TURKISH
JOURNAL OF PUBLIC HEALTH

MAY 2004 Published biannually VOLUME 2 NUMBER 1

TJPH

A JOURNAL OF PEER-REVIEWED RESEARCH PUBLISHED BY
THE TURKISH SOCIETY OF PUBLIC HEALTH SPECIALISTS
ISSN 1304-1096

TURKISH JOURNAL OF PUBLIC HEALTH

ISSN 1304-1096

Printed by
Graphis Matbaa

Produced in Turkey by Ege Yayinlari
Aslan Yatagi Sokak, Sedef Palas No.35/2 Cihangir
34433 Istanbul - Turkey
Tel: +90 (212) 249 0520 - 244 7521-23
Fax: +90 (212) 244 3209
E-mail: zero@kablonet.com.tr

Contents

From the Editor

Turkish Journal of Public Health is now in its second year of existence and three issues are published with the combined efforts of the reviewers and authors who have contributed their valuable time and work.

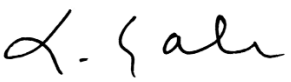
In this issue, besides four research articles two important topics are discussed: byssinosis and confounders in medical research. B. Cakir, very briefly enlightened confounding and interaction in her review.

In the notes from the field the structure, organisation, educational activities and future perspectives of the Turkish Medical Association's Institute of General Practice is described by O. Asut. This Institution is a unique model in general practice training and expected to improve the primary health care services in Turkey.

We would like to remind the 9th National Public Health Congress which will be held in Ankara, Turkey, during 3 to 6 November, 2004. It will mark the 40th anniversary of the establishment of public health/community medicine in Turkey. As well as participation from Turkey, the organizers expect international participation. The main topics of the congress will be "The Last 40 Years of Public Health in Turkey and Throughout the World", "Emerging Health Issues in the 21st Century", "Population, Environment and Development", and "Public Health in Disasters". More information about the congress is available at the Web Site (www.halksagligi.org).

We are happy to have the third issue of Turkish Journal of Public Health and we would like to thank all the reviewers and authors who contributed to the first three issues of this journal.

Editor



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Aim and Scope

The Turkish Journal of Public Health (TJPH) is a peer-reviewed research journal published bi-annually and serving a broad audience in the field of Public Health and Community Medicine both nationally and internationally. TJPH aims to provide a medium for the rapid communication of advances and new knowledge in this field. The editor anticipates receiving manuscripts from the following areas of research: health policy and management, biostatistics, epidemiology, environmental health, health economics, medical demography, social sciences for health, health education, public health laboratory, community nutrition, infectious diseases, disaster management, accidents, women's health/reproductive health, child health, chronic diseases, and occupational health.

Submission of Papers

The following types of contributions are welcomed:

1. Original research articles: papers reporting original research findings in a relevant area (maximum 5000 words).
2. Short reports: preliminary/short reports of research findings (maximum 1500 words).
3. Critical reviews: authors are advised to contact the editor prior to submission of critical review papers (maximum 4500 words).
4. Notes from the field: Highlighting practice-based programs, initiatives of widespread interest, experiences to share with the public health community (maximum 1000 words).
5. Letters to the editor: a limited number of letters to the editor concerning the published papers in the TJPH (maximum 300 words).
6. Data: Data from nationally or sub-nationally representative surveys (maximum 35 tables and figures).

Submissions will be considered on the understanding that they comprise original, unpublished material and are not under consideration for publication elsewhere. A cover letter to this effect should be enclosed with each submission, signed by all authors of the paper.

All papers are published in English although submission of articles in Turkish is encouraged and will not prejudice editorial consideration. The authors may use either the British or the American spelling, but they should be consistent throughout the paper. Submissions undergo a two-tiered review process. The editorial board for overall quality and interest screens them initially. Papers accepted for formal review will be sent anonymously to at least two independent referees.

Authorship

Authorship by more than 6 authors requires justification. We adhere to the criteria of the International Committee of Medical Journal Editors (JAMA. 1997; 277:927-934). For manuscripts with two or more authors, each author must qualify by having participated actively and sufficiently in the study that is being carried out and reported on. The inclusion of each author in the authorship list of a report is based only (1) on substantial contributions to (a) concepts and design, or analysis and interpretation of data and (b) drafting the manuscript or revising it critically for important intellectual content; and (2) on final approval by each author of the submitted version of the manuscript. Conditions 1 (a and b) and 2 must both be met. Others contributing to the work should be recognized separately in an Acknowledgement. In the covering letter that accompanies the submitted manuscripts, it must be confirmed that all authors fulfilled both conditions.

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Electronic submission would be preferred.

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All authors must sign the letter, with one named correspondent (give postal and e-mail addresses and telephone and fax numbers). Disclose all possible conflicts of interest (e.g. funding sources for consultancies of studies of products). A brief indication of the importance of the paper to the field of public health is helpful. You may suggest up to 4 knowledgeable reviewers (include postal and e-mail addresses and telephone and fax numbers).

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The text of the article should include the following: Abstract (up to 250 words, followed by up to 6 keywords), Introduction, Materials and Methods, Results, Discussion, and Acknowledgments. Each section should begin on a new sheet.

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Tables must be concise, as simple as possible, and cited consecutively by Arabic numerals in the text (Table 1, Table 2, etc). Each table should be titled and typed on a separate sheet. The title of each table should clearly indicate the nature of the contents. Sufficient detail should be included in the table footnote to facilitate interpretation.

References

Cite references in numerical order and as superscripts in the text. List all authors when there are six or fewer; when there are seven or more, list only the first three and add "*et al*." Use Index Medicus (abridged) abbreviations for journal names. Do not reference papers that are "submitted"; these can be mentioned in the body of the text. Cite personal communications in text only, giving source, date, and type (if e-mail, provide sender's address). References should follow the style described by the International Committee of Medical Journal Editors (www.icmje.org). The following are sample styles:

Journal article

Feldman HA, McKinley SM. Cohort versus cross-sectional design in large field trials: precision, sample size, and unifying model. Stat Med 1994; 13: 61-78.

Book

UNICEF. State of the World's Children. New York: Oxford University Press, 1998.

Chapter in a book

Phillips SJ, Whisnant JP. Hypertension and stroke. In: Laragh JH, Brenner BM, editors. Hypertension: Pathophysiology, Diagnosis, and management. 2nd ed. New York: Raven Press; 1995. p. 465-78.

Online book or web site

Garrow A, Winhouse G. Anoxic brain injury: assessment and prognosis. In: Up To Date Cardiovascular Medicine [online]. Available at: www.UpToDateInc.com/card. Accessed February 22, 2000.

Acknowledgements

Prepare acknowledgments on a separate page. Upon acceptance, you will be asked to certify that you have listed all persons who have contributed substantially to the work but who do not fulfill authorship criteria and that you have obtained permission for listing them. Also required is disclosure of all financial and material support. If human subjects are involved, you must report approval by an institutional review board. TJPH adheres to the Declaration of Helsinki of the World Medical Association (JAMA 1997; 277: 925-926).

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Assessment of dental fear among senior students in faculties of medicine and dentistry

Dilek ASLAN[a], Songul VAIZOGLU[b], Rabia GUNER[c], Nihat INAN[c], Tuba KINAY[c], Cem KILINC[c], Cetin IMAMOGLU[c], Derya GULNAR[c], Kuntay KOKANALI[c], Suheyl HAYTOGLU[c], Emre INOZU[c], Murat KOCYIGIT[c], Neslihan KIRMAN[c], Ozan ELVERICI[c], Cagatay GULER[d]

Abstract

The objective was to determine the dental fear experienced by senior students of faculties of medicine and dentistry at a university in Turkey. Two hundred and fifty one senior students of the faculty of medicine (FM) out of 287 (87.5%) and 58 senior students of the faculty of dentistry (FD) out of 70 (82.9%) participated in this cross-sectional study. Each participant completed a questionnaire under observation at each faculty in January, 2003. Majority of the participants from the FM were male (55.8%), while the majority from the FD was female (65.5%). Mean dental fear score was 15.1 for those from FM and 5.2 for those from FD and their medians were 13.0 and 3.0, respectively. The prevalence of dental fear among males and females were statistically non-significant for both medical and dental students. However, women visited their dentists more often than men. Another interesting finding was that the prevalence of dental fear among students who also had other types of fears was higher than among those who did not have other fears (*Medical students: p=0.046, Dental students: p=0.01*). There was no association between dental fear and having a health professional within their family. It was also found in this study that having a dental injection for local anesthesia was the most fearful procedure for the FD students, but facing with a working aerator and the actual treatment phase of teeth were the most fearful procedures for the medical faculty students. Dental fear of patients can be overcome through better communication skills of dentists.

Key words: medical students, dental students, fear, dental fear

Introduction

Many people can experience different fears, anxiety and even phobia from time to time. Depending on the changing conditions of life, we generally witness the emergence of new and different types of fears and they are defined according to their features. The fear of being stuck within an elevator, the fear of being stuck in traffic, height fear/phobia, plane phobia and dental fear are some examples for these different types of fears[1].

Dental fear may pose a serious threat for human health because of its impact on the lives of individuals. It often paralyzes people for seeking dental care, though they all know that the basis of mouth and dental health is the regular dental controls and care. However, a person with dental fear usually avoids from seeking regular dental care[1]. In terms of dental health and overall well being, this can have serious implications. When we take into consideration the organic link that exists among different systems of the human body, this so-called "simple" fear would finally become a threatening factor for physical health.

In many surveys conducted in different countries, the number of people who have fear about routine dental health procedures that usually consist of regular dental examinations was found around 30.0%. In fact, many studies in this field show that 36.0% of the people experience this situation and avoid much needed care due to fear surrounding the dental experience[1,2]. According to a study

[a] MD, MS, Lecturer, Hacettepe University, School of Medicine, Department of Public Health
[b] MD, PhD, Associate Professor, Hacettepe University, School of Medicine, Department of Public Health
[c] MD, Hacettepe University, School of Medicine
[d] MD, PhD, Professor, Hacettepe University, School of Medicine, Department of Public Health
Correspondence:
Dilek Aslan, Hacettepe University, School of Medicine, Department of Public Health, Ankara, Turkey.
e-mail: daslan@superonline.com, diaslan@hacettepe.edu.tr

carried out in the United Kingdom, 34.0% of people living in the northwest part of the country feel deep concern when they have physical complaints, which require them to see their dentists. Furthermore, 31.0% of people living in the southeast part of the country become anxious during their dental care procedures[2]. Another study conducted in the United States of America (USA) indicates that between 9.0% and 15.0% of people do not go to dentists due to their previous painful experiences and concerns about dental health problems[3].

Those who have dental fear may also have some other problems in terms of their mental health. As a result of chronically infected gums and teeth, a person may lose some of his/her teeth and have bad breath. There can be chewing and digestive problems. If they feel insecure about their breath and smile, this leads to less self-confidence and a hiding behavior when they talk or laugh. This type of fear may also bring other kinds of fears in individuals. Moreover, dental fear may cause further limitations in their social and business environments, thus creating a professional distress and difficulty source in their lives.

Health professionals are less likely to have dental fear compared to other professionals in the society. The long medical education and clinical training may contribute to a decrease in dental fears. Still, however, detailed studies are warranted in order to reveal this change in their attitude.

The aim of this study is to determine the opinions of senior students of faculties of medicine and dentistry about dental examinations and controls and the existence of their dental fear. If dental fear is identified in these students, then, it is important to understand the etiologies of their fears and the possible association between the socio-demographical characteristics of those students and their opinions about dental fear.

Materials and methods

Faculty of Medicine (FM) and Faculty of Dentistry (FD) in which the study was completed are the faculties of a university located in Ankara, the capital city of Turkey. Seventy senior students of FD and 287 senior students of FM constituted the sampling of our research. Two hundred and fifty one senior students of FM out of 287 (87.5% participation rate) and 58 senior students of FD out of 70 (82.9% participation rate) were included in this cross-sectional study.

The study team developed a simple scoring system (fear score) in order to evaluate the dental fear level of the students. The results are presented in Table 6. "Relaxed", "a little uneasy", "anxious", "very anxious" and "extremely anxious" were the categories. Feeling "relaxed" got "0" point, and feeling "extremely anxious" got "4" points. The highest score that a student could get was 52. Data collection was completed in January, 2003. SPSS 11.0 version (Statistical Package for Social Sciences) statistical programme was used for the analysis of the data.

Results

The socio-demographic characteristics of the students who were included in our study on dental fear are presented below (Table 1):

The mean age of students of FM was 23.7 ±0.9 (median=24.0, min-max: 21-27) and the mean age of senior students of FD was 22.8 ±0.9 (median=23.0, min-max: 21-25).

Table 1. Socio-demographic characteristics of the students (FM Phase VI, FD Phase V, 2003)

Characteristics	FM n	FM %	FD n	FD %
Sex				
Male	140	55.8	38	65.5
Female	111	44.2	20	34.5
Age				
<22	2	0.8	3	5.2
22	9	3.6	19	32.8
23	112	44.6	27	46.6
24	91	36.3	6	10.3
24+	37	14.7	3	5.6
A health professional in family				
No	164	65.3	38	65.4
Yes*	87	34.7	20	34.5
Physician	69	79.3	11	55.0
Dentist	15	17.2	3	15.0
Nurse	13	14.9	2	10.0
Other**	15	17.2	3	15.0
Total	251	100.0	58	100.0

* More than one "job" were mentioned.

** Laboratory technician, pharmacist, health technician, biochemistry technician.

About 76% of the students of FM and 56.0% of the students of FD visit a dentist only when they have complaints about their teeth. Almost 28% of FM students and 47.5% of FD students stated that they visit a dentist if they have a dental problem (Table 2).

Table 2. Attendance to dentist by the students and their typical behaviours when they have a dental problem (FM Phase VI, FD Phase V, 2003)

	FM n	%	FD n	%
Attendence to dentist by the students				
Attendance only when they have complaints about their teeth	190	75.7	35	56.0
Regular attendance for controls even when they have no complaints about their teeth	30	12.0	22	37.9
Having a dental problem which requires a regular attendance of dentist by student	16	6.3	3	5.2
No attendance at all	15	6.0	-	-
Total	**251**	**100.0**	**58**	**100.0**
Typical behaviours of the students when they have a dental problem*				
Taking analgesics	156	62.4	36	45.0
Visiting a dentist	71	28.4	38	47.5
Waiting for toothache to pass by itself	70	28.0	5	6.3
Sleeping to cope with toothache	13	5.2	1	1.2
Other**	10	4.0	-	-

* More than one option were chosen in each question.

