


ORIGINAL ARTICLE

Awareness of Patients Admitted to the Emergency Department About Overdiagnosis

Acil Servise Başvuran Hastaların Aşırı Tanısal Değerlendirme Hakkındaki Farkındalığı

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ABSTRACT

Background: Overdiagnosis is defined as detecting a disease or abnormal condition that, if left undiagnosed, would not harm the individual.

Our aim in the study is to increase individuals' awareness of overdiagnosis from a social and demographic perspective. Thus, we think that the number of unnecessary laboratory tests, computed tomography and other imaging tests in the emergency department can be reduced.

Methods: For the study, a questionnaire including demographic data and 7 questions about overdiagnosis was prepared for the patients who applied to the emergency department. The questionnaire was filled out by the emergency specialists and senior emergency assistants in charge of the patient in the form of questions and answers with the participants.

Results: Our primary findings are: (1) There is statistically significant relationship between patients' ideas about overdiagnosis and variables such as gender, education level, place of residence, economic status, chronic diseases and the number of drugs used; (2) When we asked the patients if they would like to have a screening test for the diagnosis of a serious disease that does not cause complaints, 406 (76.5%) people stated that they wanted to have a screening test. However, after informing about overdiagnosis, this number decreased to 261 (49.2%) people.

Conclusion: In our study, we demonstrated that patients did not want unnecessary diagnosis and treatment when informed about overdiagnosis and overtreatment before performing any screening test. Therefore, we think that if patients are adequately informed, overdiagnosis and overtreatment rates, which place a great burden on the healthcare system, can be reduced.

Keywords: Overdiagnosis, Early Diagnosis, Tomography, Emergency Service

ÖZ

Amaç: Aşırı tanısal değerlendirme, kelime anlamı aşırı teşhis olan ve teşhis edilmediği takdirde kişiye zarar vermeyecek bir hastalığın veya anormal bir durumun tespit edilmesi olarak tanımlanmaktadır. Çalışmadaki amacımız sosyal ve demografik açıdan bireylerin aşırı tanısal değerlendirme hakkındaki farkındalığını arttırmaktır. Böylelikle acil serviste gereksiz laboratuvar tetkiklerinin, bilgisayarlı tomografi ve diğer görüntüleme tekniklerinin sayısının azalabileceğini düşünüyoruz.

Gereç ve Yöntem: Çalışma için acil servise başvuran hastalara yönelik demografik verileri ve aşırı tanısal değerlendirme hakkındaki 7 soruyu içeren anket formu hazırlandı. Anket formu, sorumlu acil uzmanları ve kıdemli acil asistan doktorları tarafından, katılımcılarla karşılıklı soru cevap şeklinde dolduruldu.

Bulgular: Elde ettiğimiz birincil bulgular şunlardır: (1) Hastaların aşırı tanısal değerlendirme hakkındaki fikirleri ile cinsiyet, eğitim düzeyi, ikamet yeri, ekonomik durumu, kronik hastalıklar ve kullandığı ilaç sayısı gibi değişkenler arasında istatistiksel olarak anlamlı düzeyde ilişki vardır. (2) Hastalara, "Şikâyete sebep olmayan ancak ciddi bir hastalığın teşhisi için tarama testi yaptırmak ister misiniz?" diye sorduğumuzda 406 (%76,5) kişi tarama testi yaptırmak istediğini belirtti. Ancak aşırı tanısal değerlendirme hakkında bilgilendirme sonrasında bu sayının 261 (%49,2) kişiye düştüğü görüldü.

Sonuç: Çalışmamızda herhangi bir tarama testi yapmadan önce, hastaların aşırı tanısal değerlendirme ve tedavi konusunda bilgilendirildiğimizde; hastaların büyük bir oranda gereksiz teşhis ve tedavileri istemediğini görmekteyiz. Dolayısıyla eğer hastalar yeterli bir şekilde bilgilendirilirse, sağlık sistemleri üzerinde büyük bir yük oluşturan aşırı tanısal değerlendirme ve tedavinin azalabileceğini düşünüyoruz.

