A population- based study on awareness of heart attack in Aydın city-Turkey

Aydın-Türkiye'de kalp krizi farkındalığı üzerine toplum temelli bir çalışma

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ABSTRACT

Objective: The study was conducted to determine the level of knowledge and awareness of risk factors and warning signs of heart attack in a selected sample of the Turkish population.

Methods: Population-based cross-sectional study was carried out with people over age 40 years in Aydın. The study group was determined by multi-stage sampling method (simple random and cluster sampling methods). Questionnaire was administered during face-to-face interviews in the participants' homes. Chi-square and t-test were used for analytical evaluation. Risk assessments were performed utilizing logistic regression analysis.

Results: The percentage of participants who did not know what a heart attack is and its warning signs were 42.3% and 23.2%, respectively. Overall, 11.8% were unaware of risk factors. Loss of consciousness/fainting, chest pain, radiation of pain were reported as three major warning signs. Among risk factors, stress was ranked as the most common, followed by smoking. It was determined that age, place of residence, education, occupation, self-reported risk factors had effect on the knowledge for major warning signs ($p<0.05$). In multivariate analysis, the factors having a negative effect on knowledge of major warning signs were having primary school/lower level of education (OR=2.447, 95%CI 1.773-3.378; $p<0.0001$), being older (OR=1.020, 95%CI 1.007-1.032, $p=0.002$), living in urban area (OR=1.493, 95%CI 1.133-1.968, $p=0.004$), being unemployed (OR=1.436, 95%CI 1.010-2.041, $p=0.044$) and absence of self-reported risk factors (OR=1.965, 95%CI 1.201-3.216, $p=0.007$). The percentage of participants stated that the first action to take for a person having heart attack was to put them on their back, open their collar, elevate their feet was 24.1%. They had learned information about the symptoms and the risk factors from television (28.6%) and neighbors/relatives (28.3%).

Conclusion: This study revealed the need for increasing awareness utilizing community based education programs and the mass media. *(Anadolu Kardiyol Derg 2009; 9: 304-10)*

Key words: Heart attack, warning signs, risk factors, awareness, knowledge

ÖZET

Amaç: Türkiye'den seçilmiş bir örneklemde kalp krizi risk faktörleri ve alarm belirtileri bilgi ve farkındalıklarını belirlemektir.

Yöntemler: Toplum temelli ve kesitsel tipteki bu çalışma, Aydın merkezde yaşayan 40 yaş üstü 997 katılımcı ile gerçekleştirildi. Gruplar çok aşamalı örnekleme yöntemiyle (basit rastgele-küme örnekleme yöntemleri) belirlendi. Soru formu, katılımcıların evlerinde yüz yüze görüşme tekniği ile dolduruldu. Tanımlayıcı istatistiklerde yüzde, ortalama±standart sapma değerleri, analitik değerlendirmede ki-kare, t-testi, risk değerlendirmede lojistik regresyon analizi kullanılmıştır.

Bulgular: Katılımcıların %42.3'ü kalp krizinin ne olduğunu, %23.2'si alarm belirtilerinin herhangi birini bilmiyordu, %11.8'i ise risk faktörlerinden herhangi birinin farkında değildi. Katılımcılar kalp krizi alarm belirtisi olarak ilk üç sırada, bilinç kaybı/baygınlık, göğüs ağrısı ve ağrının yayılmasını belirttiler. Risk faktörü olarak ilk sırada stres, ikinci sırada sigara yer aldı. Kalp krizi majör alarm belirtilerini yaş, yerleşim yeri, eğitim durumu, meslek ve kişisel risk faktörü bulunma durumlarının etkilediği tespit edilmiştir ($p<0.05$). Çok değişkenli analizlerde ilkokul ve altı eğitimli olmanın 2.447 kat (%95GA 1.773-3.378; $p<0.0001$), ileri yaşın 1.020 kat (%95GA 1.007-1.032, $p=0.002$), kentsel alanda yaşamanın 1.493 kat (%95GA 1.133-1.968, $p=0.004$), işsiz olmanın 1.436 kat (%95GA 1.010-2.041, $p=0.044$) ve kalp krizi açısından herhangi bir risk faktörünün olmamasının 1.965 kat (%95GA 1.201-3.216, $p=0.007$) kalp krizi majör risk faktörlerini bilme durumunu ters yönde etkilediği tespit edilmiştir.