** 10 students have chosen the option "other" and they did not explain what they meant.

Table 3. Negative experiences about previous dental examinations of students (FM Phase VI, FD Phase V, 2003)

Negative experience	FM		FD	
	n*	%	n	%
No	211	84.7	46	79.3
Yes**	38	15.3	12	20.7
Problems about local anesthesia	10	27.8	7	63.6
Problems about treatment	10	27.8	1	9.1
Attitude of the dentist	9	25.0	2	18.2
Malpractice problems	5	13.8	1	9.1
Hygenic problems	1	2.8	-	-
Impact of other patients	1	2.8	-	-
Total	**249**	**100.0**	**58**	**100.0**

* Two students did not answer this question.

** Two students replied as "yes" without any explanation.

15.3% of FM students and 20.7% of FD students had a negative experience about previous dental examinations. "Problems about local anesthesia or dental treatment" (27.8%) was the most important negative experience faced by the FM students. On the other hand, the most common negative experience of FD students was "the problems about local anesthesia" (63.6%) (Table 3).

Appendix 1 and 2 list the replies of participants with respect to their feelings of anxiousness about dental examinations.

Table 4. Dental fear scores of the students generally about dentists and dental examination (FM Phase VI, FD Phase V, 2003)

Fear Score	FM n*	%	FD n**	%	p
0-9	88	37.4	45	80.4	
10-19	76	32.3	9	16.1	
20-29	41	17.4	1	1.8	p<0.001
30-39	18	7.7	1	1.8	
40-52	12	5.1	-	-	
Total*	235	100.0	56	100.0	
Mean±sd	15.1±12.04		5.2±6.7		
Median	13		3		
Min-max	0-51		0-34		

* A total of 16 students did not answer these questions.

** A total of 2 students did not answer these questions.

The association between total fear scores of each group and some variables was also examined. As a result of these evaluations, there was no statistically significant difference between dental fear and sex (FM p=0.607, FD p=0.491), dental fear and age (FM p=0.319, FD p=0.822), and dental fear and the existence of a health professional within family (FM p=0.278, FD p=0.492). However, the fear scores of the students who have dental fear at any stage of treatment were much higher than the scores of those who do not have any dental fear. This statistical difference was significant (FM Chi-square=3.967, p=0.046, FD Chi-square=6.49, p=0.011). The fear scores of FM students who had previous negative experience about dental examination were much more higher than the scores of those who did not have any negative experience at all. This association was statistically significant (Chi-square= 9.986, p= 0.002). On the other hand, the difference was statistically non-significant in terms of a significant association among the FD students (Chi-square= 0.5, p=0.428).

Discussion

Dental fear can be seen as one of the main reasons for individuals for not seeking dental care when they have dental problems and not benefiting from dental health services or using them when it is very late. The researchers in this study could not find any publication at national level in the country on the assessment of dental fears during their literature searching, which was done before starting this study. One explanation of the fact that we could not find any example of these studies might be their non-publication in national and international circles. Or another explanation might be the lack of any study in this field. For this reason, this study constitutes an important step as it would attract the attention of people in this field.

Total fear scores taken by senior students of FD was significantly smaller than the total fear score of FM students, (The difference between the mean scores was 9.9, $t=8.4$, $p<0.001$). Lower level of fear scores taken by the senior students of FD might stemm from the professional education and clinic training they received on this field.

Dental fear was not affected by sex in this study (FM, $p=0.607$; FD, $p=0.491$). In another study conducted in the same field, no significant difference on dental fear was available between the sexes, though females were found to be more worried about dental examinations[4]. Another survey carried out in Saudi Arabia shows that dental fear was higher in females than in males[5].

Having a health professional in the family was another variable to be tested in our study. Like the previous variables, we could not find any statistically significant difference between dental fear and having a health professional within the family (FM, $p=0.278$; FD, $p=0.492$). Furthermore, there was no meaningful difference between those having a dentist in their family and those having not (FM, $p=0.10$; FD, $p>0.05$). Having a health professional in the family might not have an impact on the dental fear of this research group since these people themselves will also become health professionals soon. However, among the senior students of FM, those who had a dentist in their family generally visited dentists more regularly. Frequency of visit in these situations was much higher and statistically significant ($p<0.01$). These findings indicate that a dentist within or close to the family had a positive impact on regular dental controls of students, but could not help them in preventing fears about dental examinations.

It was found in our study that those students having other types of fears had also a tendency to have a higher level of dental fear. Their difference was statistically significant (FM, $p=0.046$; FD, $p=0.04$). In both groups of students, the most common fears were animal fear, height fear/phobia, dark phobia and claustrophobia. According to another study, those who had lower rates of dental fear also had at least one other fear/phobia, while those who had higher rates of dental fear also had at least five other types of fears. But these fears were extraordinary ones such as sickness and death, failure and shame, various social conditions, physical injury and natural disasters[6].

The fact that those who had dental fear also had other types of fears shows the complex nature of this feeling. In fact, dental fear is created or affected by many factors. In a survey searching the link between having anxiety and having dental fear, it was found that those who had higher anxiety might also have higher level of dental fear[7].

Previous painful negative experience was another influential factor in determining fear scores of the students. There was a statistically significant difference between the fear scores of FM students who had a previous negative record and those who did not have any ($p=0.002$). However, the difference between the fear scores of FD students who had negative experience and who did not have was not statistically significant ($p=0.478$). It seems that dental fear stems from a number of sources, however, previous painful and negative experiences during visits to a dentist's office were found to be the most important reason of dental fear in another research. Second important point was that the group members had already this fear inside them. Thirdly, the attitude of the dentist has generally caused extra fear among patients[6]. Negative experiences of previous dental examinations may lead patients to avoid subsequent dental examinations. There was a significant association between having previous negative experiences and not visiting a dentist when there is a need for dental examination ($p<0.01$). But the difference between having previous negative experiences and refraining from going to a dentist on the way or during the treatment was statistically non-significant ($p>0.05$). 62.4% of the students stated that they would have painkillers

when they had a toothache. 28.0% of them would wait for the toothache to pass away itself and 5.2% would sleep to cope with the toothache. Only 28.4 of them apply directly to a dentist when they face dental problems. As it is seen from the explanations, students generally try to solve their dental problems primarily by themselves. But, when they can not cope with their toothache, they finally visit a dentist only as the last option.

In our study, the most fearful situations during dental examinations faced by students were hearing the voice of the aerotor, facing the possibility of a dental injection and receiving dental injection for local anesthesia. Some other surveys on this field also indicated that people found dental injection of local anesthesia and feeling the driller as the most fearful situations during a dental treatment[4,5]. Moreover, the results of other researches conducted among FM and FD students confirm dental injection and feeling the driller as the most fearful situations[4,8].

As it was stated before, a fear scoring was done by the researchers in this study. However, apart from this option, various structured measurements or methods could have been used in order to understand the fears and anxiety of students and their related factors. There are a number of studies carried out in this field[9-11].

It should be stated that there were also some constraints in this study. Dental fear is a feeling that human beings experience. A more comprehensive study of the influential factors causing this feeling and planning of new quantitative and qualitative studies together related to the field might be a good way to eliminate these constraints. In addition, the lack of the question "do you have a dental problem now" in our questionnaire form was a restriction. The existence of such a problem might have influenced the opinions and feelings of the participants on the subject.

In conclusion, this study constitutes a step, as it would provide a database for new surveys and studies on the subject in the future. Furthermore, for these senior FM and FD students will soon start their working life, it was thought that an assessment of their opinions and feelings about dental examination and fear would give clinicians fresh ideas in finding new solutions to the problem.

It would be better to carry out "follow up" studies among students in different levels of their educations such as the first, third, and the sixth year of educational level rather than comparing between medical and dental students.

Detailed studies including "qualitative" components are recommended to be carried out to understand the influencing factors of dental fear.

There are a number of scales developed for assessing the "dental fear"[12]. These tools might have been used after conducting the validitiy and reliability studies for the Turkish population. The international scales might have given more generalizable and comparable results.

Appendix

Appendix 1. Fear scale of FM students about dental examination (FM Phase VI, 2003)

	%				
	Relaxed	A little uneasy	Anxious	Very anxious	Extremely anxious
How do you feel when you have to visit a dentist? (n=250)	34.8	41.6	15.9	6.0	1.6
How do you feel yourself when you are actually visiting a dentist? (n=249)	34.1	37.8	19.3	8.0	0.8
How do you feel when you are at the waiting room of a dentist? (n=248)	35.9	36.7	15.7	9.7	2.0
How do you feel when you get the smell of dentist's examination room? (n=249)	34.1	36.9	15.7	10.4	2.8
How do you feel when dentist takes you into his/her examination room? (n=249)	37.8	30.5	18.1	12.0	1.6
How do you feel when you sit down on the dental chair for examination (just before starting treatment)? (n=250)	31.6	30.4	22.8	11.2	4.0
How do you feel when you wait for the completion of preparations at your dental chair for treatment? (n=247)	30.8	32.0	21.9	11.7	3.6
How do you feel when the X-ray of your teeth is taken? (n=246)	67.5	22.0	6.5	2.4	1.6
How do you feel when you face the possibility of having a dental injection for local anesthesia? (n=248)	33.5	29.8	17.3	9.7	9.7
How do you feel when you are actually receiving dental injection for local anesthesia? (n=246)	28.5	30.1	21.5	10.6	9.3
How do you feel when you see the medical devices (sont, aerotor, canal files, etc.) that dentist uses in your treatment (n=250)	30.4	31.2	16.4	13.2	8.8
How do you feel when dentist starts to use his/her aerotor for your treatment? (n=250)	28.4	27.6	22.4	12.0	9.6
How do you feel while dentist is actually treating your teeth? (n=250)	26.8	36.4	17.2	11.2	8.4

Appendix 2. Fear scale of DF students about dental examination (DF Phase V, 2003)

	%				
	Relaxed	A little uneasy	Anxious	Very anxious	Extremely anxious
How do you feel when you have to visit a dentist? (n=58)	79.3	12.1	6.9	1.7	-
How do you feel when you are actually visiting a dentist? (n=58)	72.4	15.5	10.3	1.7	-
How do you feel when you are at the waiting room of a dentist? (n=58)	70.7	22.4	3.4	3.4	-
How do you feel when you get the smell of dentist's examination room? (n=58)	72.4	20.7	5.2	1.7	-
How do you feel when dentist takes you into his/her examination room? (n=58)	74.1	17.2	6.9	1.7	-
How do you feel when you sit down on the dental chair for examination (just before starting treatment)? (n=58)	62.1	31.0	5.2	1.7	-
How do you feel when you wait for the completion of preparations at your dental chair for treatment? (n=58)	65.5	29.3	3.4	1.7	-
How do you feel when the X-ray of your teeth is taken? (n=57)	84.5	13.8	-	-	-
How do you feel when you face the possibility of having a dental injection for local anesthesia? (n=58)	48.3	41.4	5.2	5.2	-
How do you feel when you are actually receiving dental injection for local anesthesia? (n=58)	50.0	39.7	5.2	3.4	1.7
How do you feel when you see the medical devices (sont, aerotor, canal files, etc.) that dentist uses in your treatment (n=58)	84.5	12.1	3.4	-	-
How do you feel when dentist starts to use his/her aerotor for your treatment? (n=58)	69.0	24.1	6.9	-	-
How do you feel while dentist is actually treating your teeth? (n=57)	63.8	31.0	3.4	-	-

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Job satisfaction among physicians and nurses working in emergency departments

Hulya ELLIDOKUZ[a], Hulya UNALAN GEDIK[b]

Abstract

The aim of this survey is to determine the job satisfaction of physicians and nurses working at regular and, unspecialized emergency services in Turkey and also the associated factors with the job satisfaction. Emergency department personnel in four hospitals in Izmir were interviewed. Questionnaire form is developed using Job Satisfaction Survey. The scores ranged from one to five.The sample consisted of 64 physicians and 58 nurses. Job satisfaction scores were higher in nurses compared to physicians and emergency physicians. The scores were higher in emergency department personnel who worked in the emergency department for three years and less. Hospital A (university hospital with an emergency training program) had statistically higher scores than the other three hospitals. Emergency medicine training programs and in-service training for the nurses is considered to have a positive influence in job satisfaction.

Key words: Job satisfaction, emergency department, physician, nurse

Introduction

Improving the quality standards in hospital departments have an important positive impact on community health[1,2]. Patient and community satisfaction should also be considered in this respect. In order to improve quality of standards as well as general and job satisfaction, specific measurements and actions are needed; improving job satisfaction in medical wards is one of the foremost examples[3]. Job dissatisfaction affects both service quality and the physical, social and mental well-being of the personnel as it will cause loss of interest to work, slowing down and at the end quitting from their job. As the health-care service is directly related to human life and it requires high attention and constant work, the importance of job satisfaction is even higher. The causes of job dissatisfaction that effect performance negatively should be investigated and working conditions should be improved.

Emergency medical care is carried out in non-specialized units in Turkey. In order to improve prehospital-care and to change structures of the emergency medical services, emergency medicine education program began formally eleven years ago. This effort has been expected to lessen the complaints about emergency departments. One of the reasons for the complaints is unsatisfied health-care providers[4]. The aim of this survey is to determine the status and probable factors related to job satisfaction of physicians and nurses at non-specialized emergency services.

Materials and methods

This a cross-sectional study carried out in Izmir at 1999. Four different hospitals in Izmir were included in the study. First one is a university hospital, which is the only one with emergency medicine education program (A), second is another university hospital (B), third is a governmental hospital (C) and fourth is a social insurance institution hospital (D). Only hospital A has emergency medicine education programs and the nurses get in-service training in emergency nursing care.

[a] MD, Assistant Professor, Afyon Kocatepe University School of Medicine, Department of Public Health
[b] RN, MS, Dokuz Eylul University, School of Health
Correspondence:
Hulya Ellidokuz, Afyon Kocatepe University, School of Medicine, Department of Public Health, Afyon, Turkey
e-mail:hdokuz@aku.edu.tr

Questionnaire form consisted of 11 descriptive questions (sex, age, marital status, working period and career etc.) and 36 satisfaction questions, from "Job Satisfaction Survey by Spector". The Job Satisfaction Survey is a 36 item, nine facet scale to assess employee attitudes about the job and aspects of the job. Each facet is assessed with four items, and a total score is computed from all items. High scores on the scale represent job satisfaction, so the scores on the negatively worded items were reversed before summing with the positively worded into facet or total scores.

The nine facets are pay (pay and remuneration), promotion (promotion opportunities), supervision (immediate supervisor), fringe benefits (monetary and nonmonetary fringe benefits), contingent rewards (performance based rewards, appreciation, recognition, and rewards for good work), operating procedures (operating policies and procedures, required rules and procedures), coworkers (people you work with), nature of work (job tasks themselves), and communication (communication within the organization)[5,6].