Anahtar Kelimeler: Aşırı Tanısal Değerlendirme, Erken Teşhis, Tomografi, Acil Servis

Introduction

Overdiagnosis is defined as detecting a disease or abnormal condition that, if left undiagnosed, would not harm the individual. It was first described in the cancer diagnosis; however, it can also occur in many cases, especially in slow-progressing and asymptomatic conditions (1). Overdiagnosis is considered a challenge to the sustainability of healthcare systems

and human health. As Welch, Schwartz, and Woloshin stated in their book *Overdiagnosed*, published in 2011, "early diagnosis is a double-edged sword"; While it has the potential to provide significant benefit to treatment it can also lead to the detection of abnormalities that are hidden dangers and never cause complaints in the person (2). As a result, individuals may experience no

clinical benefit from overdiagnosis even if they are physically, psychologically, or financially harmed.

When the literature is examined, the main parameters that can be listed as the causes of overdiagnosis are as follows; (a) "more is better" and "new is better" approaches in health care, (b) increased testing rates, the doctor or patient's willingness not to miss a diagnosis, (c) financial incentives that hospitals and healthcare professionals have to do more research and treatment for patients, (d) advances in industry and technology and the use and promotion of increasingly sensitive testing, (e) health professionals' fear of malpractice, (f) advertisements that take advantage of our fear of undiagnosed disease and encourage us to go to our doctor for testing (3,4).

Overdiagnosis can have severe financial and health consequences. Side effects of treatments, unnecessary tests, deterioration in the quality of life due to treatment complications, and early mortality can be considered examples of the negative consequences of overdiagnosis. In addition, overdiagnosis creates an excessive financial burden on the healthcare system by causing unnecessary use of diagnostic tests, health facilities, and services (1). Therefore, the possibility of overdiagnosis should be kept in mind before any diagnostic test is ordered. Mandatory strategies to inform patients regarding the benefits and harms of screening are also among possible solutions that can minimize screening-related overdiagnosis. Raising awareness of this phenomenon is extremely critical, as overdiagnosis is one of the most common consequences of screening and early detection of any abnormality. Thus, the present study aimed to measure the awareness of patients who applied to the emergency department about overdiagnosis in the light of sociodemographic information.

Materials and Methods

Study design and settings:

The present study was performed in Emergency Department of the City Hospital, a tertiary university hospital where approximately 1000 patients are admitted daily. Of the individuals who applied to the emergency department between October 17, 2022, and December 17, 2022, 531 patients were included in the study. The local ethics committee approved the study, which was performed following the VMA Declaration of Helsinki, 1964, and later revisions. The study was conducted by emergency specialists and senior emergency residents. Questionnaire forms were introduced to all participants, they were informed about the purpose of the study, and detailed informed consent was obtained from all. In addition, the study was performed on a voluntary basis. Patients who were able to express themselves and were over the age of 18 were included in the study. Patients under 18, intubated patients, pregnant patients, patients who voluntarily quit the study, patients who refused to participate, and patients with missing data collection forms were excluded. The questionnaire was filled out by the emergency specialists or senior

emergency residents in charge of the patient in the form of questions and answers with the participants. In addition, the sociodemographic information of the patients was recorded in the patient follow-up form by the physician responsible for the patient.

Patient follow-up form

A patient follow-up form was created for each patient participating in the study. In this form, a questionnaire consisting of 7 questions regarding the thoughts of the patients about overdiagnosis was included. In addition, demographic data such as age, gender, place of residence, education level, economic status, health insurance, chronic diseases and drugs used by the patients were also included in this form.

