardiac etiologies, the origin of chest pain in adolescents is multifactorial. While cardiac causes do exist, they are comparatively rare in this population [3]. Non-cardiac factors such as musculoskeletal disorders, respiratory issues, gastrointestinal reflux, and importantly, psychosomatic and psychological factors play a far more dominant role. In many adolescents, no clear organic cause can be established despite thorough clinical evaluation, resulting in the categorization of their condition as unexplained chest pain [4].
Unexplained chest pain may not only represent an isolated physical complaint but can also serve as a clinical indicator of underlying psychological disturbances. Adolescents experiencing UCP often suffer from heightened levels of anxiety, uncertainty, and emotional distress due to concerns about the seriousness of their symptoms. These psychological burdens may extend into broader aspects of social functioning, adversely affecting academic performance, peer relationships, extracurricular involvement, and overall quality of life [5].

Furthermore, the consequences of UCP are not limited to the individual adolescent alone. Parents may experience considerable worry, confusion, and frustration while navigating their child's recurring symptoms. Healthcare providers also face diagnostic and therapeutic challenges in managing these cases, often requiring careful exclusion of organic causes while being mindful of the psychosocial dimensions involved [6].

The interplay between depression, social functioning, and unexplained chest pain is a relatively underexplored area of adolescent health research. Prior studies suggest that adolescents with UCP may present with multiple somatic symptoms, including sleep disturbances, headaches, and other stress-related manifestations, further complicating their emotional and functional status. Failure to recognize these associated psychological and social factors may delay appropriate interventions and exacerbate the adolescent's distress [7].

Given the complex biopsychosocial nature of unexplained chest pain in adolescence, comprehensive evaluation tools are essential. Structured assessments such as the HEADSSS (Home, Education, Activities, Drugs, Sexuality, Suicide/Depression, and Safety) framework allow clinicians to systematically explore psychosocial risk factors, while standardized quality of life inventories such as the Paediatric Quality of Life Inventory (PedsQL) provide objective insight into the adolescent's perception of their well-being [8].

In light of these considerations, the present study was designed to explore the intersection between unexplained chest pain, depression, and social functioning among adolescents. By systematically examining psychosocial, somatic, and functional domains, the study aims to generate meaningful insights that can guide early identification, supportive interventions, and comprehensive care strategies for adolescents experiencing UCP.

2. Materials and Methods

This study was designed as a cross-sectional observational analysis, conducted over a period of six months in the Department of Paediatrics at Vinayaka Mission's Kirupananda Variyar Medical College & Hospital (VMKVMCH), Salem. Ethical clearance for the study was obtained from the Institutional Ethical Committee before initiation. Written informed consent was obtained from the parents or legal guardians of all participating adolescents, and assent was obtained from the adolescents themselves.

The study population included adolescents aged between 10 and 12 years who presented to the Pediatric Outpatient Department (OPD) with complaints of chest pain. Detailed clinical evaluation and investigations were performed to identify eligible participants with unexplained chest pain (UCP), following systematic exclusion of organic causes.

3. Inclusion Criteria

- Adolescents aged between 10 and 12 years.
- Adolescents diagnosed with unexplained chest pain by a healthcare professional after appropriate evaluation.
- Adolescents presenting with depressive symptoms as assessed by standardized psychological assessments or clinical evaluation.
- Adolescents willing to participate voluntarily and whose parents or guardians provided informed written consent.

4. Exclusion Criteria

- Adolescents younger than 10 years or older than 12 years.
- Adolescents whose chest pain could be attributed to identified medical conditions, such as cardiac diseases, respiratory disorders, or gastrointestinal causes.
- Adolescents with chronic medical illnesses or comorbidities that could interfere with the study outcomes.
- Adolescents with a history of substance abuse or addiction.
- Adolescents diagnosed with psychiatric illnesses or undergoing psychiatric treatment prior to the study.