Internal consistency of the questionnaire was 0.98 measured by Cronbach alpha.

Statistical significance was tested with t test, multivariate regression analysis and Kruskal Wallis Variance Analysis test. The results were evaluated as significant at the $p < 0.05$ level.

All the physicians and nurses working in the emergency departments were included in the study (n=148). Questionnaire forms were given out to four emergency department personnel and 122 questionnaire forms were returned. Overall response rate, being similar at four hospitals was 82.4 percent. The medical staff who have not been reached because of leave of absence at the time of study were excluded. There were 41 participants from hospital A, 18 from hospital B, 46 from hospital C and 17 from hospital D.

Results

The sample consisted of 64 physicians and 58 nurses; 37 (30.3%) male and 85 (69.7%) female. The mean age of the sample was 28.8 ± 5.8 (min. 20, max. 50 years old); the mean job experience was 6.5 years ± 5.4, the mean work experience in emergency departments was 3.4 years ± 3.5.

According to the working time at the emergency departments, 59.8% of the personnel were working daytime and on duty, 23% of the personnel on shifts, 13.2 % the personnel were working either nighttime or daytime. During work hours, they provide care for about 95 patients.

Table 1. Management of the job stress of the emergency department workers

Management of the job stress	n (n=122)	%
Sharing with family / friends	74	60.7
Using defense mechanisms	64	52.5
Resting / vacation	59	48.4
Thinking of changing the job	26	21.3
Thinking of changing the unit	23	18.9
Thinking of changing the hospital	24	11.5

The most common way to deal with job stress was sharing with family / friends (Table 1). There was statistical significance at the promotion scores; according to sex, males were more satisfied than females ($p=0.007$). There was no statistical significance at job satisfaction scores according to age. Job satisfaction scores were not affected by marital status ($p>0.05$).

When job satisfaction scores from physicians and nurses were compared, there was statistical significance at the promotion, fringe benefits, nature of work and total satisfaction scores ($p<0.05$). The nurses had the highest scores in all of these items (Table 2).

Table 2. Job satisfaction scores according to the jobs

	Emergency Physician (n = 41)	Physician (n =23)	Nurse (n = 58)	p value*
Pay	1.37±0.83	1.47±0.92	1.71±1.18	0.601
Promotion	2.37±1.06	2.02±1.04	3.80±1.06	p<0.001
Supervision	2.81±1.03	2.92±1.21	2.71±1.03	0.782
Fringe benefits	1.88±0.89	2.11±0.97	3.00±0.97	p<0.001
Contingent rewards	2.25±1.06	2.17±1.18	2.07±1.14	0.788
Operating procedures	1.84±1.10	2.00±1.12	2.23±0.95	0.176
Coworkers	2.85±0.69	2.78±0.82	2.98±0.90	0.363
Nature of work	3.01±1.00	3.40±1.23	3.90±1.05	0.007
Communication	2.09±0.71	2.17±0.94	2.46±0.79	0.226
Total satisfaction	2.27±0.49	2.33±0.66	2.75±0.69	0.012

* Kruskal Wallis Variance Analysis

As shown in Table 3, job satisfaction scores were higher among the emergency department personnel who have worked for three years and less. The

scores showed significant differences between hospitals for promotion, fringe benefits, operating procedures, nature of work, communication and total satisfaction ($p<0.05$). The highest scores were reached at hospital A (Table 4).

Table 3. Job satisfaction scores according to the working time in emergency departments

	3 years and less (n=80)	More than 3 years (n=42)	p value*
Pay	1.62 ± 1.02	1.21 ±0.68	0.012
Promotion	2.71 ±1.15	1.97 ±1.20	0.001
Supervision	2.98 ±1.15	2.64 ±1.11	0.130
Fringe benefits	2.35 ±1.04	1.85 ±0.91	0.011
Contingent rewards	2.26 ±1.18	2.02 ±1.06	0.276
Operating procedures	2.12 ±1.18	1.71 ±0.83	0.031
Coworkers	3.04 ±0.76	2.46 ±0.71	p<0.001
Nature of work	3.50 ±1.08	3.07 ±1.25	0.052
Communication	2.31 ±0.83	2.03 ±0.85	0.077
Total satisfaction	2.54 ±0.61	2.10 ±0.53	p<0.001

* t test

When multivariate regression analysis was carried out for parametric variables, job satisfaction score has been seen to be effected only by job experience (Beta=-0.298, p=0.001). Job satisfaction score is high when job experience is low.

Table 4. Job satisfaction scores according to the hospitals

	A(n=41)	B(n=18)	C(n:46)	D (n=17)	p value*
Pay	1.62±1.13	1.63±1.09	1.27±0.67	1.47±0.81	0.449
Promotion	3.09±1.28	2.47±0.96	2.23±1.11	1.58±0.81	p<0.001
Supervision	2.90±.05	3.13±1.08	2.86±1.21	2.44±1.21	0.447
Fringe benefits	2.85±0.88	2.35±1.15	1.62±0.72	1.80±0.88	p<0.001
Contin. rewards	2.19±1.21	2.33±1.15	2.28±1.12	1.82±1.11	0.377
Operating proc.	2.40±1.05	1.82±1.23	1.87±0.89	1.64±1.20	0.003
Coworkers	3.02±0.87	2.85± 0.70	2.71± 0.71	2.72±0.84	0.236
Nature of work	3.92±0.95	3.16±1.23	3.04±1.17	3.00±1.00	0.001
Communication	2.53±0.88	2.30±0.85	2.02±0.76	1.83±0.73	0.011
Total satisfac.	2.72±0.62	2.44±0.65	2.18±0.44	2.04±0.61	p<0.001

* Kruskal Wallis Variance Analysis

Discussion

There is no data on the conditions of emergency medical staff in order to improve quality standards and professional skills in emergency departments in Turkey. This study is the first one to investigate human resources in emergency departments in Turkey. According to our study on the overall evaluation, the emergency department personnel are moderately satisfied with their jobs. However nurses, those who have worked less than three years and workers of Hospital A are significantly more satisfied than the other groups.

Emergency departments have an environment that is highly specialized, pressured and stressful, and emergency department staff is confronted by unusual problems many of which are emergent. There are many other problems such as insufficient beds and equipments, overload of patients and lack of staff. Spector, discovered the strongest correlations between influential factors and emergency physicians as perceptions of the job, supervision, intention of quitting, and organizational commitment. More modest correlations were found with salary, age, absenteeism, and turnover[6].

It is interesting to see that although the work is very stressful and they are not satisfied with their pay, still the areas that show most significant differences in satisfaction scores are promotion, fringe benefits and nature of work. Similar findings were presented in the literature[12-15]. The reason may be that the personnel who work in the emergency departments are usually highly motivated and devoted to their work.

The working conditions of hospitals (physical environment, working hours, and constant personnel) show differences. In studies about nurses, it has been observed that factors like unarranged working shifts, irregular sleeping hours, neglecting the social life, not being able to spend time with family and spoiling of the biorhythm are the most important causes of the job dissatisfaction. All of these factors were not examined in detail in this study except the physical environment.

As the workers in the hospital A have higher satisfaction scores than the other hospitals, having an emergency medicine training program for physicians and also for nurses will result in higher staff satisfaction and must be provided to become more widespread in Turkey. However this conclusion could not be generalized to all hospitals; since the study was carried out in four hospitals in Izmir. For more accurate results, studies, which provide data and information essential to improving quality standards and continuing professional development, should be carried out with more emergency department staff from other hospitals, considering

the conditions of different provinces.

Working less than three years makes a significant difference in satisfaction scores among emergency department personnel. A number of studies indicated similar results[7,13,14,16]. The nature of the work and stressfulness of the conditions in the emergency departments could support this finding. Working long time under these circumstances will decrease satisfaction. According to Mueller, job satisfaction is the degree of positive affective orientation towards employment[17]. Higher job satisfaction may lead to better health care.

Special training programs influence the satisfaction positively. Therefore, nurses and physicians at the emergency departments should be trained about emergency care. Work assignments, rules and procedures should be fully determined. Every emergency department must have a protocol to work most effectively. Working hours should be improved and arranged so that exhaustion will be prevented. Financial improvements for the emergency department workers are necessary considering the vital role of these units in health care.

Acknowledgements

We thank Gul Ergor, MD, Professor of Public Health, for her support.

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A hospital based descriptive study: the characteristics of orthopedic patients

Mahir GULEC[a], Cemil YILDIZ[b], Tayfun KIR[a], Selim KILIC[a], Metin HASDE[c], Mehmet ALTINMAKAS[d]

Abstract

The pediatric orthopedic patients make up almost 12% of all orthopedic population, and their problems affect personal, social, and economic life of the families. Description of pediatric orthopedic inpatients' characteristics and statistical data on those variables would be useful in efforts to increase the quality of medical care. To achieve this goal, we analyzed the characteristics of 111 inpatient children treated in the department of orthopedics and traumatology at Gulhane Military Medical Academy Training Hospital in 2001.

This is a descriptive research conducted by reviewing the hospital records of inpatients under 16 years of age who were treated between 1 January-31 December 2001. The mean age of the study group was 6.1±4,3. 63 (56.8%) of the patients were girls and 66 (59.5%) were under 6 years of age. An examination of these inpatients indicated that pain and/or limitation of ROM (range of motion) and/or swelling were the most common complaints with a proportion of 56.8%. More than half of them (56.8%) were treated for congenital abnormalities and 28.8% were diagnosed with DDH (developmental dysplasia of the hip). 94 (84.7%) of the cases were operated and 38 (34.2%) of the cases were hospitalized for 4-7 days.

Pediatric musculoskeletal system pathologies form an important part of the orthopedic practice. Early diagnosis and treatment play an important role in avoiding later more serious problems with this type of disorders in children. Further studies on a larger patient group with more parameters, performed in different regions are needed to present the characteristics of pediatric orthopedic patients in Turkey.

Key words: Pediatric orthopedics, characteristics, early diagnosis.

Introduction

Musculoskeletal pathologies are observed commonly in all age groups and cause physical disability, loss of movement, and degradation of quality of life[1]. They are often observed in lower and upper extremities, hip and spine. Every year 12% of the population in the USA is affected by these disorders and pediatric orthopedic cases make up 21.3% of this population[2].

Pediatric orthopedic pathologies may vary greatly from a simple fracture and/or dislocation to congenital deformities, metabolic bone diseases and tumors. Every year fracture and/or dislocation due to accidents during especially participation in sports and games is observed in 1 out of 20-25 children all over the world and is usually seen in forearm, clavicle, tibia, and elbow (including supracondylar and humeral head)[3,4]. Tibia and fibula fractures generally occur as a result of bicycle, motorcycle, sport or traffic accidents[4,5]. Epiphysial fractures might affect growth negatively[4,6], and infection is frequently observed as a complication in open fractures[7]. Some other complications might be nonunion, delayed union, malunion, and avascular necrosis[8]. The best way to avoid these complications is to choose the correct treatment method and to prevent contamination.

As mentioned above, pediatric orthopedic patients affect not only personal, social and economic life in terms of mortality and morbidity, but also the quality of life of the families. Because of this reason and the huge number of patients, pediatric orthopedics is regarded as a separate branch in many countries, such as the USA[9].

[a] MD, Assistant Professor, Gulhane Military Medical Academy, Department of Public Health
[b] MD, Assistant Professor, Gulhane Military Medical Academy, Department of Orthopedics and Traumatology
[c] MD, Professor, Gulhane Military Medical Academy, Department of Public Health
[d] MD, Professor, Gulhane Military Medical Academy, Department of Orthopedics and Traumatology
Correspondence:
Tayfun Kir, Gulhane Military Medical Academy, Department of Public Health, Ankara, Turkey
e-mail: tayfunkir@gata.edu.tr

Pediatric musculoskeletal system pathologies form an important part of the orthopedic practice. Early diagnosis and treatment has an important role in the prevention of possible serious problems that may result from this type of disorders seen in children. Description of the characteristics of pediatric orthopedic inpatients and the statistical data is needed to increase the quality of medical care and to plan a better future service. To achieve this goal, we analyzed the data of 111 inpatient children treated in the Department of Orthopedics and Traumatology of a university hospital in 2001.

Material and methods

This is a descriptive research conducted by investigating the hospital records of all inpatients under 16 years of age who were treated between January 1 and December 31, 2001 in the Department of Orthopedics and Traumatology at Gulhane Military Medical Academy (GMMA).

An information form, consisting of characteristics of subjects, type of registration, complaint, etiology, diagnosis, type of treatment, hospitalization period, designed through collected literature information and by utilizing the hospital records of patients was used in this study. Collected data were grouped and tabulated.

Results

The distribution of inpatients according to their socio-demographic characteristics is shown in Table 1.

Sixty three (56.8%) of the inpatients in the GMMA were girls and the average age was 6.1±4.3. 66 (59.5%) were under 6 years of age. When we examined the records of the inpatients, it is seen that pain and/or limitation of ROM (range of motion) and/or swelling were the most common complaints with a proportion of 56.8% (n=63). 63 (56.8%) of them were treated due to congenital deformities and 32 (28.8%) were diagnosed as DDH (developmental dysplasia of the hip). 94 (84.7%) of them were operated and 38 (34.2%) of the cases were hospitalized for 4-7 days. No complication was observed in 109 (98.2%) of the patients. In the remaining 2 patients, dorsal kyphosis and bleeding in the operation site occurred as complication (Table 2).

