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Chronic Chest Pain in Adolescents: Is Not Only a Medical Condition, But Also a Social Problem

ABSTRACT

Objective: Chest pain is a frequent cause of referral to pediatric cardiology departments and leads to unnecessary testing although cardiac etiology is very rare. Recent studies reported that adolescents' chest pain is generally related with psychological disorders. Adolescents prone to have psychological problems more than others. This condition leads to have different social trends which also can be affected from recurrent complaints and illnesses. The aim of this study is to examine the relationship between chest pain and social trends in adolescents.

Methods: A total of 101 adolescents -51 with chest pain and 50 control- were enrolled in this study and 'Social Trends Scale (STS)' was applied to all participants. Cigarette smoking, presence of family problem and monthly income were recorded. Social trends of participants were evaluated in the subtitles of social adaptation, substance avoidance, violence avoidance, school status, family status and 'target and ideals' by 'STS' which included 26 questions.

Results: Chest pain group had lower scores in all subtitles compared with controls. Violence avoidance and family status scores were significantly lower in study group. The presence of chest pain with smoking leaded to social impairment and chest pain with smoking decreased the substance avoidance behavior. Chest pain had negative effect on school status with monthly income of the family.

Conclusions: Chest pain affects some social trends negatively with some other factors. This social situation which we have observed during the evaluation of adolescents with chest pain enlightens the importance of psychological evaluation and guidance services.

Keywords: Adolescents, Chest Pain, Psychological, Social Trends

Adölesanlarda Kronik Göğüs Ağrısı: Yalnızca Medikal Değil Sosyal Bir Problem

ÖZET

Amaç: Adölesanlarda göğüs ağrısı, çocuk kardiyoloji polikliniklerine sık başvuru sebebi olmasına rağmen, nadiren kardiyak etiyolojiye rastlanılmakta ve gereksiz testlere yol açmaktadır. Son çalışmalar, adölesan göğüs ağrısının genellikle psikolojik rahatsızlıklarla ilişkili olduğunu bildirmiştir. Adölesanlar, psikolojik problemlere sahip olmaya, diğer yaş gruplarına göre daha yatkındır. Bu durum, aynı zamanda tekrarlayan şikayet ve hastalıklardan da etkilenebilecek sosyal eğilimlerde değişime yol açmaktadır. Bu çalışmanın amacı, bu yaş grubunda tekrarlayan göğüs ağrısının, sosyal eğilimler ile olan ilişkisini irdelemektir.

Gereç ve Yöntem: Elli bir adet (51) göğüs ağrısı olan ve 50 adet sağlam kontrol olmak üzere toplam 101 adölesana, 'Sosyal Eğilimler Anketi' uygulandı. Ayrıca katılımcıların sigara kullanımı, aile içi problem varlığı, aylık gelir durumu kayıt edildi. Sosyal eğilimler anketi ile adölesanların sosyal eğilimleri, sosyal uyum, maddeden kaçınma, şiddetten kaçınma, aile statüsü, okul statüsü, hedef ve ideal faktörleri başlıkları altında değerlendiren 26 soru yöneltilmekte ve her bir faktör altında toplanan sorulardan faktör ortalama skoru hesaplanmaktadır.

Bulgular: Göğüs ağrısı olan adölesanların, tüm faktörler için toplam skorlarının kontrol grubuna gore daha düşük olduğu belirlendi. 'Şiddetten Kaçınma' ve 'Aile Statüsü' skorları anlamlı şekilde düşüktü. Sigara kullanımı ile birlikte göğüs ağrısı varlığının, sosyal uyumu bozduğu, göğüs ağrısı ve sigara kullanımı birlikteliğinin maddeden kaçınma davranışını azalttığı belirlendi. Göğüs ağrısı, aylık gelir durumu ile birlikte 'Okul Statüsü' skorlarını olumsuz yönde etkilemekteydi.