Katılımcılar (%24.1), kalp krizi geçiren birine ilk yapacakları müdahaleyi "sırt üstü yatırmak, yakasını açmak, ayaklarını kaldırmak" olarak ifade ettiler. Kalp krizi alarm belirtileri ve risk faktörleri hakkındaki bilgilerini televizyon (%28.6), komşu/akrabalarından (%28.3) edindiklerini belirttiler.

Sonuç: Bu çalışma, toplum temelli eğitim programları ve kitle iletişim araçları kullanılarak kalp krizine yönelik farkındalığın artırılmasının bir ihtiyaç olduğunu göstermiştir. *(Anadolu Kardiyol Derg 2009; 9: 304-10)*

Anahtar kelimeler: Kalp krizi, alarm belirtileri, risk faktörleri, farkındalık, bilgi

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Introduction

Coronary heart disease remains the number one cause of death in Turkey (27.1%) and in most industrialized nations (1-6). Its economic burden is steadily increasing (7).

Although the importance and benefits of early diagnosis of heart attack are known, the number of patients who come to the hospital within the time that effective treatment can be given is low. A delay in treatment of acute coronary syndrome (ACS) increases its mortality and preventable complications. If reperfusion can be accomplished within one hour with specific treatment methods (such as tissue plasminogen activator or angioplasty) patients' survival rate increases to 50%, but the patient's earliest arrival to the hospital after the onset of symptoms is essential (5, 6, 8-10).

The total delay to treatment time consists of two components: A) pre-hospital delay time from onset of symptoms to hospital arrival and, B) in-hospital delay time from hospital arrival to reperfusion therapy (11, 12). Several factors influence the patient's hospital arrival time. Of these factors, four variables as age, sex, race/ethnicity, and diabetes mellitus have the importance in the last literature (13, 14).

The pre-hospital delay is considered in three phases: 1) from the time the symptoms begin until the patient realizes that there is an emergency medical situation, 2) from when the decision is made that there is an emergency medical situation until the decision is made where to go first (hospital, MD office etc.), 3) until the patient arrives at the hospital. The most significant loss of time occurs during recognition of symptoms and making the decision that emergency medical assistance is needed. The reason for this is possibly because the patient or people with the patient do not have sufficient knowledge of the warning signs of a heart attack. The patient's knowledge of heart attack plays a paramount role in influencing the patient's treatment-seeking behavior after the onset of acute symptoms. Limited knowledge of symptoms of a myocardial infarction (MI) often causes patients to detention. However, this causes a significant preventable delay in treatment (2, 3, 5, 6, 9, 11). We do not know if the characteristics that contribute to delay in seeking treatment for acute MI symptoms are similar for Turkish patients. Studies, concerning public knowledge of heart attack symptoms are needed in a developing country such as Turkey, because of different social and cultural settings influence patients' response to MI symptoms.

The aim of this study was to determine 40+ year old individuals' knowledge of symptoms of a heart attack, and to define the factors determining the awareness level, actions to take, its risk factors and the first response to symptoms and cardiopulmonary resuscitation (CPR) of the public in Aydın, Turkey.

Methods

Study design and sample

This population-based cross-sectional study was carried out between November and December 2006 in Aydın, a city in Western Turkey with a population of 217,558. The research population was comprised of 40+ year old individuals (because heart attack is more commonly seen in 40+ year olds) (N=31,448) who lived in the coverage area of two semi-urban and two urban health centers. The inclusion criteria for the study were that the individual did not have a communication problem, did not have a perception problem (dementia, schizophrenia, etc.), and agreed to participate in the research.