Table 1. Socio-demographic characteristics of inpatients in the department of orthopedics and traumatology

	Characteristics	n	%
Sex	Female	63	56.8
	Male	48	43.2
Age	6 years or younger	66	59.5
	More than 6 years of age	45	40.5
Type of registration	Outpatient clinic	69	62.2
	Emergency service	29	26.1
	Referral from another hospital	13	11.7
Complaint	Pain and/or limitation of ROM and/or swelling	63	56.8
	Gait disorders	30	27.0
	Implant removal	5	4.5
	Deformity of spine or extremity	8	7.2
	Other	5	4.5
Etiology	Congenital	63	56.8
	Falling down	35	31.5
	Traffic accident	7	6.3
	Metabolic	6	5.4
Diagnosis	DDH (Developmental dysplasia of the hip)	32	28.8
	Fracture	29	26.1
	Congenital deformity	27	24.3
	Acquired deformity	7	6.3
	Metabolic diseases	5	4.5
	CP (Cerebral Palsy)	7	6.3
	Other	4	3.6
Treatment	Operation	94	84.7
	Other treatment methods*	17	15.3
Hospitalization period (days)	1-3	29	26.1
	4-7	38	34.2
	8-15	29	26.1
	15-30	11	9.9
	31-60	4	3.6
	Total	111	100.0

* Splint, medication, traction, closed reduction

Table 2. Characteristics of inpatients in the department of orthopedics and traumatology according to their sex

		Sex		
		Female n (%)	Male n (%)	Total
Age Groups	6 years or younger	37 (56.1)	29(43.9)	66 (100.0)
	More than 6 years	26 (57.8)	19(42.2)	45 (100.0)
Etiology	Falling down or traffic accident	15 (35.7)	27(64.3)	42 (100.0)
	Congenital or metabolic	48 (69.6)	21(30.4)	69 (100.0)
Diagnosis	DDH	24 (75.0)	8 (25.0)	32 (100.0)
	Fractures	11 (37.9)	18(62.1)	29 (100.0)
	Congenital deformities	10 (37.0)	17(63.0)	27 (100.0)
	Others	18 (78.3)	5 (21.7)	23 (100.0)
	Total	63 (56.8)	48(43.2)	111 (100.0)

The number of the female inpatients who were 6 years of age and younger was 37 (58.7%) and older than 6 years was 26 (41.3%). Girls have a proportion of 69.6% (n=48) for congenital or metabolic diseases in total and boys have a proportion of 64.3% (n=27) in cases injured as a result of falling down or traffic accidents. 24 (75%) of the inpatients with DDH were girls and 18 (62.1%) of the inpatients with a fracture were boys.

The distribution of some of the characteristics of inpatients according to their complaints is shown in Table 3. As seen in the table, 93.1% (n=27) of the patients with a fracture registered to the hospital with the complaint of pain and/or limitation of ROM and/or swelling. 53.1% (n=17) of the patients with DDH registered to the hospital with the complaint of gait abnormalities.

Table 3. Characteristics of inpatients in the department of orthopedics and traumatology according to their complaints

	Complaints			
	Pain, limitation of ROM, swelling	Gait disorders	Other	Total
Diagnosis	n (%)	n (%)	n (%)	
DDH	9 (28.1)	17 (53.1)	6 (18.8)	32 (100.0)
Fractures	27 (93.1)	-	2 (6.9)	29 (100.0)
Congenital deformities	15 (55.6)	9 (33.3)	3 (11.1)	27 (100.0)
Others	12 (52.2)	4 (17.4)	7 (30.4)	23 (100.0)
Total	**63 (56.8)**	**30 (27.0)**	**18 (16.2)**	**111 (100.0)**

The distribution of some of the characteristics of inpatients according to their age is given in Table 4. The average age of the patients with DDH is 2.5±1.6 and the average age of patients with an acquired deformity is 11.5±2.7. The average age of patients who registered to the outpatient clinic first is 5.1±4.2 whereas the average age of patients who were first admitted to the emergency room is 8.2±4.0. The average age of children who registered to the hospital because of traffic accidents and sport injuries was 10.0±4.1 and 10.0±00 respectively and the average age of patients with congenital deformity was 4.6±3.9.

Table 4. Characteristics of inpatients in the department of orthopedics and traumatology according to their age

		Age	
		Average	± SD
Diagnose groups	DDH	2.5	1.6
	Fracture	8.1	3.9
	Congenital deformities	6.1	4.4
	Acquired deformities	11.5	2.7
	Metabolic diseases	4.2	2.3
	CP	8.5	3.5
	Other	7.0	5.0
Type of registration	Outpatient clinic	5.1	4.2
	Emergency service	8.2	4.0
	Sent from another military hospital	5.9	3.6
	Other	6.0	4.3
Etiology	Traffic accident	10.0	4.1
	Falling down	7.9	3.8
	Penetrating injury	2.0	0.0
	Hit by a moving object	7.5	4.9
	Sport injury	10.0	0.0
	Metabolic	3.7	2.5
	Malpractice	14.0	0.0
	Congenital	4.6	3.9
Total		**6.0**	**4.3**

Discussion

Children constitute an important part of the population in orthopedic clinics[2,3] and pediatric orthopedic patients affect personal, social, and economic life of their families[10,11]. In Turkey, there is hardly any statistical information about the hospitalization of this age group in orthopedic clinics so we believe that our findings will provide valuable information on this subject despite its handicaps like the limited number of subjects and limited time.

When we look at the age and sex characteristics of our inpatients, the average age of our group was 6.1±4.3 and there were more girls (56.8%). The average age of patients who first applied to outpatient clinic was 5.1 and of those who first came to the emergency room was 8.2. It was found that the most common reason for hospitalisation among children under 6 years of age were congenital and metabolic disorders. In children above 6 years of age, the most common reasons for their injuries were falling down, traffic or sport accidents. The difference might result from the fact that in the younger age

group, parents identify gait abnormalities and bring their children to hospital and they are diagnosed with DDH or some other musculoskelatal problems. In the older age group, however, the children are more active so they are more exposed to traumas that may result in fractures.

The most common complaints in children are pain, dysfunction (eg. limping) and deformity. Among our inpatients, the most common complaint for registration to hospital was pain and/or limitation of ROM and/or swelling (56.8%). 134 (70.8%) of all patients whose complaints were pain and/or limitation of ROM and/or swelling were boys. 20 (66.7%) of all patients who came to the hospital with the complaint of gait abnormality were girls. The reason of this might be the fact that boys are more exposed to fractures due to accidents and so their complaints are pain and/or limitation of ROM and/or swelling.

69 (62.2%) of patients first came to the outpatient clinic, 29 (26.1%) to the emergency room, and 13 (11.7%) were sent from other hospitals. Outpatient clinic was the first application service for 76.2% of the girls in our series (n=48). 48 (69.6%) of the patients who first applied to the outpatient clinic were girls and 22 (75.9%) of the cases who firstly applied to the emergency service were boys. The reason is that we have a great number of DDH inpatients in our series most of whom are female and they are directly sent to our outpatient clinic from other hospitals. On the other hand, more application of the boys to the emergency service might be explained by the fact that boys spend more time outside the house so they are more commonly exposed to accidents.

It is seen in our study that the most common diagnoses were DDH (28.8%, n=32) and fracture (26.1%, n=29). DDH is a spectrum of disorders of development of the hip that presents itself in different forms at different ages[12]. Although the prevalence of DDH differs from country to country, the data of the hip are more consistent with reports ranging from 1.0 to 1.5 cases per 1000 live births[13]. However, there are marked geographic and racial variations in the incidence of DDH. 80% of it can be diagnosed at birth and the remaining is diagnosed after the child starts walking. DDH is more common among female patients (80%) and children born breech[12-14]. In our study, it was found that DDH was observed in girls 3 times more than boys. Besides physical examination, hip ultrasonography has become very popular recently and is helpful as a screening test for DDH[15,16].

Often the orthopedic problems of boys required emergency treatment so most probably they were treated in the previous stages and did not come to our hospital. In a research carried out in Wisconsin and based on 4 year records of trauma, it was found that the most common reasons of fractures were falling down, sport and recreational activities[17]. Similar to this finding, we found that falling down was the second most common reason of fractures with a proportion of 31% in our study and that fracture was observed 2 times more in boys than girls. Observing more fractures in boys can be explained by the fact that, due to the structure of our society, boys play outside the house more than girls do and as a result the probability of falling down or any other injury is greater.

Another important group of our inpatients was those with CP (Cerebral Palsy) and the proportion was 6.3%. Torfs *et al.* reported that they found 41 (0.3%) CP cases in 19044 live births[18]. In recent reports, the incidence of CP is between 2.4 and 2.7 per 1000 live births[19].

In our study, it was found that 7.2% of the patients were treated due to a spine or limb deformity. Identification of posture disorders[20-22] in childhood plays an important role in the prevention of possible future cosmetic and functional pathologies, musculoskeletal and sometimes even systemic problems. Since most of these deformities might be treated conservatively in the early period, there may not be a need for surgical operation in the future. It was found that 84.7% of the inpatients in the Department of Orthopedics and Traumotology was operated. This is similar to the findings in Savk's research[23], which was 86.3%. It was reported in a study that was performed between 1985-1987 in Spain, that the children who registered to a hospital with orthopedic complaints had a surgical operation rate of 56.5%[24]. The difference between our results and this study may be due to the fact that our findings represent only inpatient records but in the other study both inpatient and outpatients were examined.

Further studies with a larger patient group and more parameters (eg. cost) performed in representative samples are needed to present the characteristics of pediatric orthopedic patients in Turkey.

Acknowledgments

We thank Stephen W. Burke, M.D., Director of Pediatric Orthopedics, The Hospital for Special Surgery, NY, USA for critically reviewing the manuscript.

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Socioeconomic factors and survival of cancer cases

Kazım TIRPAN[a], Gul ERGOR[b]

Abstract

Cancer is the generic term for some 200 different diseases that characterize abnormal cell replication. It is the second most common cause of death after cardiovascular diseases. Because incidence of cancer increases with age, it had become an important health issue in industrial countries since the second half of the 20th century after success in management of communicable diseases. Socioeconomic status is an important factor in cancer incidence, mortality and survival. Socioeconomic factors include education, income, housing, occupation and residing area. The aim of this study is to evaluate the impact of socioeconomic status on cancer survival by obtaining cancer cases from the cancer registry database.

This study was performed among cancer patients residing in Narlidere and Balcova districts of Izmir city reported to Cancer Registry from Dokuz Eylul University hospital during 1993-1996. Data on patients were obtained from Cancer Registry (KIDEM) (n=241). Patients and their relatives were visited at their home and interviewed (n=107). If the patients were not found at their addresses, the information was obtained from the hospital files (n=73), cemetery and mortality records (n=27) of the municipality (n=15). Survival analysis was conducted using life table and Kaplan-Meier analysis. Pearson Chi-Square and Cox Regression analysis was conducted to assess the factors affecting survival.

The most common cancer types were lung cancer in males (n=37, %28.0) and breast cancer in females (n=31, %28.4). Lung cancer had the shortest survival time (median survival time: 7 months); skin cancer had the longest survival time (mean survival time: 75 months). Socioeconomic status was evaluated by health insurance, education, occupation, income and ownership of a house.

The most important component affecting survival was determined as the health insurance. The group that had better health insurance lived longer than the group with the poorer health insurance (Log rank, p=0.022). There is a significant difference in survival between white-collar workers and blue-collar workers (Log rank, p=0.020). Having a better health insurance was related to the occupational status, which was related to the educational status. Health insurance affected the survival especially by enabling early diagnosis. Having cancer also worsens the economic status of the patients with insufficient health insurance (p<0.001).

Key words: Socioeconomic status, health insurance, cancer, and survival.

Introduction

Cancer is not the name of an individual disease, but rather a definition including more than two hundred diseases having multifactorial etiologies, different clinical progresses, invasiveness and treatment choices. Cancer has become a primary issue after the achievements in terms of treatments of the infectious diseases in the developing countries[1].

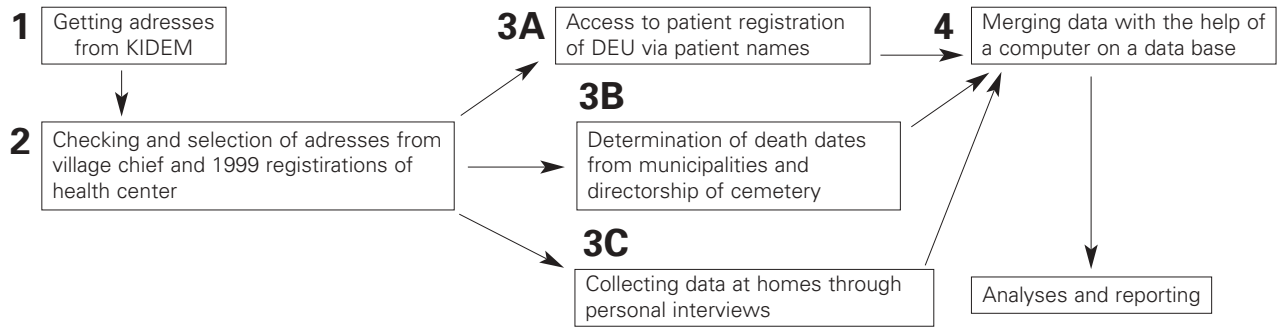
Inequalities in health reflect the inequalities in the social structure of the community. Developing countries have higher mortality, lower life expectancy and lower survival rates in cancer compared to developed countries. Differences in cancer risk exist between the regions of the same country with different socioeconomic conditions[2]. Various variables are used for determining the socioeconomic status. Income, occupation and education are the frequently used ones[3]. Socioeconomic status determines the occurrence of cancer, duration of survival and mortality of cancer through many intermediate variables.

[a] MD, Public Health Specialist, Deputy Manager, Eskisehir Health Directorate

[b] MD, Professor, Dokuz Eylul University, School of Medicine, Department of Public Health

Correspondence:
Kazim Tirpan, Eskisehir Health Directorate, Eskisehir Turkey
e.mail: tirpank@hotmail.com

Figure 1. Flowchart of data collection



Smoking is the most important factor among these variables that is a significant determinant for many types of cancer. Smoking is more common in the groups with low socioeconomic status and also in developing countries[4]. Accessibility of fresh fruits and vegetables is difficult for the low-income people so these people are deprived of the protective effect of diet against cancer in many parts of the world. In spite of the existing cultural differences, there are some studies showing relations between alcohol consumption and socioeconomic status[5,6].

Most frequent cancers of women are breast cancer and cancers of the reproductive system. These cancers are associated with high socioeconomic status, fewer children, late birth, less breast-feeding activity and late menopause. Dependent to sexual behavior features, (early onset of coitus, frequency of Human Papilloma Virus infection) cervical cancer is seen more in the lower socioeconomic groups of the communities[7,8]. Agents like Human Papilloma Virus, hepatitis viruses and Helicobacter pylori are related with various cancers. Being an HBV carrier is related with low educational level and crowded living conditions. Research for HCV and H. pylori are rare and their distributions are similar to HBV[9,10]. Exposure to occupational activities is thought to be responsible for 4 percent of the cancers. These cancers intensify in hard workers and low socioeconomic conditions[11]. Unemployment is a socioeconomic determinant that increases incidence and mortality of cancers[12]. Heavy environmental pollution causes an increase in cancer cases, especially lung cancer. Evidence shows that people with low socioeconomic status are much more exposed to environmental pollution. Companies prefer to establish factories with dangerous waste in underdeveloped zones where people with low socioeconomic status like immigrants usually dwell.