Sonuç: Göğüs ağrısı, bazı faktörlerle birlikte, birtakım sosyal eğilimler üzerine olumsuz yönde etkili idi. Göğüs Ağrısı olan adölesanlara yaklaşımda gözlediğimiz bu sosyal durum, bu gruba verilecek rehberlik hizmetlerine ışık tutacak nitelikteydi.

Anahtar Kelimeler: Adölesan, Göğüs Ağrısı, Psikososyal, Sosyal Eğilimler

INTRODUCTION

Chest pain is one of the most common complaint in pediatric emergency departments that needs to be directed to a pediatric cardiologist after heart murmurs, although cardiac etiology is very rare (1).

The belief of chest pain as "heart pain'' in children and families leads to recurrent hospital admissions, unnecessary medical testing and anxiety in health care providers too. However, chest pain without an obvious medical pathology usually named as 'idiopathic chest pain' and it is the most common cause of chest pain in children and adolescents with an incidence of 21-59 % (2). In recent years, there are an increasing number of studies that defend that children especially adolescents with idiopathic chest pain may have a psychological disorder (anxiety, depression, conversion disorder etc.) and should be referred an psychological evalution (3-6).

In addition to this, adolescents have increased social stress due to changes in both biological, hormonal conditions and interpersonal relationships. Increased social stress, recurrent complaints and illnesses can change the social trends of adolescents. Many adolescents who are experiencing social stress prone to maintain depressive symptoms (7). These symptoms can include somatic symptoms like chest pain. Previous researches also highlighted the importance of examining social stress in adolescents (8,9). A large review by Mc Donnel et al reported that social enviroment is an important factor that may influence childhood vulnerability to noncardiac chest pain (8).

The present study examined the relationship between chest pain and social trends in a sample of adolescents. This study also should take a worthy of particular attention because of being the first study that evaluates social situation and trends in adolescents with chest pain.

MATERIAL AND METHODS

The study group was recruited from 51 adolescents aged 11-18 years who admitted pediatric cardiology department because of the complaint of chest pain. Age and sex matched, 50 healthy adolescents without chest pain were formed the control group. Study group were screened with a detailed procedure including history, physical exam, electrocardiogram, transthoracic echocardiogram and were also evaluated for other possible causes of chest pain including gastroesophageal reflux, costochondritis and pneumonia. After the initial evaluation all participants were asked to fill 'Social Trends Scale'.

Social Trends Scale: A validated questionnaire including 26 questions which evaluates the social trends of people between the age of 11- 18 years, in the subtitles of social adaptation, substance avoidance, violence avoidance, school status, family status and 'target and ideals'. The mean score was calculated from the questions collected under each title (10) (Figure 1).

Figure 1. Social Trends Scale questionnaire

Statistical analysis: The data were recorded with the Statistical Package for the Social Sciences program version 21 (SPSS, SPSS, Inc., Chicago, IL, USA). The distributions of continuous variables were analyzed with the Shapiro–Wilk Normality test. The descriptive statistics were defined as mean ± standard deviation for normally distributing data and as median (minimum–maximum) for non-normally distributing data. The significance of the differences in mean values between two independent groups was analyzed with the Student t-test and the significance of the differences in median values between two independent groups was analyzed with the Mann–Whitney U test. A general linear model analysis were applied to evaluate the factors that affect the presence of chest pain. Spearman correlation test was performed to observe the linear relationship between independent variables.

Ethical Considerations: The study protocol was approved by the ethics committee of a tertiary center (number: 15/448) and performed in accordance with the Declaration of Helsinki. The participants and their parents were clearly informed about the study by the physician and informed consent was introduced.