5. Study Procedure

All adolescents presenting to the Pediatric OPD with chest pain underwent comprehensive clinical evaluation. Detailed history taking included assessment of duration, nature, aggravating and relieving factors of chest pain, as well as associated symptoms such as vomiting, poor weight gain, palpitations, sleep deprivation, and headaches. A thorough physical examination was performed for each participant.

Following clinical assessment, investigations were carried out to exclude potential organic causes of chest pain:

- Cardiac causes were ruled out using clinical examination and electrocardiogram (ECG).
- Respiratory causes were excluded through chest X-ray and systemic respiratory examination.
- Gastrointestinal causes were evaluated based on history and physical examination findings.
- Musculoskeletal causes and other identifiable disorders were ruled out based on examination findings.

Adolescents who did not fit into any identified organic cause were classified as having unexplained chest pain and were subsequently enrolled into the study.

6. Psychosocial and Psychological Evaluation

Eligible participants underwent a detailed psychosocial evaluation using the HEADSSS (Home, Education/Employment, Activities, Drugs, Sexuality, Suicide/Depression, and Safety) framework to assess various psychosocial dimensions that may contribute to the experience of chest pain. The HEADSSS interview provided valuable insights into the adolescents' home environment, school performance, peer relationships, recreational activities, emotional well-being, safety concerns, and risk behaviors.

Following the HEADSSS assessment, participants completed the Paediatric Quality of Life Inventory (PedsQL), which evaluated quality of life across multiple domains including physical, emotional, social, and school functioning. Adolescents who scored poorly in one or more domains of the PedsQL were further referred for clinical psychological assessment. A trained clinical psychologist evaluated these adolescents for depression and anxiety using standard psychological evaluation tools.

7. Sample Size and Recruitment

The total sample size for the study was 200 adolescents. On average, 10 to 15 adolescents attending the Pediatric OPD daily were screened for eligibility until the required sample size was achieved over the study period.

8. Data Collection and Statistical Analysis

All relevant clinical, psychosocial, and psychological data were recorded using a structured data collection form for each participant. Variables recorded included demographic data, clinical history, family history, HEADSSS assessment findings, PedsQL scores, and psychological evaluation outcomes.

The compiled data were entered into SPSS software (Statistical Package for the Social Sciences), version 29.0 for statistical analysis. Descriptive statistics such as mean and standard deviation were calculated for continuous variables, while categorical variables were expressed as frequencies and percentages. Comparison of parameters was performed using analysis of variance (ANOVA) and multivariate analysis where appropriate. A p-value of less than 0.05 was considered statistically significant.

9. Results

A total of 200 adolescents aged between 10 and 12 years who presented with unexplained chest pain were enrolled in the study. After comprehensive clinical and diagnostic evaluation, all participants met the inclusion criteria and were successfully assessed for depression, social functioning, and associated somatic symptoms.

The study population included both male and female adolescents, with a balanced gender distribution. The majority of participants reported persistent chest pain with varying durations and intensities, while multiple associated complaints such as sleep disturbances, headaches, and poor academic performance were frequently observed.

Psychosocial assessments revealed considerable impairment in several domains, including school performance, peer relationships, family functioning, and overall emotional well-being. A significant proportion of adolescents were found to have depression and anxiety following clinical psychological evaluation based on PedsQL scoring.

Table 1. Age Distribution of Participants.

Table 1: Shows the Age-Wise Distribution of the Study Population

Age Group (Years)	Number of Adolescents	Percentage (%)
10 Years	60	30%
11 Years	75	37.5%
12 Years	65	32.5%
Total	200	100%

Table 2. Gender Distribution of Participants

Table 2: Presents the Gender Distribution of the Adolescents Included in the Study.

Gender	Number of Adolescents	Percentage (%)
Male	104	52%
Female	96	48%
Total	200	100%

Table 3. Chief Complaints and Associated Symptoms.