Use of health services is another socioeconomic indicator. Groups with lower socioeconomic status receive less qualified health care, lack screening programmes[13,14], and are removed from the health services at the terminal stage. As a result of all these factors, many cancer types have high incidence, high mortality and low survival in low socioeconomic groups[15,16].

The aim of this study is to evaluate the impact of socioeconomic status on cancer survival by selecting cancer cases from the cancer registry database.

Materials and methods

This study was designed as a retrospective cohort including 241 adult cancer cases, living in Narlidere and Balcova (districts of Izmir) during 1993-1996, diagnosed by Dokuz Eylul University (DEU) Hospital.

Collection of data

KIDEM, which was established in the structure of Izmir Health Directorate in March 1993, was commissioned to coordinate cancer surveillance of Izmir region. KIDEM, the population based cancer registry in Turkey, started to register cancers from the 1st May 1992.

Data included in the dates of this study and the study area were received from KIDEM and personal addresses were obtained from this source. Afterwards, the selected list was checked with the help of the head of the regions and the health center registrations; addresses and study areas were determined. Questionnaires were filled by face-to-face interviews with the patients or the relatives of deceased patients. In addition, information on cases was received from the archives of patient registration at the hospital, death certificates at cemetery directorship and municipalities.

All data were merged in the computer, so that matching cases were selected and missing data were completed paying attention to reliability.

Primarily date of deaths and follow up periods were determined from the data sources in order to carry out survival analyses. Questionnaires were used for investigating the impact of socioeconomic status. Matching cases and availability of data are shown in Table 1.

Table 1. Distribution of collected data according to data sources

Data Source	Cases	Matching	Total
Questionnaire	107	0	107 [a]
Patient registery	73	98	171 [b]
KIDEM	19	0	19
Cemetery	27	27	54
Municipalities	15	9	24 [c]
Total	**241**	**134**	**375** [d]

Matching shows the usage of more than one source for an individual case registry.

[a] Information about socioeconomic status was obtained by questionnaires.

[b] Information about metastasis and treatment was obtained by the patient registers additional to questionnaire findings.

[c] (24 death files were found by municipalities. 15 were not found by another data source and included to main data base, remaining 9 cases were accepted as matching and used for only checking the consistency of data.

[d] Total cases were 241 when matching cases were removed.

In addition to the questions about socioeconomic status, types of treatment, alternative therapies, changing of beliefs, occupation and economics were examined by the questionnaire.

A participant was considered "sufficiently covered" if s/he was a retired civil servant or if s/he had private health insurance. "Insufficient coverage" was defined as having an SSK coverage (security for laborers), Bag-Kur coverage (security for tradesmen) or Green-Card coverage (security for the poor). Patients without any social security were not included in the analyses. The dependent variable was the survival status. Cases were followed through the year 2000, starting from their date of diagnosis. Survival analyses were performed by the Kaplan Meier method. Factors that affect survival were examined as multiple variables by the Cox Regression Model.

Results

Age an sex distribution of patients included in the study is shown in Figure 2.

Figure 2. Distribution of age and sex among study participants (Izmir, 1993-96)

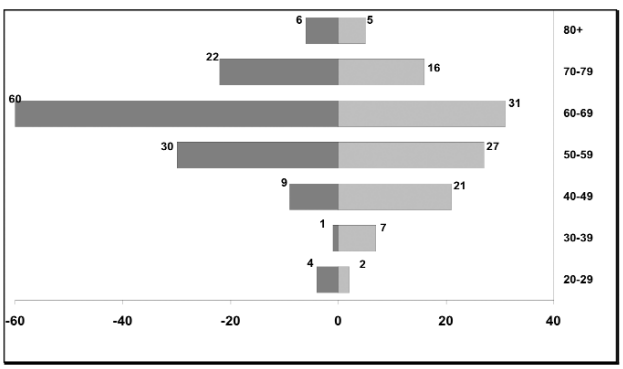


Table 2. Distribution of ten leading cancer types according to sex (Izmir, 1993-96).

Men			Women		
Cancer Type	n	Percent	Cancer Type	n	Percent
Lung	37	28.0	Breast	31	28.4
Skin	18	13.6	Skin	11	10.1
Urinary bladder	12	9.1	Primary Unknown*	8	7.3
Stomach	8	6.1	Lung	6	5.5
Colon	8	6.1	Colon	6	5.5
Kidney	7	5.3	Ovaries	5	4.6
Mouth	7	5.3	Mouth	4	3.7
Primary Unknown*	7	5.3	Stomach	4	3.7
Larynx	4	3.0	Corpus of uterus	4	3.7
Lymph node	4	3.0	Cervix	4	3.7
Other	20	15.2	Other	26	23.8
Total	**132**	**100.0**	**Total**	**106**	**100.0**

* Place of origin unknown

Most of the patients were between 60-69 years old and there were more males than females.

The most frequent cancer type is lung cancer for men (28.0%) and breast cancer for the women (28.4%). Skin cancers were the second most frequent for both.

Table 3. Distribution of cases according to social security status

Social security status	n	Percent
Retirement security for civil servants	65	60.7
Social Security Organisation (SSK)	18	16.8
Bag-Kur for tradesmen	11	10.3
Private insurance	6	5.6
Green card	3	2.8
No security	4	3.7
Total	107	100.0

60.7% of the cases reported by DEU had been covered by Emekli Sandigi (retirement fund of civil servants).

Table 4. Social security coverage and existence of metastasis

Social security	Metastasis					
	Yes		No		Total	
	n	%	n	%	n	%
Sufficient	33	43.4	43	56.6	76	100.0
Insufficient	25	59.5	17	40.5	42	100.0
Total	58	49.1	60	50.9	118	100.0

Chi square=2.8 DF=1 p=0.094

Metastasis was seen less in people with "sufficient" social security coverage but the difference between the two groups was not statistically significant.

Table 5. Social security coverage and the change in the economic status

Worsening of the economic situation	Social Security					
	Sufficient		Insufficient		Total	
	n	%	n	%	n	%
No	61	84.7	12	37.5	73	70.2
Yes	11	15.3	20	62.5	31	29.8
Total	72	100.0	32	100.0	104	100.0

Chi square=23.6 DF=1 p<0.01

* People who don't have any social security were excluded.

Questions about the use of saved money and selling a property were asked to determine the change of existing economic status and it was seen that cases belonging to the "insufficient" group had more changes in their economic status.

Table 6. Organized life table for the 6 year time period

Follow up Period (Month)	Alive at the Onset of Interval	Deaths in the Interval	Alive at the end of the Interval	Probability of Survival	Probability of Cumulative Survival
12	241	57	36	0.744	0.744
24	148	26	5	0.821	0.611
36	117	14	8	0.876	0.535
48	95	9	6	0.902	0.483
60	80	5	15	0.931	0.449
72	60	3	23	0.938	0.422

Median survival period was 44.15 months. Cumulative survival probability at the12th month was 74.72% and 42% for the 72nd month determined by the lifetime table method (Table 6). Survival periods for cancer types having relatively high (7 cases or over) number of cases is shown in Table 7.

Table 7. Distribution of cancer types according to survival periods

Cancer type (N)	Survival Periods (month)							
	Mean	SE	Confidence limits		Median	SE	Confidence limits	
Lung (43)	17	4	10	24	7	1	5	10
Stomach (12)	17	5	7	26	10	3	4	15
Colon (14)	30	7	17	43	29	12	7	52
Mouth (11)	37	9	19	55	20	8	4	36
Kidney (9)	50	13	25	75	38	3	32	44
Breast (31)	74	5	64	84	-	-	-	-
Urinary bladder (13)	75	7	62	89	-	-	-	-
Skin (29)	75	5	64	85	-	-	-	-

The cancer type with the shortest survival period among the applicants of DEU is the lung cancer (median=7 months). For breast, urinary bladder and skin cancers, more than half of the cases were alive at the end of the follow up period. Hence their medians could not be calculated.

Table 8. Effect of the socioeconomic variables on survival

Variable	Categories	n	Relative Risk	95% Confidence Interval	
Social security	Sufficient*	80			
	Insufficient	47	1.72	1.06	2.79
Education	Primary and below	49	1.15	0.69	1.91
	Secondary and upper*	59			
Occupation	Officer*	69			
	Trader	26	1.11	0.59	2.08
	Laborer	25	1.93	1.07	3.47
Income	Good*	76			
	Bad	31	0.68	0.37	1.25
Ownership of house	Self*	86			
	Another	22	1.30	0.71	2.37
Ownership of another house	Yes*	29			
	No	79	0.51	0.30	0.88

* Reference group

Variables thought to be a component of socioeconomic status were examined. The type of social security and occupation were found to be significant with respect to survival.

In the univariate analysis as shown in Table 8, the group that had "insufficient coverage" had 1.72 times higher death risk compared to the group with "sufficient health insurance status" and this was statistically significant.

Table 9. Results of the Cox Regression Model

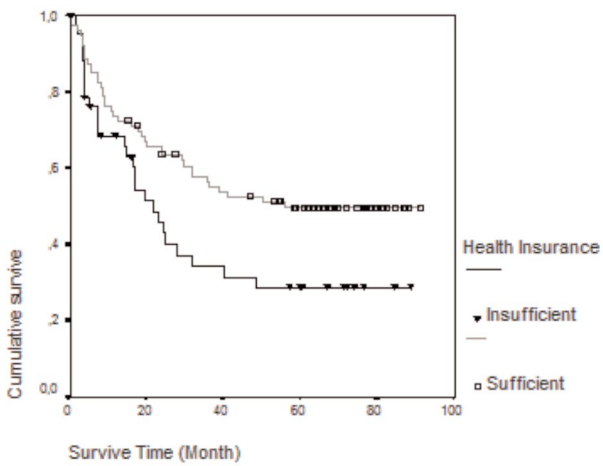
Variable	Beta	S.E	P Value	Relative Risk	95% Confidence Intervals	
Metastasis	1.55	0.29	<0.001	4.7	2.6	8.4
Sex	0.57	0.31	0.055	1.7	0.9	3.2
Age	0.33	0.30	0.282	1.3	0.7	2.5
Health insurance	0.29	0.27	0.283	1.3	0.7	2.3

Metastasis was regarded as a sign showing that the case was diagnosed at a late stage and it was included in the model.

Sex and age were examined as basic demographic variables and included in the model. As the most important socioeconomic variable, the social security coverage was also included into the model. Metastasis was the most important factor that influenced survival.

To assess the effect of social insurance on survival, the survival curves were drawn for the sufficient and insufficient coverage groups. The differences were found statistically significant with the log rank test (Figure 3).

Figure 3. Relative risks and confidence intervals of the components of SES



Discussion

When cancer is examined by etiology, it is closely related to working life, environmental conditions, nutritional status and some chronic diseases. Early diagnosis can be achieved by screening programs and regular health controls. Social security at the time of treatment and home care services at the terminal period affect the survival[6,8,9,10,11,17]. In fact, all these variables are related to socioeconomic status[2].

Cancer research can be conducted at various levels including the population level (such as associations with health systems and levels of industrialization) or at the laboratory (research for genetic determinants or molecular changes)[18]. However, preventing cancers and increasing survival are the two priorities.

Although it has problems in representing various socioeconomic levels, this study represents a well defined geographic area. Cancer incidence in men is higher in this study, and this situation is parallel with the data of the world and Turkey. The types of cancers are not different from the world cancer distributions[19,20,21,22].

Social security directly influences the treatment and survival of cancer cases but there was not a significant relationship between income and type of social security in our study. The reason may be the fact that in Turkey, people who have no social security can benefit from the social security of the other members of their family like children or spouses (in this study 38 cases (35.5%) had social security through the other members of their family). Education influences the opportunity to find a job and also social security. The income of public officers has been reduced in time, compared to traders. Although SSK is the largest social security institution in the area, 16.8% of the applications were from SSK and 60% were from Emekli Sandigi, because most of these patients go to SSK hospitals. In this study the group with "insufficient coverage" had lived through more economic alterations and this was statistically significant ($p<0.01$)(table 5).

When social security variable was included in the Cox regression model and adjusted for metastasis, it was found insignificant. Although it was not significant, having more metastasis in the group with "insufficient coverage" made us think that there might be an association between metastasis and social security (table 4, p=0,094).

An important limitation of the study is the changing of the study design from population based to hospital based because KIDEM data could not be obtained. The fact that socioeconomic status influencing the applications to the Dokuz Eylul University made it difficult to reveal the differences between socioeconomic status and survival. Still, it was shown that social security status influenced the survival in sufficient - insufficient coverage groups. It was also shown that survival was different in occupational groups, which was associated with social security. Taking into consideration that Dokuz Eylul University hospital has selected patients in terms of health insurance and socioeconomic status, the difference of survival should be higher in patients outside of this hospital.

Merging all cancer types together to examine the survival was another limitation of the study since cancers at different sites will have varying survival rates. Due to the small numbers in each cancer type this was unavoidable. However, there is no evidence that socioeconomic status will have a more detrimental effect on cancers with short survival compared to cancers with longer survival.

In conclusion, socioeconomic status assessed by social security coverage had a differential effect on cancer survival in favor of "sufficient coverage". This effect is believed to be through late diagnosis and its consequences in treatment among the "insufficient coverage" group.

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Health effects of cotton dust and byssinosis

Nadi BAKIRCI[a], Robert Mc NIVEN[b], Nazmi TUMERDEM[c]

Abstract

This article reviews the health effects of cotton dust in exposed workers, including the definitions of byssinosis, the clinical, epidemiological and etiological features of respiratory disease patterns observed in these workers. The treatment of effected workers, future research directions and possible prevention strategies will all be discussed.

Key words: Cotton dust, byssinosis

Background

Cotton is one of a group of organic fibres useful to man. Cotton has been predominantly used for manufacturing material for clothing or soft furnishings. Hemp, flax and possibly sisal are other organic dusts used less commonly, but with a similar range of potential for causing respiratory disease.

Observations of respiratory diseases attributed to textile dust go back up to 18th century. Ramazzini defined the working environment; "*... there was a disgusting and harmful smell, emerging from softening of hemp and flax and can be perceived from a long distance*"[1].

Although cotton and flax have been processed for centuries, the first cases of reported respiratory disease are described during the 19th century. In 1831, Kay, a physician in Manchester (UK), defined a respiratory problem characterized by a work related cough beginning with "unease below the sternum" among Lancashire textile workers[2]. This area of England was then the most intensive industrial region. The onset of disease at this time may have been attributed to the increasingly automated processes of cotton, with the speed of machines increasing the generation of airborne fibres and particle dust.

Classical byssinosis

The disease was first defined by Mareska and Heyman[3] in 1845. However, a more clear definition has been made by Greenhow[4] in 1860. According to this definition, asthma like symptoms were experienced during first days of the working week, with improvement as the week progressed. This unusual temporal feature is still uses as the characteristic requirement for the definition of the disease.