Statistical analysis

The data in the study were collected with the "Overdiagnosis Awareness Questionnaire in Emergency Department Patients." The questionnaire consisted of two parts and a total of 15 questions. Accordingly, the first part included eight questions about the demographic information of the participants. In the second part, there were seven questions to determine the overdiagnosis awareness of the patients. The seven questions in the questionnaire are presented in Table 1. In the study, the data were first transferred to the IBM SPSS statistical program (v.20.0; SPSS Inc., Chicago, IL, USA), and the analyzes were performed with this program. Continuous variables were presented as mean and standard deviation and categorical variables as frequency and percentage values. Differences between groups depending on continuous variables were evaluated with an independent sample t-test and categorical variables with a Pearson chi-square test. The assumptions required for the independent sample t-tests were checked, and no significant violations were detected. Similarly, in the chi-square analysis, the minimum expected value was investigated before reporting the Pearson chi-square value, and again no violation was determined. Correlations between continuous variables were analyzed with the Spearman Correlation test. A p-value less than 0.05 was considered statistically significant in all interpretive analyses.

Results

A total of 531 patients were included in the study. The answers provided by the participants to the survey questions are presented in detail in Table 1.

In our study, the relationship between demographic data and the questionnaire was examined. When the "Yes" and "No" answers given to the questions depending on the age variable were analyzed, the independent sample t-test results were statistically significantly different for Questions 1 and 4 ($p=0.00$ and $p=0.05$, respectively). Accordingly, the ages of those who answered "Yes" to Question 1 (44.34 ± 15.64) were significantly higher than those who answered "No" (38.10 ± 15.11). As for Question 4, the ages of those who answered "Yes" (38.01 ± 14.59) were statistically

Table 1. Survey questions and answers

Questions	Yes, n (%)	No, n (%)	Blank,n(%)
1. Do you have regular screening tests?	62 (11,7)	469 (88,3)	0
2. If you wanted to be scanned, do you know where to go?	204 (38,4)	327 (61,6)	0
3. Do you have enough information about the benefits and harms of screening tests?	119 (22,4)	412 (77,6)	0
4. You have a serious illness that does not cause any complaints. This disease can be diagnosed by performing some screening tests. Would you like to have these screening tests?	406 (76,5)	125 (23,5)	0
4. Those who answered YES to the question:			
5. Do you think you can cope with the physical, psychological and financial difficulties you will encounter during the treatment and diagnosis of the disease?	328 (80,8)	78 (19,2)	0
4. Those who answered NO to the question:			
6. When this disease is diagnosed late, you will get less response from treatment. Still don't want to be diagnosed?	90 (72)	35 (28)	0
7. You have a serious illness that does not cause any complaints. This disease can be diagnosed by performing some screening tests. Would you like to have these screening tests? (Asked after being informed about overdiagnosis)	261 (49,2)	228 (42,9)	42 (7,9)

n; number of participants, %; represents the percentage value in the category.

Table 2. Analysis results based on demographic data

Variable	Subgroup	Values	Question1	Question 2	Question3	Question4
Age, X ± SS ^a		38,77±15,3	0,00**	0,24	0,07	0,02*
Gender, n (%) ^a	Woman	251 (47,26)	0,00**	0,01*	0,43	0,40
	Male	280(52,7)				
Residence,n(%) ^a	Urban	463 (87,1)	0,67	0,01*	0,00**	0,14
	Rural	68 (12,8)				
Education level, n (%) ^a	Can't read or write	26 (4,9)	0,04*	0,00**	0,00**	0,03*
	Primary school	162 (30,6)				
	High school	175 (33,0)				
	Universty	168 (31,6)				
Economical Situation, n (%) ^a	Bad	37 (6,9)	0,01*	0,42	0,01*	0,34
	Middle	340 (64)				
	Good	154 (29,0)				
Health Insurance, n(%) ^a	Present	480 (90,3)	0,72	0,13	0,15	0,47
	Absent	51 (9,6)				
Chronic Disease, n(%) ^a	Present	133 (25,04)	0,00**	0,61	0,09	0,89
	Absent	398 (74,9)				
Number of drugs used, n(%) ^a	0	390 (73,4)	0,01*	0,85	0,12	0,54
	1-2	103 (19,4)				
	3-4	19 (3,5)				
	5 and above	19 (3,5)				

achi-square test; b independentsample t test;

Table 3. Responses to Question 7 of those who answered "Yes" to Question 4 and "Yes" to Question 5.