As no study to date was available documenting public awareness of heart attacks in Turkey, the anticipated population proportion was accepted as 50%. The study group was determined by the multi stage sampling method, including simple random sampling and cluster sampling methods, respectively. After determining the neighborhoods covered by the health centers, a street cluster was chosen from every neighborhood using a simple random sampling method, and until the determined sample size was reached, every 40+ year old individual who met the research criteria was interviewed. For cluster sampling strategy, the design effect was estimated as two. While d=0.05 and design effect was two at a 95% confidence interval it was determined that the sample size would be 768 (15). Taking a missing of 30%, the goal was to reach 998 individuals in the community. Of the targeted 998 individuals, 997 were reached (response rate 99.8%).

Procedure

This study was approved by the ethical committee of the Medical Faculty of Adnan Menderes University (Protocol No: 2006/00157). Twenty final year students from the School of Health were trained for data collection for two weeks. Written consent was taken from the participants prior to administration of the questionnaire. When individuals were not found at home at first time, a second home visit was made. The questionnaire was completed by students in the homes of the participants in face-to-face interviews during the day time, frequently in the afternoons and on weekdays. If there was any difficulty in understanding open-ended questions, they were just repeated without any steering explanation. In the case of refusal to participate, the subject was replaced with a substitute (one person refused to participate in the study). Following the completion of the questionnaire, a brochure including basic information about heart attacks, which was prepared by the investigators, was given to the participants.

Questionnaire

The questionnaire was prepared after a review of relevant literature and questions which are commonly used in community based studies were chosen for use in the questionnaire to maintain validity (8, 9, 16 - 21). Also it was reviewed by three experts of the Department of Cardiology of the Medical Faculty at Adnan Menderes University, and then it was pre-tested on 80 people who were not included in the study, and was modified based on the pilot test results.

The questionnaire included 29 questions under four main sections. The first section included eight closed-ended and one open-ended (age) questions about sociodemographic characteristics (sex, education, marital status, income, occupation, living arrangements, residence, social security health insurance).

The second section included five questions related to the awareness of the participants about warning signs and risk factors of heart attack. One of them was a closed-ended question designed to determine knowledge: Have you ever seen a person having a heart attack?

In addition, there were four open-ended questions. “What is a heart attack?” was the first open-ended question. Other open-ended questions which allowed a maximum of three answers were “What are the warning signs of heart attack?”, “What are the risk factors for having a heart attack?”, and “What are the sources of your information?” Again, if there was any difficulty in understanding open-ended questions, they were just repeated without any steering explanation. If the participant did not answer after repeating the question a maximum of three times the interviewer moved on to the next question.

The warning signs given by the participants were divided into five groups: chest pain (pressure/squeezing/heaviness/burning/sensitivity in the chest), radiation of pain (pain starting in the left chest spreading to the neck/chin/shoulder/arm/elbow/back), shortness of breath/difficulty breathing with or without chest discomfort, stomach or abdominal discomfort (heartburn/indigestion/nausea/vomiting), sweating and loss of consciousness/fainting (dizziness/fainting/dazed/pallor/weakness, etc.). Of these "chest pain" and "radiation of pain" were considered the major warning signs and those who knew one of these were given one point and those who did not one of these were given zero points, then these scores were compared with the participants' demographic characteristics.

In the third section, nine closed-ended questions were asked to determine by self-report whether or not the participants had any risk factors, which predisposed them to coronary heart disease. The participants were asked to answer the questions with a "no" or "yes" response. In the evaluation of self-reported risk factors no measurement or laboratory analysis was done.

In the fourth section, there were six questions about first aid and cardiopulmonary resuscitation (CPR) for people having a heart attack. The first question was, “If you or one of your close relatives/friends has symptoms of a heart attack, what would you do first?” Then five more questions were asked to determine the participants' knowledge about cardiopulmonary resuscitation. Of these the open-ended questions that were asked were: “Where did you learn about cardiopulmonary resuscitation?” and “How long ago did you learn about cardiopulmonary resuscitation?” The closed-ended questions were asked about knowledge about cardiac compressions, how to do it and whether or not they wanted to learn how to do it.