The term byssinosis was first used in England by Proust (1877) and Oliver (1902)[5]. They reported a wide spectrum of respiratory symptoms ranging from acute dyspnoea attacks accompanying cough and a feeling of chest tightness after exposure to cotton, hemp and flax through to chronic respiratory disease causing irreversible airway obstruction.

Further understanding came following the epidemiological studies of Richard Schilling and colleagues in the 1950's and 60's[6]. The original classical form of the disease was characterized as chest tightness occurring initially on the first working day of some weeks of the working week (grade 1/2). Workers were thought to progress to symptoms experienced every week (grade 1), then to symptoms on the first and other days of the week (still with improvement as the week progressed (grade 2). A further grade of workers who had permanent respiratory impairment on lung function testing was included (grade 3)[7].

After many subsequent studies performed among people exposed to cotton and other vegetable dusts, it has been determined that there may be other reactions not compatible with the classical definition of byssinosis. For this reason, a conference by the

[a] MD, Assistant Professor, Marmara University, School of Medicine, Department of Public Health
[b] MD, Senior Lecturer, Consultant Respiratory Physician, North West Lung Centre, Wythenshawe Hospital, Manchester
[c] MD, Public Health Specialist, Occupational Health Physician
Correspondence:
Nadi Bakirci, Marmara University, School of Medicine, Department of Public Health, Istanbul, Turkey, e-mail: nadiba@e-kolay.net

intervention of International Occupational Health Commission in Manchester in 1986 aimed to review the spectrum of disease[8]. In this conference, all reactions developing after exposure to cotton dust reported at the time were classified. These criteria (named as Manchester Criteria) are presented below:

Manchester criteria

1. Mill fever

There occurs an acute increase in fever with influenza like symptoms in the afternoon or evening of the first working day. This acute fever occurs following initial intense cotton dust exposure. After repeating exposures, presumed due to a tolerance development, fever doesn't recur. However, following a long period of withdrawal from work, re-exposure can result in the fever emerging again. Symptoms usually occur early in the working career and do not appear to be associated with any long-term consequences.

2. Decrease in respiratory functions

Following exposure to cotton dust, various lung function changes can be seen. Commonly a reduction of FEV 1 (forced expiratory volume in 1 second is seen), occurs across the first working shift of the week. Lung function has also been seen to decrease progressively across the working week, even though the largest falls in lung function across a shift occur on a Monday (first working day). As such, there is not full recovery over the first rest period, of the lung function lost. Although the subsequent loss of FEV 1 across the shifts after Monday is smaller, they still occur at a greater rate than overnight recovery. The net effect was a gradual decline of post shift fev1 across the week. The lost fev1 is recovered however by the weekend (or long rest period) break[9]. In a small portion of cotton workers, a decrease in pulmonary function occurs within half an hour of beginning of the individual's very first working shift. If exposure continues, the worker progressively deteriorates and cannot tolerate the environment. These workers should be advised to leave the industry as soon as possible.

3. Chest tightness

A gradual chest tightness seen in the afternoon of the first working day is a typical sign of long-term exposure. The symptoms require many years of continued work exposure before it develops. These workers are those define as having classical byssinosis.

4. Bronchial hyper-reactivity

Bronchial hyper-reactivity usually measured by non-specific challenge to metacholine or histamine has been reported in cotton workers. Hyper-reactivity has been reported following both acute exposures to cotton dust and after many years of exposure, even in workers who do not report classical byssinosis.

5. Chronic bronchitis

Chronic bronchitis, characterized by cough and sputum has been reported among workers exposed to high concentrations of cotton dust for prolonged periods. Although, generally seen among smokers a study by Niven *et al.*[11] demonstrated a strong effect of cotton exposure on the risk of symptomatic chronic bronchitis associated with lung function decrement in non-smoking workers and when comparing smoking cotton workers with non-smoking controls. It has also been reported that workers may experience a non-productive dry cough, which may or may not accompany chest tightness.

Categorising clinical features and lung function response to cotton

It is clear that a number of different clinical and physiological responses to cotton dust exposure are possible. From the Manchester criteria, it was clear that a number of features akin to asthma like responses occur (airway inflammation, bronchial hyper-reactivity). These responses occur either immediately (acute responses) or following prolonged exposure and alternative aetiologies for these acute and chronic responses are possible.

In addition an agent capable of causing an acute febrile response may be responsible for the symptoms of "mill fever". These symptoms are similar to those of humidifier fever, where immunological responses to bacteria contaminating water-humidifier systems and bacterial endotoxin have been variably implicated.

In chronically exposed workers, different patterns of symptoms can appear. Some workers develop classical byssinosis, characterized by chest tightness

on a first working day, the frequent presence of bronchial hyper-reactivity, while other workers develop a chronic bronchitis pattern with increased cough and sputum. Although these two patterns of response to chronic exposure may have different aetiological agents, both can be associated with a loss of lung function.

There are no specific features on chest X-ray, which is unhelpful in the clinical assessment. No changes in gas transfer if measured have been reported.

In the acute phase, there is a decrease in respiratory function across shift may be measurable with spirometry. Attempts to demonstrate these changes in workers with chronic disease have met with variable success.

In an attempt to take in to account the variable response that can occur after acute and chronic exposure to cotton dust, the World Health Organisation attempted a new classification. This new classification included the classical forms of byssinosis, symptoms associated with "*respiratory tract irritation*" and a separate sub-category of acute and chronic lung function changes[10,11].

Other authors have avoided using the complicated WHO classification and record two different sub-categories of acute and chronic byssinosis. Acute byssinosis relates to the symptoms or lung function changes associated with acute exposure. It is believed that acute byssinosis may be responsible for the high turnover rates of employees' cotton mills[12]. Chronic byssinosis relates to "*classical byssinosis*" defined by Schilling developing after 20-25 years of exposure (Table 1). The word "*byssinosis*" in general is used for "*classical byssinosis*".

Table 1. Features of acute and chronic byssinosis

Acute Byssinosis
- It is seen among workers exposed to cotton dust for the first time during the early periods of work life.
- Decrease in respiratory functions throughout the shift.
- Symptoms related with airway irritation emerge.
- It can lead to high turn-over and "healthy worker" effect.
Chronic Byssinosis
- It is seen after 20-25 years of exposure to cotton dust.
- It relates the "classical byssinosis" defined by Schilling and his colleagues.

Grading

First grading system for byssinosis was done by Schilling in Spain in 1963[13]. According to this grading, byssinosis was evaluated in 4 basic clinical grades, which are still in current use.

Grade C 1/2: Occasional chest tightness seen on first days of working week.

Grade C 1: Chest tightness and/or shortness of breath seen regularly on first days of working week.

Grade C 2: Chest tightness and/or shortness of breath seen on both first and the following days of working week.

Grade C 3: Persistent impairment in respiratory function and decrease in ventilation capacity in addition to the symptoms of Grade C 2.

When the worker is kept away from the environment, the early symptoms totally disappear. In some workers, persistent impairment in respiratory functions develops while some are believed to progress directly to stage C 3.

The categorization of WHO[14] identifies that symptoms and lung function change, while occurring sometimes together, may also occur separately in the absence of the other (Table 2).

In studying or screening workers exposed to cotton or similar organic dusts, both symptoms and measurement of lung function need to be measured independently. In diagnosis, medical history and results of pulmonary function tests are the leading points.

Christiani *et al*. in 1994, investigated the importance of before and after-shift pulmonary function tests and questionnaires in cotton-exposed workers. They determined symptoms by questionnaire and the presence of 5% decrease in FEV1 across the shift. The latter represented a risk factor for chronic impairment of respiratory functions[15].

Prevalence studies

Chronic byssinosis

Epidemiological studies of the prevalence of byssinosis have shown variable results (Table 3). Unfortunately not all of the studies have used the same identical criteria for a diagnosis of byssinosis. As a result not all of the rates quoted can be directly compared. Some of these anomalies are unavoidable as certain phrases and most notably chest tightness, does not necessarily translate into alternative languages and cultures.

Table 2. The WHO classification and grading system:

Classification	Symptom
Grade 0	No symptom
Byssinosis	
Grade B 1	Chest tightness and/or shortness of breath on most of working days.
Grade B 2	Chest tightness and shortness of breath on first and other days of working week.
Airway irritation	
Grade AI 1	Cough accompanying exposure to dust
Grade AI 2	Persistent sputum beginning or worsening with exposure to dust (nearly all days of 3 months in a year)
Grade AI 3	Persistent sputum beginning or worsening with exposure to dust and that worsens with chest tightness or lasts at least 2 years.
Pulmonary functions	
Acute changes	
No effect	A consistent* decrease in FEV1 less than 5% or increase in FEV1 during shift
Mild effect	A consistent* decrease in FEV1 between 5-10% during shift
Moderate effect	A consistent* decrease in FEV1 between 10-20%
Severe effect	A consistent* decrease in FEV1 at least 20%
Chronic changes	
No effect	FEV1 is 80% or more of predicted value**
Mild to moderate effect	FEV1 is between 60-79% of predicted value**
Severe effect	FEV1 is less than 60% of predicted value**

* decrease in at least 3 consecutive measurements after at least 2 days of withdrawal from dust exposure

** should be performed before shift after at least 2 days of withdrawal from dust exposure

Table 3. Studies related to the rate of byssinosis in different years and countries

Study and the country	Year	Rate of byssinosis
ENGLAND		
Schilling R.S.F.[6]	1955	55.0
Cinkotai F.F.	1978	17.4
Cinkotai F.F.[16]	1988	3.9
Fishwick D.[17]	1994	3.7
Bakırcı N.[18]	1996	2.5
Raza S.N.[19] (Cotton weaving)	1999	0.3
SWEDEN		
Haglind P.[20]	1981	19.0
CHINA		
Lu P.L.[21]	1987	5.6
Jiang C.Q.[22]	1995	1.7
Christiani D.C.[23]	2001	7.6
DENMARK		
Sigsgaard T.[24]	1992	12.0
USA		
Jones	1979	5.7
TURKEY		
Tokgöz M.[25]	1968	25.0
Zencir M.[26]	1996	3.5
Altin R.[27]	2002	14.2
Tümerdem N.[28]	2002	0.0
AUSTRALIA		
Gun R.T.[29]	1983	1.1
SUDAN		
Awad el Karim M.A.[30]	1987	34.0
CAMEROON		
Takam J.[31]	1988	18.0

The studies in Lancashire have invariably used Schilling's original definition and a similar questionnaire approach. These studies have demonstrated a progressively reducing prevalence rate, presumably because of improvements in the working environment from greater enclosure of machines and better dust extraction systems.

Rates of byssinosis within these studies differ according to work area. Exposures to total cotton dust and to important contaminants of cotton dust vary widely throughout the mill process. Respiratory problems are experienced most commonly in the early stages of cotton process (opening, carding) than the later stages.

Irritation/acute symptoms

Irritant effects of acute dust exposure have been shown to be more prominent among cotton workers than synthetic-cotton blend workers. It has been also seen that rates of respiratory problems were lower among synthetic workers[32,33].

Lung function changes

Becklake *et al.*[34] has followed cotton workers for 5 years. They measured across shift changes in respiratory function and longitudinal decline in

lung function over subsequent years. There was a significant relationship between acute and chronic changes in lung function.

Donham *et al*.[35], studied workers and measured lung function and cross-shift changes in lung function. In their study a 10% or more decline in FEV 1 occurred in response to dust concentrations of 2.8 mg/m^3 (as measured by personal dust sampling measuring total dust).

Pathological changes

Pathological changes of the lung and airways have been demonstrated in cotton-exposed workers[36]. It is thought that changes in respiratory functions are results of these pathologic responses[37]. The changes reported in these studies are varied and sometimes contradictory[11]. Generally a neutrophilic inflammation appears to be the most consistent finding. Post-mortem studies have demonstrated mucous gland hyperplasia and smooth muscle hypertrophy in the airways. However these latter changes may relate to co-existent chronic bronchitis from smoking, rather than to cotton specific disease.

Byssinosis in non cotton spinning industries

Byssinotic cases have been shown to occur in different industrial areas except from cotton spinning. Ozesmi *et al*.[38] reported byssinosis among wool workers. In this study, 22.0% of workers were believed to have contracted byssinotic like symptoms. In another study, Bakirci *et al.* reported byssinotic symptoms among workers exposed to cottonseed and demonstrated a cross shift decline in respiratory functions on the first day of the working week[39].

Aetiology

The aetiology of byssinosis is still not clearly known. Many agents and factors have been claimed to be responsible as the mechanism of byssinosis. In the epidemiological studies mentioned above, strong associations have been shown between cotton dust concentrations and respiratory symptoms. Formerly, it was thought that dust itself leads to byssinosis, however, current evidences pointing out the importance of contaminants over cotton dust are increasing.

There are exposure-effect studies showing association between cotton dust endotoxin concentration and respiratory disease[40]. Cotton dust includes high concentrations of Gram negative (Gr-) and Gram positive (Gr+) bacteria and fungi[41,42]. Castellan *et al*.[43], in 1984, demonstrated that (Gr-) bacterial endotoxin had an important role in acute pulmonary responses caused by respirable cotton dust. Similar results supporting the association between endotoxin level and byssinosis have been achieved[44]. However, in an experimental study, done by Antweiler in 1961 among animals, it was shown that (Gr-) bacterial endotoxin didn't lead to increases in histamine after cotton dust exposure[45]. However cotton washed or steamed to remove endotoxin and microbiological products has been shown to effectively inert and exposure to such cotton does not reproduce symptoms in individuals experiencing lung function changes with un-washed cotton[46]. A relation was not found between concentration of environmental atmospheric microorganisms and byssinosis in Tuffnell's study in 1960. There was a relationship between certain bacillus species (B.pumidus and B.subtilis) and byssinosis, but this was not thought to be causative[47]. Pernis *et al*.[48] reported a role for bacterial endotoxin in occupational diseases caused by respirable vegetable dusts.

Studies in recent years have tended to show a strong relation between endotoxin concentration in organic cotton dust and respiratory symptoms among exposed workers.

It is more realistically proven that endotoxin is responsible for the acute effect on pulmonary function[49]. Animal studies relating endotoxin exposure in vivo to response, have demonstrated tolerance to repeated exposure and neutrophilic inflammation as characteristic of the pathological response. Furthermore human studies of challenge to endotoxin produces a febrile response in some subjects at high levels, with airway responses akin to the animal studies in other subjects[50,51,52]. On the contrary a study of the effect of endotoxin on lung cells, it was shown that endotoxin extracted from cotton had no effect on respiratory tract epithelium[53].