7. Question	n	%
Yes	215	65,6
No	105	32
Blank	8	2,4

n; Number of responding participants, %; Percentage of respondents

Table 4. Percentage and frequency values of the answers given to Question 7 by those who answered "No" to Question 4 and "No" to Question 6.

7. Question	n	%
Yes	8	22,9
No	26	74,3
Blank	1	2,9

n; The number of participants, %; Percentage of respondents

significantly lower than those who answered "No" (41.50±17.16). The chi-square test findings of the other categorical variables based on the questions are summarized in Table 2. There was significant relationship between the variable and the question for at least one question in all other variables, except for the " Social Security Health ". In addition, the "Education Level" variable was statistically significantly correlated with all questions. In other words, "Education Level" was determinant in all questions (Table 2).

In this study, when we asked the patients if they would like to have a screening test for the diagnosis of a severe disease that did not cause complaints, 406 (76.5%) participants stated that they would like to have a screening test. However, when the answers given to the same question after being informed about the overdiagnosis were examined, it was observed that this number decreased to 261 (49.2%) people.

Patients who wanted a screening test and thought they could cope with the difficulties they would encounter when the disease was diagnosed were informed about overdiagnosis. When the answers to the 7th question were analyzed, it was determined that 105 participants initially wanted to have a screening test, but decided not to have a screening test after being informed. (Table 3).

When we informed the patients who did not want to have a screening test with late diagnoses, and there was a possibility of less benefit from the treatment, 35 people stated that they could have a screening test. However, when we informed these patients about overdiagnosis and examined their answers to question 7, 26 (74.3%) of 35 patients, who wanted to have a screening test, gave up having a screening test (Table 4).

When the patients who did not want to have a screening test were informed about the late diagnosis and the fact that they could benefit less from the treatment, 90 (72%) patients stated that they still did not want to have the test. These patients were informed about overdiagnosis and asked the 7th question, but 59 (65.7%) people still did not want to be tested.

Discussion

Overdiagnosis has started attracting great attention due to the increase in cancer screenings since the beginning of 21st century (5). The literature review has revealed that thyroid cancer can be considered one of the most striking examples of overdiagnosis. It is estimated that more than 500,000 people in 12 countries, many of whom have undergone unnecessary surgery and lifelong medication, may have been overdiagnosed with thyroid cancer over the past two decades, (6).

Studies have demonstrated that increased use of imaging tests may also lead to the detection of asymptomatic conditions such as aortic aneurysms and renal carcinoma. Thus, it has been determined that recent nephrectomies have been associated with the number of screenings performed, not the actual incidence of kidney cancer (7).

For example, when the studies for the diagnosis of pulmonary embolism (PE) were examined, the incidence of PE diagnoses in the United States increased by 81% between 1998 and 2006, from 62.1 per 100,000 to 112.3% per 100,000 since the use of Computed Tomography Pulmonary Angiography (CTPA). However, despite the highly increasing diagnosis of PE, the mortality rate for PE remained almost unchanged (12.3 and 11.9 deaths per 100,000 in 1998 and 2006, respectively). Only a small change in mortality indicates that PE diagnosed between 1998 and 2006 was in the low-risk group (8). From this point of view, CTPA has been observed to have been used too frequently and unnecessarily for the diagnosis of PE, leading to overdiagnosis and treatment of clinically insignificant PE. In addition, overuse of CTPA may also cause the incidental detection of asymptomatic conditions such as pulmonary nodules, thyroid nodules, or adenopathy, leading to even more screening or invasive testing. As a result, these abnormalities have often been observed to be harmless (9).