Statistical analysis

SPSS 11.0 for Windows® software (Chicago, IL, USA) was used for statistical analysis of the data. Mean standard deviation and percentages were used in the evaluation of descriptive statistics. In the analytical evaluation, Chi-square test was used in comparison of the data collected by counting; Student’s t-test was used in comparison of measuring data. Logistical regression analysis was done to determine the possible risky factors that could affect the heart attack awareness. In this analysis, awareness or unawareness of heart attack was taken as dependent variable, age, residence, education level, occupation and having or not having self reported risky factor were taken as independent variables. Data collected by measuring were showed as arithmetic average ± standard deviation, data collected by counting were showed as number (%), the results of regression analysis were showed as relative risk (odds ratio-OR) and 95% confidence interval (CI). The $p<0.05$ was accepted for significance. The Backward-Wald method was used as the regression model.

Results

There were 997 participants, including 670 women and 327 men who had a mean age of 55.79±11.25 (40-90) years. The remainders of the participants’ demographic characteristics are shown in Table 1.

More than half (587 people, 58.9%) of the participants knew someone who had had a heart attack. To the question "What is a heart attack?" 42.3% answered, "I don't know." Of the 575 participants who answered this question 27.3% answered that it was the heart stopping/ death, 25.9% that it was chest pain/tightness, 20.9% that it was a blockage in the coronary arteries, and 25.9% had other answers (fainting, slowing of the heart, weakness, etc.).

Table 1. Demographic characteristics of the participants, 2006, (n=997)

Characteristics	n	%
Gender		
Female	670	67.2
Male	327	32.8
Education		
With or lower than primary school	765	76.7
Secondary/high school or beyond	232	23.3
Marital status		
Married	833	83.6
Single/Widow/Divorced	164	16.4
Perceived family income*		
Low	454	45.5
High	543	54.5
Occupation		
Currently employed	160	16.0
Unemployed**	837	84.0
Living arrangements		
Alone	70	7.0
Other***	957	93.0
Residence		
Rural	497	49.8
Urban	500	50.2
Social security health insurance		
Yes	868	87.1
No	129	12.9

*Low: Income does not cover expenses, High: Income meets the expenses or is higher than expenses
**Housewife or retired or out of employ ***Living with partner/children/family
Data are represented as proportions and percentages

To the question, "What are the warning signs of heart attack?" the first three answers of the participants were evaluated. Of the participants, 23.2% did not know any of the warning signs. However, 16.6% gave incorrect symptoms (headache, back ache, speaking difficulty, etc.) and 1.3% gave risk factors as warning signs. The first three warning signs of heart attack known by the participants were "loss of consciousness/fainting" (39.2%), chest pain (34.2%), and radiation of pain (25.5%) (Table 2). Of the participants, 11.8% did not know any of the risk factors, and 23.5% gave warning signs or risks for other illnesses. Among the risk factors given, stress was ranked as the most common (65.5%), followed by smoking (23.0%), poor nutrition/eating fatty foods (12.6%) and fatigue (12.5%) (Table 2).

In univariate analysis, it was determined that age, place of residence, educational status, occupation and self-reported risk factors had an effect on the knowledge status for major warning signs of a heart attack ($p<0.05$). A higher percentage of individuals who were younger, lived in a rural area had a secondary level of education or higher, and were employed knew the risk factors of a heart attack and the major warning signs of a heart attack (Table 3).

Table 2. Knowledge of the participants about heart attack warning signs and risk factors, 2006 (n=997)

Response	n	(%)
Warning signs		
Loss of consciousness/fainting	391	39.2
Chest pain	341	34.2
Radiating pain	255	25.5
Shortness of breath/difficulty breathing	195	19.5
Sweating	143	14.3
Stomach or abdominal discomfort	42	4.2
Risk factors		
Stress[a]	655	65.6
Smoking	230	23.0
Poor nutrition/eating fatty foodsb	126	12.6
Fatigue[b]	125	12.5
Obesity	111	11.1
Hypertension	86	8.6
Alcohol use[a]	64	6.4
High cholesterol	59	5.9
Genetic tendency	58	5.8
Physical inactivity	15	1.5
Diabetes mellitus	13	1.3
Older age	11	1.1

[a]Contributing factors reported by the American Heart Association
[b]Factors not listed as risk factors for coronary heart disease by the American Heart Association
Data are represented as proportions and percentages

In the final model of the multivariate analysis, the factors having a negative effect on knowledge of the major warning signs (chest pain and radiation of pain) of heart attack were having a primary school or lower level of education being older, living in urban area, being unemployed and absence of self-reported risk factors.