Table 3: Summarizes the Distribution of Associated Complaints Among Adolescents Presenting with Unexplained Chest Pain

Symptom	Number of Adolescents	Percentage (%)
Vomiting	48	24%
Palpitation	32	16%
Poor Weight Gain	22	11%
Sleep Deprivation	66	33%
Headache	42	21%

Table 4. Past Medical History Among Participants.

Table 4: Presents Relevant Past Medical History Among the Study Participants

Past History	Number of Adolescents	Percentage (%)
History of Trauma	10	5%
Gastrointestinal Surgery	4	2%
History of Drug Intake	8	4%
Smoking/Alcohol Use	3	1.5%
Substance Abuse	2	1%
Known Chronic Illness	6	3%
Known Psychiatric Illness	5	2.5%
History of Psychiatric Evaluation	7	3.5%

Table 5. Family History.

Table 5: Outlines the Family History Recorded in Participants

Family History Parameter	Number of Adolescents	Percentage (%)
Family History of Cardiac Disorders	18	9%
Type of Family - Nuclear	160	80%
Type of Family - Joint	40	20%
Number of Siblings ≤ 2	150	75%
Number of Siblings > 2	50	25%

Table 6. Socioeconomic Distribution.

Table 6: Demonstrates the Socioeconomic Status of Participants Based on Standard Criteria.

Socioeconomic Class	Number of Adolescents	Percentage (%)
Upper Class	22	11%
Middle Class	128	64%
Lower Class	50	25%

Table 7. Scholastic Performance.

Table 7: Shows the Academic Performance of the Adolescents

Academic Performance	Number of Adolescents	Percentage (%)
Satisfactory	120	60%
Below Average	80	40%

Table 8. Peer Relationship Assessment.

Table 8: Summarizes Peer Relationship Findings

Peer Relationship Status	Number of Adolescents	Percentage (%)
Good Peer Support	130	65%
Poor Peer Support	70	35%

Table 9. HEADSSS Psychosocial Assessment Findings.

Table 9: Highlights Significant Findings from HEADSSS Assessment

HEADSSS Domain	Abnormal Findings Present (%)
Home Issues	18%
Educational Stress	26%
Limited Activities	20%
Drug/Alcohol Use	1.5%
Suicidal Ideation	4%
Depression Symptoms	28%
Sleep Problems	33%

Table 10. PedsQL Quality of Life Scores.

Table 10: Provides the Pedsql Scores Across Various Domains

Domain	Poor Quality of Life (%)
Physical Functioning	15%
Emotional Functioning	28%
Social Functioning	21%
School Functioning	26%

Table 1 reflected that most participants were between 10 and 12 years of age, with balanced distribution across age subgroups. Table 2 showed an almost equal gender distribution. Table 3 demonstrated that sleep disturbances, headaches, and vomiting were common associated symptoms. Table 4 revealed few adolescents had past medical or psychiatric history. Table 5 highlighted nuclear families as the most common family structure, with a small proportion reporting family cardiac history. Table 6 showed the majority belonged to the middle socioeconomic class. Table 7 and Table 8 indicated that a considerable number of adolescents reported scholastic difficulties and poor peer support. Table 9 demonstrated that emotional disturbances, educational stress, and depression were frequent findings on HEADSSS assessment. Table 10 summarized the domains of poor quality of life as identified using PedsQL, with emotional and school functioning most significantly affected.

10. Discussion

This study was conducted to explore the intersection of unexplained chest pain (UCP), depression, and social functioning in adolescents—a clinically significant yet often underexplored area of pediatric practice. Unexplained chest pain remains a frequent cause of pediatric consultations, contributing to both adolescent and parental anxiety, repeated healthcare visits, and unnecessary investigations. Unlike adults where chest pain is commonly attributed to cardiac origins, most cases in adolescents are non-cardiac in nature, often linked to functional, psychosomatic, and psychological factors [9].