Even recent epidemiological studies have demonstrated no significant relationship between endotoxin exposure and acute decrease in FEV 1. Castellan *et al.* in 1987, did not find a relationship between cotton dust concentration and reduction in respiratory functions, there is strong evidence of a relationship between endotoxin levels in respirable cotton dust and acute changes in respiratory

functions[54]. But, Kennedy *et al.* has recently reported an association between chronic bronchitis and endotoxin in their study[55]. Unfortunately there are high levels of endotoxin present in certain industries where the chronic form of byssinosis is not a recognised phenomena[11]. In the poultry industry, the existence of high levels of dust containing endotoxin at greater levels than that found in the cotton mill environment. While such exposure has led to reports of up to 34.0% of workers experience lower respiratory tract and 42.0% upper respiratory tract symptoms, chronic classical byssinosis symptoms are not typically reported[56].

In another study done in farms, no respiratory symptoms were found in areas where endotoxin concentrations were high[57]. Typical effects of organic dusts are seen also among poultry house workers[58,59]. Though the exposure to endotoxin was high and led to typical symptoms related to the respiratory tract, typical classical forms of byssinosis were not seen.

Whilst endotoxin and bacterial contaminants within cotton dust are probably responsible for some (probably many) of the acute effects of cotton dust exposure on susceptible individuals, the factors responsible for chronic byssinosis remain obscure.

Management, prevention and follow-up

Management of byssinotic workers

Ideally a worker experiencing symptoms compatible with byssinosis should be removed from dusty and contaminated areas. This is done to prevent the theoretical progression of the symptoms and lung function decline. Such a management strategy is difficult in practice and it may lead to effected workers hiding their symptoms for fear of job loss or reduced income. Treatment is similar to asthma, with bronchodilators, inhaled steroids and even sodium chromoglycate all having some beneficial effects.

Prevention

The very basic strategies in prevention are those of any occupational disease. Reduction of exposure, by whatever means (enclosure, segregation and personal protective equipment) will all reduce the level or extent of exposure of workers. A case can be made for medical screening to identify effected workers. However as indicated above, the benefit of this is less clear-cut than is the case with occupational sensitisation (occupational asthma) for example. Occupational and public health strategies will be influenced by studies of follow-up of effected workers or longitudinal studies of exposed cohorts.

Exposure assessment and environmental follow-up

The theoretical aim is to decrease dust and exposure to aetiological contaminants and thereby to prevent the appearance of respiratory disease.

Before we can do this confidently we need to be sure of the correct assessment of exposure.

Dust can be sampled from two basic sources: one is the working environment (work area dust) and the other is worker himself (personal dust). Generally, gravimetric methods have been applied for both types of sampling process. In the UK, personal duct concentrations have been documented as giving more reliable data for assessment of exposure. As a result in the late 1990's the Health and Safety Executive changed their guidance recommendation for monitoring exposure to a personal sampling technique. The method recommended involves the use of portable pumps, generating flow rates of 2 litres per minute, and collecting dust on to an open faced (total dust) cassette containing a micro-glass fibre filter. Filter and heads are attached to the respiration level of worker. The sampler is preferably worn for the duration of the working shift and therefore measures a mean dust exposure for the work shift of total (inhalable) dust.

For the assessment of chronic disease it is possible to make an assessment of an individuals cumulative (working life time) exposure from their work history and known levels of exposure.

However in the United States, dust exposures are measured and monitored using a vertical elutriator. This method measures respirable dust as the elutriator separates and samples on the basis of particle size. Theoretically only those particles that could penetrate the lower respiratory tract are sampled. The disadvantage is that these particle separating samplers are not portable and can only measure exposures in the vicinity of a worker performing his tasks. Certain activities in the working day may generate local dust "clouds" that are not measured by the vicinity or work area samplers. To date, no

satisfactory comparison of the US or UK standards of exposure assessment have been performed.

There are threshold values for cotton dust in current literature. Exposure limits for average respirable (work area, particle fractionated) cotton dust according to workrooms, which are determined by WHO[60], are presented in Table 4.

Table 4. Threshold values for cotton dust

Production	Average cotton dust concentration
	(mg/m^3)
Carding	0.5
Spinning	0.2
Weaving	0.75

The current UK standard, measuring personal total dust is set at 2.5mg per metre cubed. Although these standards may seem widely dissimilar, one study comparing personal and work area dust sampling techniques demonstrated differences of up to 10 fold between the two exposure assessment methods[61].

Reducing exposure

The aim of taking measurements should be to decrease dust exposures. Working with enclosed systems (enclosing machines at the source of dust generation) and suitable ventilation systems are the basic preventive measurements. Absorptive crenels should be supported with active ventilation. Using suitable personal masks are also important. However, a resistance among workers is seen towards personal protectors. In order to overcome these problems, active participation of workers and continuous education are needed.

There are also studies carried out, to study the potential protective effects of removing important contaminants by washing cotton prior to processing[62] or applying high temperatures[63]. While potentially beneficial, neither of these techniques has proved practically possible to date.

Medical follow-up of workers

Pre-employment examinations:

The aim of pre-employment medicals is theoretically to identify susceptible individuals, who might be at such an increased risk of developing disease, that they are better deployed to low or non-exposed environments or to determine a baseline lung function, so that early decrements can be identified and workers removed if unduly at risk of long term harm.

However little is known of the risk factors for acute or chronic disease and the long-term prognosis of those experiencing acute effects remains unclear.

It is prudent however that we collect simple demographic data, using standard questionnaires. These should enquire of familial or personal history of atopy or asthma, smoking habits and measurement of simple pulmonary function. Radiological examination cannot be supported. Workers with particularly poor lung function are likely to be at most risk, although no authors to date have been able to support a level of lung function at which workers should be prevented from working in the cotton mill environment.

Skin testing is also of interest as it is anecdotally reported that atopic workers are more likely to report severe acute effects and be unable to tolerate the working environment. However there again remains little scientific proof of this suggestion.

Periodic examinations:

It is reasonable to recommend periodic assessment of exposed workers, to reveal respiratory problems developing following cotton dust exposure. A simple standard questionnaire form, identifying the onset of symptoms and repeat lung function to compare to baseline levels may identify workers developing early loss of lung function. However protocols for managing workers who develop symptoms or lung function decline are difficult to develop and require local support from managers and worker representatives.

Simple pulmonary function tests, such as those determined by a portable spirometer are probably sufficient. Ideally across shift changes would be measured although these are hard to produce bearing in mind the variety of shifts that workers may be undertaking. Moderate effects (10% or greater) are defined by the WHO definition as moderate or severe and would be of concern. However longer term studies relating such changes to chronic effects on respiratory health are cotton workers are urgently needed to help those pursuing occupational health in the textile industries around the world.

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Do not get confused by the confounders: identification and control of confounders in medical research

Banu CAKIR[a]

Abstract

A wide range of interests may guide a researcher to conduct a study in medical field. The objective of a medical research may be to determine the prevalence of a particular disease/condition in a particular population; to identify predictors/risk factors of a particular disease; comparative evaluation of the effectiveness of a new medication or detection of its side effects. Regardless of the specific aim of a medical study, the researcher's ultimate goal is to determine the "truth" as "valid" as possible.

The finding of a study is the end result of three factors: 1) the "truth", 2) random error, or 3) systematic error. Various errors may "bias" the results due to factors arising in collecting/evaluating information and/or selecting study participants or, similarly, various confounding factors may cause systematic error in medical research and threaten the validity of interpretations, if not adequately controlled for in the planning and/or analysis stages of research.

This review describes and summarizes important epidemiological issues such as systematic and random error, association, statistical significance (p-value and confidence interval) and interaction and attempts to elucidate "why identification and control of confounders in medical research is important" and "how it can be done".

Key words: Confounding, bias, interaction

Introduction

Recently, I came across a brief and pleasant, yet informative, paper of Dickinson and Robinson on confounders in medical research[1]. The paper, inspired by a common TV commercial, introduces the concepts of confounding and confounders in a simple, easy and pleasing style, rather than complicated conceptual frameworks and mathematical models. I would like to summarize the authors' example very briefly: Mr. Jones and Ms. Smith both insist that his/her washing detergent is the best, yet the cheapest, detergent in the market. Mr. Smith claims "Fresh", his detergent, is expensive but is worth its price given its high cleaning action. Ms. Smith, on the other hand, insists on "Chepa" because "she can buy the same cleansing action for less" and she says that there is no need for fancy wraps[1]. To support their claim, this week, they would like to compare the cleaning power of the individual detergents.

Let us assume that each consumer goes to his/her house, washes their cloths with his/her own detergent and brings them back in his/her laundry bag. An "objective" judge, as we usually watch on TV commercials, assesses the cleanliness of each item and decides which detergent cleans better. Do you agree with the validity of such an assessment? Why? Why not? Let us assume again that the judge decides that the cleanliness of the clothes is exactly the same. Would you agree that "Fresh" and "Chepa" have the same cleansing power? If I state that "Fresh" cleans better or if you claim that "Chepa" has a higher cleansing action, who is right? What other information do you need to accurately determine which washing detergent is more effective on dirt than the other?

Here are a few questions that may be asked: what where the characteristics of the clothes washed (cotton/rayon/polyester)? What was the initial level of dirtiness of each cloth? What kind of dirt

[a] MD, Associate Professor, Hacettepe University, School of Medicine, Department of Public Health
Correspondence:
Banu Cakir, Hacettepe University, School of Medicine, Department of Public Health, Ankara, Turkey
e-mail: cakir@tr.net

spots were there on clothes (if any)? Which types of washing machines were used (age, type, characteristics)? Was any pre-washing done? What was the temperature of the water used for washing? What was the amount of detergent used? Was a dryer used?[1]

Presence of an "objective" judge does not always ensure that the assessment is "valid": either of the methods/factors with identical action can be judged as "better" or "worse", depending on how many other factors are affecting the outcome, and/or confounding it. Unfortunately, we cannot "re-wash" our decisions in the medical field. Therefore, appropriate and adequate analysis of data and "evidence-based" decisions are of "vital" importance in medical research.

"Association" implies togetherness of a particular exposure and disease, such that one changes as the other changes[2,3]. Determination of a statistically significant association between a given exposure and disease usually directs the researchers to further evaluate: 1) the size of such an association, 2) the dose-response effect (if any), 3) the consistency of findings with those of related research, 4) biological plausibility, 4) temporality, 5) specificity and 6) experimental evidence. Presence of such factors is a requisite for asserting "causality"[2]. This review summarizes the characteristics and role of confounders in medical research and introduces some epidemiological concepts such as, effect size of an association, statistical significance and interaction. However, details of such concepts are beyond the scope of this work.

Points to be emphasized in studying an exposure-disease association

A study on the association between a particular risk factor and disease would elucidate the end result of three factors: 1) the "truth", 2) random error, 3) systematic error. Systematic errors, in turn, include bias and confounding. Even when there is a "real" association between a given exposure and disease, random and systematic errors may cause an "expected" value to appear less or greater than the "true" value. In contrary, a Type I error may conclude that an association exists when there is no association in reality. Therefore, before concluding that an exposure is associated with a disease, the following possibilities should be ruled out:

I) Random error (chance): Type I (alpha) error is described as finding an association in the study when there is no association in reality. This type of error is not due to a factor that can be controlled for systematically, nor prevented. Researcher decides the level of Type I error that he/she can accept: the accepted level is usually 0.05 or 0.01 in medical field. Suppose that a researcher wants to study the association between an individual's proneness to depression and exposure to an unwanted/upsetting event in the previous month; and, finds that individuals reporting such events are 3 times more likely to get high scores from Beck's Depression Scale, corresponding to a p-value of 0.086 in statistical comparisons of the two groups. If the researcher had pre-determined the alpha error level as 0.05, this finding suggests that there is no statistically significant association between tendency for depression and experiencing an upsetting event in the previous month. On the other hand, this result could have been accepted as statistically significant, had the pre-chosen type I error been 0.10[2-4]. The majority of epidemiologists prefer to present the p-value as calculated, rather than presenting it with reference to some cut points, such as >0.01 or <0.05. Use of precise p-values would allow clinicians to decide how significant (if any) the difference between the groups are[2,4].

II) Systematic error (bias): Another potential misinterpretation of the "truth" could be due to systematic errors, namely "bias". Several types of biases are present such as, those arising from errors in collecting data or in measurements/classifications ("information bias") or those due to misclassification of cases/controls or individuals exposed/not exposed to a particular factor ("selection bias"). The study participant may give missing or wrong information; calibration and standardization of measurement devices could be inappropriate; the interviewer might misinterprete/mismeasure or reports wrong values or the situation under investigation might change over study period. All of such errors cause information bias in medical research. Selection bias may arise when individuals admitting to hospitals have different characteristics than their counterparts with no/limited access to care; when potential participants migrates from/into the study area or when the case definition is not well-defined, causing some "cases" to be misclassified as "controls" or vice versa.

Bias causes systematic errors in medical research and all potential biases should be considered and controlled for prior to data collection. Standardization of data collection tools, training of data collectors, appropriate calibration of measuring devices, use of standardized and objective case-definitions serve the objective of minimizing bias in medical research[2-4].

III) Confounding: Confounding also hampers the scientific quality of medical research. Confounding, confounder in Latin, points at the presence of a third factor, disturbing the study of the association between a given exposure and disease. Inappropriate control of such a factor, "confounder", would cause misinterpretation of the relationship between the cause and the outcome.

Control for confounding can be accomplished either during planning stage (via restriction or matching) or in analyses (such as, standardization, stratification or multivariate modeling). Presence and significance of a potential confounder requires basic epidemiological knowledge on the "size of effect" and the change in it. Let us review those concepts first.

Size of effect in studying associations

Analytic studies investigate the association between a given outcome (disease) and potential cause(s)/risk factor(s). If an association is detected, the direction, size, and significance of this effect are further sought for. A "positive" association is present if the outcome increases/decreases as the potential cause/risk factor increases/decreases. In contrary, a decrease in the outcome corresponding to an increase in exposure, or vice versa, is considered as a "negative" association.