Overall 45.1% of the residents of urban area knew at least one of major warning signs of heart attack while this ratio was found to be 37.6% in rural area. The 36.3% of subjects who had a primary school or a lower level education knew major warning signs and this ratio was 57.8% in subjects with a secondary/ high school education or beyond. Percentage of knowledge of the warning signs was 38.6% in unemployed and 54.4% in working group.

Table 3. Awareness of heart attack according to socio-demographic characteristics, 2006

Variables	Major warning signs		
	Aware	Not aware	p*
Age, years	53.81±10.147	57.19±11.773	<0.0001
Residence, %			
Rural, n=497	45.1	54.9	0.017
Urban, n=500	37.6	62.4	
Education, %			
Completed or less than primary school, n=765	36.3	63.7	<0.0001
Secondary/ high school or beyond, n=232	57.8	42.2	
Marital status, %			
Married, n=833	42.1	57.9	0.240
Single/ Widow/ Divorced, n=164	41.3	62.8	
Perceived family income, %			
Low, n=454	41.4	58.6	0.960
High, n=543	41.3	58.7	
Occupation, %			
Currently employed, n=160	54.4	45.6	<0.0001
Unemployed, n=837	38.6	61.4	
Social security health insurance, %			
Yes, n=868	41.8	58.2	0.409
No, n=129	38.0	62.0	
Living arrangements, Alone, % n=70	32.9	67.1	0.136
Other, n=957	42.0	58.0	
Self-reported risk factors, %			
Present, n=909	42.5	57.5	0.019
Absent, n=88	29.5	70.5	

Data are presented as mean ± standard deviation, and percentages*Chi-square and Student's unpaired t-test

In the final model of the multivariate analysis, the factors having a negative effect on knowledge of the major warning signs of heart attack were having a primary school or lower level of education (OR=2.447, 95% CI 1.773-3.378; p=0.000), being older (OR=1.020, 95% CI 1.007-1.032, p=0.002), living in urban area (OR=1.493, 95% CI 1.133-1.968, p=0.004), being unemployed (OR=1.436, 95% CI 1.010-2.041, p=0.044) and absence of self reported risk factors (OR=1.965, 95% CI 1.201-3.216, p=0.007) (Table 4).

The participants stated that they had learned about the warning signs of heart attack and risk factors from television (28.6%), from neighbors/relatives (28.3%) and from their doctor (12.6%).

Although 8.8% (n=88) of the participants had no risk factors, 25.6% (n=256) had one risk factor, 28.8% (n=288) had two risk factors, and 17.9% (n=179) had more than two risk factors. The most common reported risk factors were physical inactivity (54.3%), hypertension (42.0%), and hypercholesterolemia (33.0%) (Table 5).

The participants stated that the first actions to take for someone having a heart attack are to put them on their back, open their collar, and raise their feet (22.4%), call 112 (the number for ambulance service in Turkey) (22.2%), perform CPR (17.7%) and take them to the nearest hospital (12.3%) (Table 6).

It was determined that 853 individuals, 85.6% of the participants did not know how to do cardiac compressions, and of those who did know, 48.7% (n=144) learned from television, 29.6% from first aid lesson in a driving course, 13.9% from a first aid course given by a doctor, and 7.8% from schools and friends. The length of time since they had learned about how to do cardiac compressions was a mean of 14.3±10.3 (1-50) years. It was determined that 47.8% of the participants (n=477) would like to take a free CPR course from a team of specialists.