RESULTS

Sociodemographics and Descriptive Results: Fifty one with chest pain (study group), and 50 healthy adolescents (control group), a total of 101 participants were enrolled into the study. Adolescents in both groups were mainly from low income families. The mean age of the study group was and control group was 15.1± 1.8 and 15.8± 1.6 years respectively. There were 32 girls (62.7%) in the study group and there were 25 girls (50 %) in the control group. No statistically significant difference were found between two groups in terms of age and gender (p>0.05). There were 9 (17.6%) smoking adolescents in the study group, whereas there were 4 adolescents (8%) in the control group (p>0.05). Adolescents in study group were predominantly (38%) evaluated as "idiopathic chest pain" without an organic pathology that could cause pain. The features of chest pain group were shown in Table 1. Eleven adolescents (21.6%) in the study group and 3 (6 %) adolescents in the control group were expressed the presence of a family problem.

Table 1. Features of chest pain group.

Gender	19 (37.3%) boys	
Age (years)	15.1±1.8	
Duration of chest pain complaint (months)	2.7±0.9	
The number of hospital admission	1.57±0.5	
Etiology of chest pain	İdiopathic chest pain	38 (74.5%)
	Musculoskelatal	6 (11.8%)
	Pulmonary disease	4 (7.8%)
	Cardiovascular disease	2 (3.9%)
	Gastrointestinal disease	1 (2%)

Scores of Social Trends Scale: Adolescents with chest pain had lower scores in all subtitles of Social Trends Scale (social adaptation, substance avoidance, violence avoidance, school status, family status and 'target and ideals') compared with controls. Violence avoidance and family status scores were statistically significantly lower in the study group (Table 2).

Table 2. Social Trends Scale scores of study and control groups*

Factor	Study group (n: 51)	Control group (n:50)	P
Social adaptation	4,84±0,32	4,91±0,26	NS
Substance avoidance	4,45±0,75	4,64±0,58	NS
Violence avoidance	3,38±0,85	3,78±0,72	0,036
School status	3,78±0,84	3,96±0,64	NS
Family status	3,89±1,04	4,55±0,43	0,001
Target and ideals	3,88±0,90	4,24±0,55	NS

Values are presented in mean±SD

Analytical Results (General Linear Model- Factorial ANOVA analysis): A General Linear Model (GLM) was formed from the independent factors that could affect 'Social Trends Scale' in order to observe the effects of chest pain and other independent factors together.

a- **Social adaptation:** Age, year of education variables singly and the grouping variable (presence of chest pain or not) accompanied with smoking were statistically significantly effective on social adaptation score (Table 3a).

Table 3 The effect of other variables on Social Trends Scale subfactors (General Linear Model)
Table 3a. Dependent Variable : Social Adaptation

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Model	2380,227(b)	21	113,344	1366,888	,000	,997
Gender	,000	1	,000	,005	,941	,000
Group	,039	1	,039	,469	,495	,006
Smoking	,036	1	,036	,439	,509	,006
Monthly income	,330	4	,083	,996	,415	,048
Age	,354	1	,354	4,272	,042	,051
Number of family members	,001	1	,001	,009	,926	,000
Education year	,419	1	,419	5,058	,027	,060
Gender* Group	,033	1	,033	,402	,528	,005
Group * Smoking	,494	1	,494	5,958	,017	,070
Group * Monthly income	,235	3	,078	,945	,423	,035
Group * Age	,187	1	,187	2,254	,137	,028
Group * Number of family members	,005	1	,005	,059	,808	,001
Group * Education year	,131	1	,131	1,583	,212	,020
Family problem	,005	1	,005	,055	,815	,001
Group * Family problem	,004	1	,004	,044	,835	,001
Error	6,551	79	,083			
Total	2386,778	100				

a Computed using alpha = ,05
b R Squared = ,997 (Adjusted R Squared = ,997)

There was a negative correlation between age and social adaptation but this correlation was not statistically significant. However, when the result of multifactorial analysis was considered it could be accepted that there was a negative correlation between age and social adaptation. The same result was also acceptable between education year and social adaptation. These results were probably because of the increasing problems in the later periods of adolescent age. When adolescents were divided into study and control groups, it is also found that smoking cases (n:9) had significantly lower social adaptation scores than nonsmoking adolescents (n:42) in the study group (means: 4.62 ± 0.53, 4.89 ± 0.24 respectively, p = 0.04).