In the present study, a total of 200 adolescents aged between 10 and 12 years presenting with unexplained chest pain were systematically evaluated after exclusion of identifiable organic causes through thorough clinical assessments and investigations. The comprehensive approach employed, which included ECG, chest X-ray, and detailed physical examination, successfully ruled out cardiac, respiratory, musculoskeletal, and gastrointestinal etiologies in all participants, confirming the functional nature of chest pain in this population [10].

The findings revealed that unexplained chest pain in adolescents is not an isolated somatic complaint but is frequently associated with multiple somatic and psychological factors. Associated complaints such as sleep deprivation (33%), headaches (21%), and symptoms like vomiting (24%) and palpitations (16%) were commonly reported. These associated somatic symptoms may contribute to the overall subjective experience of distress, amplifying the adolescents' perception of pain and discomfort [11].

The psychosocial evaluation using the HEADSSS assessment identified multiple stressors contributing to emotional and social dysfunction. Educational stress was notable in 26% of participants, while home-related issues were reported by 18%. Approximately 28% of adolescents exhibited symptoms of depression, and 4% reported suicidal ideation, indicating the significant psychological burden carried by this subgroup. Additionally, disturbances in sleep patterns were present in one-third of participants, further reinforcing the complex interaction between physical symptoms and emotional well-being [12].

Social functioning was also notably impacted. About 40% of adolescents demonstrated below-average scholastic performance, while 35% reported poor peer relationships. School-related functioning, peer interactions, and emotional well-being are critical aspects of adolescent development, and impairment in these domains may predispose affected adolescents to ongoing psychological distress and functional limitations [13].

The assessment using the Paediatric Quality of Life Inventory (PedsQL) provided an objective measure of quality of life across physical, emotional, social, and school domains. Emotional functioning (28%) and school functioning (26%) were the most adversely affected, reflecting the heavy psychosocial burden carried by adolescents with UCP. This highlights the fact that the impact of unexplained chest pain extends well beyond physical symptoms and permeates multiple areas of daily living [14].

The role of depression as both a consequence and possible contributor to the persistence of chest pain must be emphasized. Adolescents who experience continuous or recurring pain without clear medical explanation may develop anxiety and depressive symptoms, driven by fear of undiagnosed serious illness, social withdrawal, academic disruptions, and a growing sense of helplessness. Conversely, pre-existing emotional dysregulation may also lower pain thresholds and intensify the perception of chest pain [15].

This study also highlights the value of structured psychosocial evaluation tools such as HEADSSS, which allow clinicians to systematically assess a wide range of factors that may otherwise go unnoticed during routine clinical assessments. Similarly, the use of standardized quality of life measures like PedsQL offers an objective means of quantifying the extent of functional impairment experienced by adolescents and provides a framework for multidisciplinary interventions [16].

While this study offers valuable insights, it is important to recognize certain limitations. Being a cross-sectional study, it establishes association but not causation between chest pain, depression, and social dysfunction. Furthermore, the study focused on a specific age range of 10 to 12 years; results may differ across broader adolescent populations. Additionally, long-term follow-up data on the progression or resolution of symptoms were not included [17].

Nevertheless, the findings emphasize the importance of a holistic, multidisciplinary approach when managing adolescents with unexplained chest pain. Identifying and addressing psychological factors early may help reduce symptom persistence, improve functional outcomes, and enhance the overall well-being of affected adolescents. Pediatricians, psychologists, school counselors, and family members all play crucial roles in building resilience and supporting adolescents through these challenging experiences.

11. Conclusion

This study highlights the significant association between unexplained chest pain and psychological distress in adolescents, particularly involving depression and impaired social functioning. Somatic symptoms such as sleep disturbances and headaches further contribute to the emotional burden and functional impairment experienced by these adolescents. Comprehensive psychosocial assessments like HEADSSS and objective quality of life evaluations using PedsQL proved valuable in identifying at-risk individuals. Early recognition and multidisciplinary intervention targeting both physical symptoms and emotional well-being are essential to improve outcomes, prevent chronicity, and support the overall development and resilience of adolescents facing unexplained chest pain.

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