Discussion

Although this study has some limitations, it provides based data in terms of the heart attack awareness. More than half of the participants knew someone who had had a heart attack but more than a third did not know what a heart attack was. Only 20.9% of the participants responded the question "what is a heart attack?" with the answer "It is a blockage in the arteries feeding the heart" Which was expected by the researchers. Of all participants 23.2% did not know any of the warning signs of heart attack, 16.6% gave incorrect symptoms (such as, headache, back ache, speaking difficulty) and 1.3% gave risk factors as warning signs. In a study by Limbu et al.(9) it was reported that

Table 5. Participants' self-reported risk factors for heart attack, 2006, N= 997

Self-reported risk factors	n	%
Physical inactivity	542	54.3
Hypertension	419	42.0
Hypercholesterolemia	330	33.0
Current tobacco use	210	21.0
Diabetes	193	19.3
Father or brother with CHD before age 55	195	19.5
Mother or sister with CHD before age 65	174	17.4
Previous history of heart attack	86	8.6
Angioplasty procedure	65	6.5

Data are represented as proportions/percentages
CHD – coronary heart disease

Table 4. Risk factors for awareness of heart attack according to logistic regression analysis, final model

Variables	B	OR	%95 CI	p
Age*	0.019	1.020	1.007-1.032	0.002
Residence				
Rural	Reference	1.493	1.133-1.968	0.004
Urban	0.401			
Education				
Secondary/high school or beyond	Reference	2.447	1.773-3.378	<0.0001
With or lower than primary school	0.895			
Occupation				
Currently employed	Reference	1.436	1.010-2.042	0.044
Unemployed	0.362			
Self-reported risk factors				
Present	Reference	1.965	1.201-3.216	0.007
Absent	-0.676			
Constant	-1.961	0.141		<0.0001

R square = 0.092 * The age of respondents not dichotomized and the odds ratio for age was obtained with using it as consistent variable in the model
Logistic regression (the Backward-Wald method) model was used for risk assessment

Table 6. Participants' immediate actions to take for heart attack, 2006

First response/action (if witnessed heart attack)*	n	%
Place on back, open collar, elevate feet	224	22.4
Call for an ambulance (Call 112)	222	22.2
Do "heart massage"	177	17.7
Take/send to the nearest hospital	123	12.3
Do what neighbors/relatives recommend	47	4.7
Give artificial respirations	36	3.6
Have them smell cologne, have them drink water	31	3.1
Wouldn't be able to do anything	30	3.0
Pour cold water over their face	27	2.7
Give medication	9	0.9

*Only the first response was recorded
Data are represented as proportions/percentages

19.0-25.0% did not know any warning signs. In this Aydın study the first three warning signs of heart attack given by the participants were loss of consciousness/fainting (39.2%), chest pain/heart pain (34.2%), and radiation of pain (25.5%). In the international literature the first three signs are chest pain or discomfort (91.0%) chest pressure/tightness/pain/heaviness (66.7%), chest pain (56.6%), fainting or collapsing (48.0%) (9, 16, 22, 23). It was found that the awareness of major warning signs ("chest pain" and "radiation of pain") was related to multiple sociodemographic characteristics, but on the other hand, there was no significant relationship between awareness and marital status, perceived family income, social health insurance, or living arrangements. In the final model utilizing multivariate analysis, older age, educational status of primary school or less were found to be factors related to decreased awareness of warning signs. DuBard et al.(16) found a high level of knowledge about heart attack in female participants, those with higher income and educational level, those who were married, and those who had greater access to care. Educational level finding of DuBard et al. (16) was similar with result of Aydın study. In our study rural residence and being employed have significant odds ratios. The relevance of these observations in the context of the study could be explained with future detailed surveys.

Another component of heart attack awareness is knowledge about the risk factors. Of the participants, 11.8% did not know any of the risk factors. Among the risk factors given, stress was ranked as the most common (65.6%), followed by smoking (23.0%), poor nutrition/ eating fatty foods (12.6%) and fatigue (12.5%). The major risk factors that can be modified for coronary heart diseases of tobacco smoking, high blood pressure, diabetes mellitus, high blood cholesterol, obesity and overweight and physical inactivity were not adequately known by the participants. Stress was also the most common contributing factor reported in this study (65.6%). Alcohol, another contributing factor, was only known by 6.4% of the participants. An interesting point here is that the participants in this study listed poor nutrition/eating fatty foods (12.6%) and fatigue as primary risk factors, which. are not listed as risk factors for coronary heart disease by the American Heart Association (19). In previous studies about heart attacks, the primary aim was to determine participants' knowledge level. Awareness of warning signs and risk factors were not asked about in detail. In this study, awareness of major risk factors (smoking, high blood cholesterol, high blood pressure, physical inactivity, obesity and overweight, diabetes mellitus) was low.