b-   **Substance avoidance:** Grouping variable together with smoking was effective on substance avoidance score (Table 3b). When adolescents were divided into study and control groups, it is also found that smoking cases (n: 9) had significantly lower Substance avoidance scores than nonsmoking adolescents (n:42) in study group (means: 3.96 ± 1.26, 4.56 ± 0.56 respectively, p: 0.03).

c-   **Violence avoidance**: Smoking was found singly effective on violence avoidance score in the General Linar Model (p= 0.046). Smoking adolescents (n:13) had lower violence avoidance scores than nonsmoking ones (n:88) (means: 3.01 ± 1 3.6 ± 0.74 respectively, p = 0.03).

d-   **School status:** Age singly, monthly income together with grouping variable were found effective on school status score (Table 3c). There was a negative correlation between age and school status score (r: -0.38, n=101, p<0.001). When participants were divided according to monthly income (< 1500 Turkish liras,   1501-4000 Turkish liras and > 4000 Turkish liras), study group were lower school status scores than control group in all monthly income set. It was also found that study group's school status scores were decreased while monthly income was increased.

e-   **Family status:** Presence of a family problem was singly effective on family status score in the General Linar Model (p= 0.025). When all participants were divided into two groups according to presence of a a family problem or not, adolescents with family problem (n: 14) had lower family status scores than others (n:87) (means: 3.2 ± 1.4, 4.3 ± 0.6 respectively, p<0.001).

f-   **Targets and ideals:** Smoking, singly and also together grouping variable was effective on target and ideals score (Table 3d). In addition to this, gender together with grouping variable was effective on this subtitle. Smoking adolescents had lower target and ideal scores than nonsmoking adolescents significantly (p: 0.002). When adolescents were divided in to groups according to gender, adolescents with chest pain in both groups had lower scores and this difference was statistically significant in boys (p:0.004).

Table 3b. Dependent variable :Substance avoidance

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Model	2077,626(b)	21	98,935	243,932	,000	,985
Gender	1,490	1	1,490	3,674	,059	,044
Group	,050	1	,050	,124	,726	,002
Smoking	,449	1	,449	1,108	,296	,014
Monthly income	1,793	4	,448	1,105	,360	,053
Age	,069	1	,069	,170	,682	,002
Number of family members	,200	1	,200	,494	,484	,006
Education year	,511	1	,511	1,259	,265	,016
Gender*Group	,350	1	,350	,862	,356	,011
Group*Smoking	2,478	1	2,478	6,109	,016	,072
Group*Monthly income	1,838	3	,613	1,510	,218	,054
Group*Age	,023	1	,023	,056	,814	,001
Group*Number of family members	,039	1	,039	,097	,756	,001
Group*education year	,019	1	,019	,046	,830	,001
Family problem	,039	1	,039	,097	,757	,001
Group*family problem	,002	1	,002	,006	,938	,000
Error	32,041	79	,406			
Total	2109,667	100				

a Computed using alpha = ,05

b R Squared = ,985 (Adjusted R Squared = ,981)

Table 3c. Dependent variable :School Status

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Model	1522,967(b)	21	72,522	183,321	,000	,980
Gender	,024	1	,024	,060	,807	,001
Group	,556	1	,556	1,406	,239	,017
Smoking	,307	1	,307	,776	,381	,010
Monthly income	2,033	4	,508	1,285	,283	,061
Age	2,406	1	2,406	6,082	,016	,071
Number of family members	,034	1	,034	,087	,769	,001
Education year	,049	1	,049	,123	,727	,002
Gender*Group	1,393	1	1,393	3,522	,064	,043
Gender*Smoking	,595	1	,595	1,503	,224	,019
Group*Monthly income	3,496	3	1,165	2,946	,038	,101
Group*Age	,070	1	,070	,176	,676	,002
Group*Number of family members	,476	1	,476	1,202	,276	,015
Group*Education year	,345	1	,345	,871	,354	,011
Family problem	,989	1	,989	2,500	,118	,031
Group*Family problem	,241	1	,241	,610	,437	,008
Error	31,253	79	,396			
Total	1554,220	100				

a Computed using alpha = ,05
b R Squared = ,980 (Adjusted R Squared = ,975)