Patients recommended to be screened should be informed about overdiagnosis, and the benefits and harms of screening should be fully explained. When the existing guidelines are examined, making a joint decision with the patient for screening tests is recommended, but this recommendation is rarely applied in practice (10). Breast screening studies in the United Kingdom, Switzerland and France consider overdiagnosis as a severe hazard, emphasizing the need to provide full and balanced information to patients (11).

The present study examined patients' thoughts about screening tests and overdiagnosis. When we asked 531 patients who participated in the study, "Do you want to have a screening test for the diagnosis of a serious disease that does not cause complaints," 406 (76.5%) people stated that they wanted to have a screening test. However, when we evaluated the answers given by the participants to the same question after providing information about overdiagnosis, it was observed that the number of people who wanted to have a

screening test decreased to 261 (49.2%) participants (Table 1). An Australian study reported that over 90% of women who had mammograms and 82% of men who had screened for prostate-specific antigens were not informed about overdiagnosis. When the concept of overdiagnosis was explained to patients, a large percentage felt that this information was crucial for decision-making (12). Another study demonstrated that women aged 48-50 years were much less likely to undergo mammographic screening when informed about the extent of possible overdiagnosis (13). As a result, both the literature and the data we obtained from our study reveal that the rate of those who want to be diagnosed with the disease decreases significantly when patients are given sufficient information about screening tests and overdiagnosis.

In a study performed in Canada, the average age of women who had mammography was higher than the average of those who did not (14). In this study, we asked the patients whether they had regular screening tests (Question 1). Accordingly, the mean age of those who answered "Yes" was higher than those who answered "No."Based on this, it is observed that those who regularly undergo screening tests are older participants. When we asked the patients, "Would you like to have a screening test in case you have a severe disease that does not cause any complaints?" (Question 4), the mean age of those who answered "Yes" was lower than those who answered "No."Therefore, our study indicates that young participants want to be diagnosed if they have a severe illness even if it does not cause complaints. According to studies in the literature, young women have limited information about mammography screenings, and it is observed that they have more mammograms than women in the older age group after they are informed (15). In another study, it was found that factors such as gender, education level, marital status, any chronic disease and the presence of health insurance were important determinants of patients' willingness to undergo screening colonoscopy(16). Similarly, the present study revealed that the answers given by all participants to the first four questions were significantly related to variables such as gender, education level, place of residence, economic status, chronic diseases, and the number of drugs used (Table 2).

Participants, who wanted a screening test and thought they could cope with the difficulties they would encounter when the disease was diagnosed, were informed about overdiagnosis, and the 4th question was asked again. It was observed that 105 of the participants wanted to have a screening test at first but waived after being informed (Table 3). A study in 2003 reported that young women's decisions to have a mammogram were often made with insufficient information, which was also effective in making the wrong decision (15). In a similar study, it was revealed that informing patients increased participation in decision-making about the disease and decreased screening for prostate cancer (17).

In addition, when we told 125 people, who did not want to have a screening test (who answered "No" to Question 4) in our study, that they were less likely to benefit from late diagnosis and treatment (Question 6), 35 people stated that they could change their minds and get tested. However, 26 of these 35 participants did not want to be tested again after being informed about the overdiagnosis (Table 4).

Conclusion

Overdiagnosis poses a considerable burden for healthcare systems. Factors such as the widespread use of newly developed imaging systems and screening tests for the diagnosis of low-risk diseases and the physician's desire not to miss the diagnosis cause overdiagnosis and healthy people to be seen as unnecessarily sick. In this study, we demonstrated that patients did not want unnecessary diagnosis and treatment when informed about overdiagnosis and overtreatment before performing any screening test. Therefore, we think that if patients are adequately informed, overdiagnosis and overtreatment rates, which place a great burden on the healthcare system, can be reduced. Despite the studies performed, there is a need to develop new strategies to reduce overdiagnosis and overtreatment. This issue remains one of the biggest problems of healthcare systems.

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