When asked to identify what risk factors for heart attack they had only 8.8% of the participants were able to do so. On the other hand, one fourth had one risk factor, one fourth had two risk factors, and approximately one fifth had three risk factors. The most commonly reported risk factors were physical inactivity (54.3%), hypertension (42.0%) and hypercholesterolemia (33.0%). As it is seen in the results, it is a considerable finding for other researchers that the participants have lower data of warning symptoms of myocarditis infarction although they are the individuals under risk for the risk of heart attack. In this study, it is suggested that asking about knowledge and awareness of risk factors could provide guidance in the planning of health promotion programs.

Barnhart et al. (22) reported that in the US participants' major sources of information about heart attacks are television (56.7%), print media (28.0%) and radio (6.8%), but physicians were not listed. Lovlien et al (24) also emphasized that nurses have a vital role in training of patients with coronary heart disease, both before and after MI. In this study, however, the first three sources given were television, newspapers, and magazines (28.6%), relatives and friends (28.3%) and doctors (12.6%). It is interesting to note that a similar percentage of individuals get their information from the media and from friends and relatives. It would be beneficial to keep this information in mind when planning public health education.

In this Aydın study one fourth of the participants stated that the first immediate action they would take for warning signs of a heart attack would be to put the person on their back, open their collar and elevate their feet. In national studies, although there are different practices according to the forms of health care services in the countries and the state of development of the countries, when there are warning signs of a heart attack 66.7% use ambulance services, such as 911, and take the patient immediately to a hospital or get a doctor's consultation (77.6%) (9, 22). In this Aydın study approximately one fourth of the individuals thought about calling an ambulance (112, in Turkey). On the other hand, 17.7% of the participants stated that they would do "heart massage" when warning signs of a heart attack occurred. This answer is different from that given in other studies. This result was concerning to the researchers because 85.6% of the participants did not know how to do CPR and 48.7% of those who stated that they knew how to do CPR had learned it from television. Only 2.7% of the participants had ever performed CPR. A statistically significant relationship was found between knowing about how to do CPR and doing CPR ($p<0.001$). Only 29.9% of those who stated that they would do "heart massage" knew how to do CPR. In accordance with the First Aid Regulation in Turkey (published in the Official Gazette dated 18.03.2004, Article 16), one in 20 employees at all facilities and institutions and one in 10 employees at workplaces with heavy and dangerous work are required to have received at least a "Basic First Aid Education" certificate from a center authorized by this regulation and it is

required that there be a first aid provider on site. However, this regulation has not been widely put into practice.

Limitations of the Study

In this population based study, because most of the data was collected during the day-time, frequently in the afternoons and on weekday. It is clear that the results cannot be generalized to the wider population.

A questionnaire reliability study was planned. But re-application of forms to a particular number of subject with a two-week-interval could not be realized because of time constraint and refusal by participants.

Sex was not taken to the final model because of the high female rate as a result of the disabilities of the research.

Conclusion

In this study, 23.2% of the participants did not know any of the warning signs of heart attack, and their awareness of the major risk factors was also very low. It would be beneficial for practices that would increase the knowledge and awareness of warning signs and risk factors to be included in health promotion programs. It was interesting to find that individuals get informed as much from the media as they do from their friends and relatives. This result may be interpreted as a problem in access to public health care services. However, there are advanced health care services in Aydın. Here the public finds it easy to share their problems and information with their relatives and friends. For this reason, using peers may be the preferred method in planning public health education.

Risk groups and the characteristics of risk groups need to be kept in mind when providing health care services. Therefore, it would be beneficial for similar regional studies to be conducted. Education needs to be provided for health care workers about approaches to risks and risk management and for those who will benefit from health care services education that will increase awareness of risks.

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