Table 3d. Dependent variable :Target and ideals

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Model	1684,740(b)	19	88,671	205,887	,000	,980
Gender	,106	1	,106	,246	,621	,003
Group	,177	1	,177	,411	,523	,005
Smoking	4,283	1	4,283	9,944	,002	,109
Monthly income	3,173	3	1,058	2,456	,069	,083
Age	,001	1	,001	,002	,965	,000
Number of family members	,575	1	,575	1,334	,251	,016
Education	,004	1	,004	,010	,921	,000
Gender*Group	1,760	1	1,760	4,087	,047	,048
Group*Smoking	3,510	1	3,510	8,150	,005	,091
Group*Monthly income	1,651	2	,825	1,916	,154	,045
Group*age	,009	1	,009	,020	,888	,000
Group*number of family members	,033	1	,033	,076	,784	,001
Group*education year	,537	1	,537	1,248	,267	,015
Family problem	,191	1	,191	,442	,508	,005
Group*family problem	,434	1	,434	1,008	,318	,012
Error	34,885	81	,431			
Total	1719,625	100				

a Computed using alpha = ,05
b R Squared = ,980 (Adjusted R Squared = ,975)

DISCUSSION

There have been limited number of studies that report the effect of social factors on adolescents with chest pain (6,8,11). In addition, we never observed any study that presents social trends among these group of adolescents. The results of our study indicated that social status, trends and behaviours have a role in the etiology of chest pain during adolescence.

Recently, there is an increasing number of studies that report psychological disorders in children with chest pain. On the basis of these studies' findings, there is a high prevalence of anxiety, depression, perceived stress, and anger among adolescents with chest pain (3,4). However, adolescents prone to the damage of stress and psychological problems more than preadolescents and adults. This condition leads adolescents to have different social behaviours in their daily life from the others (7,9). Both social changes and increased prevalence of psychological problems in this period come in view as somatization defects like chest pain.

Studies which psychosocial factors are assessed in chest pain, generally use psychometric tests which determine the level of depression and anxiety while studies which use scales that evaluate social factors are very rare (4,12). In our study, Social Trends Scale validated questionnaire which evaluates social trends with 27 multiple-choice items in 6 subtitles was used (10). Chest pain group

had lower scores in all subfactors of scale. This finding also supports the previous reports that showed the importance of social evaluation in the children with chronic pain (12). This results were especially significant in social adaptation, substance avoidance, school status, 'targets and ideals' factors. There were additional effective factors, definitely. These were cigarette smoking, age, monthly income, family problems. A lot of possibilities are came in to mind about the relationship between chest pain and social factors. Is this condition the cause or the result? To explain briefly, chest pain affects the social scores or low scores trigger chest pain by its psychosomatic effect is unknown. It is clear that, this study only attracts attention to this subject and further comprehensive studies are needed.

Our study showed that chronic chest pain in adolescents affects the social trends and brings a new extent to the guidance services about this topic. The success about dealing with the problems in adolescents like; social adaptation problems, substance tendency, school problems, target and ideal deficiency may be increased by regarding recurrent chest pain in this age group. Furthermore, it may be predicted that guidance services about social problems as mentioned before may have a contribution in the treatment of chest pain in adolescents. This study reports an extraordinary relationship between chest pain and social problems

in adolescents and also enlightens the further studies that will be made about this subject. 'Social Trends Scale' can be used in these studies.

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