The size of effect is usually estimated either using the "relative risk" (RR) (in cohort studies and intervention studies) or the "odds ratio" (OR) (in case-control or cross-sectional studies). Higher the RR or OR, the stronger is the association between the effect and the outcome. Statistical significance of such an effect would be evaluated using the confidence interval (usually 95%) of the relevant RR or OR. Both RR and OR are point estimates calculated from the data to explain the size of the association (if any). Relevant confidence intervals (CI) give the range where the calculated point estimates would lie in 95 of the situations, had the study been repeated 100 times. This finding suggests that we are 95% confident that the "true" size of effect lies within the range that a 95% CI frames. As an example, suppose that a cross-sectional study indicates that the odds of accidents at home is 5 times higher among household members aged 65 and above compared to those in individuals aged 15-64 years. The relevant 95% CI is calculated as 2.3 and 6.2. This finding implies that the point estimate calculated in the study population for the association between age and accidents within the house is 5 in this study. Yet, if the study had been repeated 100 times in similar groups using the same methods, the point estimate found would have been between 2.3 and 6.2 in 95 of the trials. The confidence interval does not include 1 (i.e., the null value or the odds among elderly is the same as odds among young). Therefore, this finding is statistically significant at alpha 0.05. Assume that 95% CI is calculated as 0.6-8.2. Then, the conclusion would be different. It now means that, although the point estimate calculated in the study is 5, when we repeat the study 100 times, in 95 cases we could either find elderly at 8.2 times higher risk of accidents or that elderly are 1.7 (1/0.6) times less likely than young individuals to have domestic accidents. Similar interpretations would be true for risk ratio, and relevant confidence intervals.

"Risk difference" is another measure of effect to evaluate the difference between risks of each group. Risk difference is a quite common measure used in randomized control clinical trials, particularly when cost-effectiveness is of concern. Interpretation of the 95% CI for risk difference is different than 95% CI for RR. Assume that a new anti-inflammatory drug is being tested against arthritic symptoms in women aged 50 years or above. Assume that 200 women were tested in each of the randomized arms using either the new drug or the old one. Pain sustains in 60% of the women using the old anti-inflammatory drug whereas pain was reported by only 40% of the women trying the new drug. Accordingly, investigators calculate a risk difference of 0.20. A corresponding 95% CI of 0.09-0.30 for risk difference would suggest statistical significance at alpha 0.05 and implies that if the new drug is used instead of old drug in 100 women with arthritis, 20 more women would be free of pain. The null value for CI of risk difference is 0 because this value

indicates that the risk in one group is the same as the risk in the comparison group: i.e., Risk in the trial group - Risk in the comparison group = 0.

Factors affecting the size of association in medical research

When an association between a particular effect and a particular disease is investigated, several factors may affect and/or disturb the association (if any). For example, characteristics of the data set might affect the results in a study of association between cigarette smoking and myocardial infarction, depending on the proportion of males in the group, if there is no adjustment for gender. In order to avoid systematic biases, preliminary statistical analyses include frequency distributions and bivariate analyses. Stratified analyses should further evaluate the association between effect and outcome (disease), by stratifying on several other covariates. If a difference is detected between effect sizes in different strata such as, gender (male/female), age (young/elderly), etc. all further analyses of the association should be stratified on that factor. The Simpson's paradox indicates that the size of effect in the whole group is different than those obtained from different subgroups (strata) of a particular variable. In fact, such a finding is not a paradox but rather a "truth" and should be "explained for". Assume that the RR value calculated for the association between school success and depression is 3 in the whole group. However, RR values vary as 1.2 and 5.6 in male and female students, respectively. In such a situation, presentation of the RR for the whole group would mislead the readers. Rather, RR values should be presented separately for male and female students. This concept is known as "effect modification" (interaction).

Effect modification (interaction)

The degree of the association between an effect (cause/risk factor) and outcome (disease) might be different across subgroups of a third factor. If the type/size of the effect varies by strata of a third factor, this factor is called an "effect modifier" and this process is known as "effect modification" (interaction)[2,4]. Effect modification does not arise from the characteristics of the data set but, rather, exists in real life. Therefore, effect modification should be "explained", rather than controlled for. As an example, the association between recreational physical activity and hypertension may vary across race groups or the effect of cigarette smoking on coronary heart disease may be heterogeneous across gender. If so, the effect size (OR or RR) should be presented for subgroups of the population, such as for African-Americans or European-Americans or for males or females. Readers should be aware that the effect of a particular factor on outcome of interest (disease) is heterogeneous and the risk (if any) is different for different subgroups of the population. Accordingly, the planning of preventive and therapeutic activities and management of different individuals will be different. When the researcher detects an effect modification by a third factor, this factor would no longer be studied as a potential confounder, instead, all analyses are presented separately for different strata of the effect modifier[2,4].

Whenever an effect modification is detected, the researcher should further explore the "type", "direction", and "size" of the interaction. Such as, 1) biological (synergic or antagonistic) or 2) statistical (additive or multiplicative) interactions. If the researcher decides to conduct a multivariate analysis, such as logistic regression, he/she could either create separate models for each stratum of the effect modifier (e.g. for males or females) or could create interaction terms to be included in the models. It is noteworthy, that the "hierarchical models" concept requires that all lower-order components of an interaction term should be kept in the final model, when the interaction term itself is significant. For example, if the interaction term "gender*smoking" is statistically significant, then both "gender" and "smoking" should be in the model, regardless of their individual significance[5,6]. Also, most of the popular statistical software could explore only the "multiplicative interaction"s, but additional efforts or macros are needed to study "additive" interactions[5,6]. It is strongly recommended to get consultancy from epidemiologists and biostatisticians in evaluating interactions in multivariate analyses.

Let us study the presence of effect modification on a hypothetical example. Assume that 4000 individuals are followed for 10 years in a prospective cohort study to investigate a potential association between a factor (E) and a particular disease (D). Table 1 presents the numbers obtained from preliminary analyses:

Table 1. Association between the exposure (E) and the disease (D)

	Disease (+)	Disease (-)	Total
Exposure to E (+)	400	1600	2000
Exposure to E (-)	100	1900	2000
Total	500	3500	4000

Relative Risk = (400/2000) / (100/2000) = 4

Assuming that A, B, and C are dichotomous variables, Table 2 presents the level of association between exposure (E) and disease (D), stratifying on factors A, B, and C.

Stratified analysis for Variable A indicates that effect is homogeneous across strata, and in the group as a whole. Therefore, Variable A is neither an effect modifier nor a confounder and crude RR of 4, obtained from Table 1, is presented for the association between E and D.

Stratified analysis for Variable B, in contrary, suggests that effect is heterogeneous across strata: RR= 1.0 for stratum 1 and RR=23.5 for stratum 2. In this case, Variable B is an effect modifier and effect sizes should be presented separately for strata 1, and 2.

Stratified analysis for Variable C indicates that effect is homogeneous across strata (RR= 1.0), yet, quite different than that obtained for the groups as a whole (RR= 4.0). Therefore, Variable C is not an effect modifier but is a confounder. Therefore, the association between E and D should be presented, controlling for Variable C, i.e. RR=1.

How do we identify the confounders?

Statistically, two different methods can be used to identify confounders. First, statistical modeling including all potential confounders and using backward elimination, stepwise or forward inclusion methods, the most parsimonious, yet explanatory, model can be selected. This approach cannot guarantee detection of all potential confounders but secures that among covariates studied, all statistically significant ones will be controlled for in the final model. Another approach compares and contrasts different models with and without potential confounders: the "crude" estimate obtained from bivariate analysis or models without potential confounder is compared with "adjusted" estimate obtained from the model including the potential confounder. If the difference is higher than 10% [7], the potential confounder studied is considered as "statistically significant" and the "adjusted" (Mantel-Haenszel) estimate of the effect is presented as the measure of association [8]. Researchers using such statistical approaches should be aware of the "no collapsibility" characteristic of the odds ratio, which implies that the "crude" estimate could be different than "adjusted" odds ratio, obtained by collapsing estimates obtained from stratum-specific ORs, even when a confounder is not present [9, 10].

In parallel to the view of many contemporary epidemiologists, this paper recommends the use of another approach for identification of confounders[2].

Table 2. Association between the exposure (E) and the disease (D), stratifying on factors A, B, and C.

VARIABLE A	STRATUM 1			STRATUM 2		
	Disease			Disease		
	Present	Absent	Total	Present	Absent	Total
Exposure (+)	320	480	800	80	1120	1200
Exposure (-)	80	720	800	20	1180	1200
	RR= 4.0			RR= 4.0		
VARIABLE B	STRATUM 1			STRATUM 2		
	Disease Present	Disease Absent	Total	Disease Present	Disease Absent	Total
Exposure (+)	24	376	400	376	1224	1600
Exposure (-)	96	1504	1600	4	396	400
	RR= 1.0			RR= 23.5		
VARIABLE C	STRATUM 1			STRATUM 2		
	Disease Present	Disease Absent	Total	Present	Disease Absent	Disease Total
Exposure (+)	388	1212	1600	389	1212	1600
Exposure (-)	48	152	200	49	152	200
	RR= 1.0			RR= 1.0		

Accordingly, for a factor to be considered as "confounder", this factor should be 1) a risk factor for disease or a surrogate measure for a risk factor, 2) associated with exposure among those without disease/in the cohort, but 3) does not lie on the pathway between exposure and disease (i.e., not an intermediate factor)[2,11]. Also, a confounder should not be directly affected by either the exposure or the outcome[2]. Use of no/inappropriate strategies for confounder control or unnecessary control of non-confounders might bias study results.

"Causal figures" may enable researchers to evaluate the relationships between exposure, disease, and potential confounders. Below a few examples are provided for use of causal figures.

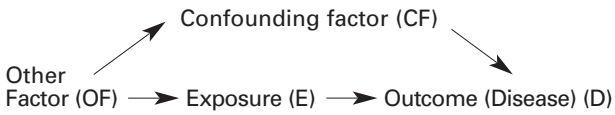
Example 1:

Assume that the association between paternal age (E) and spontaneous abortion (D) is studied in Example 1, investigating the role of maternal cigarette smoking as a potential confounder (CF)[12]. Maternal cigarette smoking may increase the risk of spontaneous abortion. Similarly, it is possible that the smoking mothers in the study population is more likely to marry older men compared to non-smoking mothers. In this situation, maternal smoking should be controlled for in studying the potential association between paternal age and spontaneous abortion. Otherwise, maternal smoking would bias the association "away from the null", regardless of the paternal age.

When the direction of the association between the confounder and the outcome is in the same way, i.e., both increase/decrease simultaneously, it is considered as a "positive" association. Such as, the affect of smoking as a potential confounder on the association between alcohol intake and lung cancer is positive. "Negative" association between a confounder and outcome is also possible. For example, age is negatively associated with oral contraceptive use but positively associated with myocardial infarction.

Graphical presentation for Example 1 does not explain all potential effects of a potential confounder and other patterns are also possible. As an example, in the association between paternal age and spontaneous abortion, maternal age could also be a confounder. Compared to young women, if older women is more likely to marry older men and are also more likely to smoke cigarettes, than the graphical presentation would be as in Example 2.

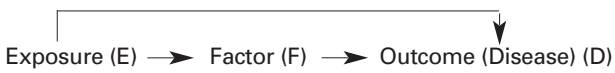
Example 2:



In this example, maternal age (OF) is associated with both maternal smoking (CF) and paternal age (E). Inappropriate control for maternal smoking would again cause bias in studying the association between paternal smoking and spontaneous abortion (D).

Several other graphical presentations could be used to describe confounders[13]. It is worth noting that a confounder is associated with the exposure of interest directly or indirectly and is also related with the outcome. However, a confounder is NOT an "intermediate variable" on the pathway between the cause (exposure) and the outcome (disease). Intermediate variables should not be adjusted for: adjustments might be used only if the researcher wants to study the "additional" effect of exposure on the outcome (Example 3).

Example 3:

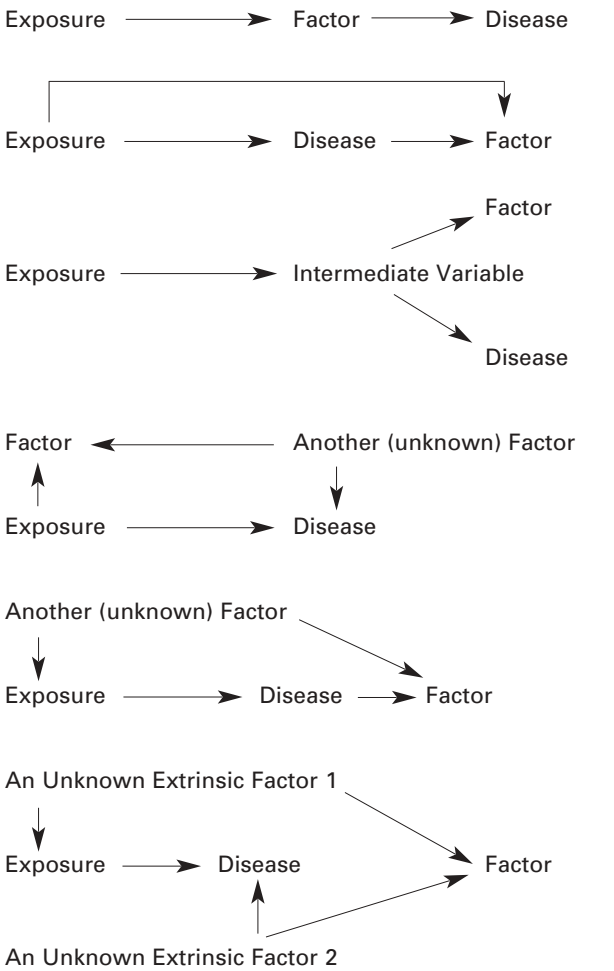


Assume that a researcher wants to study the association between obesity and coronary heart disease (CHD). In this association, LDL-cholesterol is an "intermediate" variable. Thus, when modeling controls for LDL-cholesterol, the effect of obesity on CHD would be under-estimated. Should we control for LDL-cholesterol? LDL-cholesterol is known to be associated with coronary heart disease, regardless of an individual's body weight and it is also associated with obesity, regardless of the presence of CHD. However, LDL-cholesterol is not a confounder in this example, given that it is on the pathway between obesity and CHD. Thus, adjustment is not required. On the other hand, if the researcher wonders whether obesity increases the likelihood

of CHD, even when level of LDL-cholesterol is constant, i.e. "what is the additional effect of obesity on CHD", then the researcher might want to estimate the effect size, controlling for LDL-cholesterol.

Graphical presentation of the relationships between exposure, disease and potential confounders eases the researcher's job to evaluate the role of a given factor as a potential confounder. There are several examples in medical research where the researcher mistreats a factor as a potential confounder and conducts unnecessary adjustments (Figure 1)[14]. Such unnecessary and inappropriate adjustments should be avoided. In order to lead the reader to right conclusions, it is better to treat such factors as "other covariates" in models and effect sizes should be reported separately for such covariates.

Figure 1. Examples to factors considered wrongly as confounders in medical research*



* Source: Hernan et al. Am J Epidemiol 2002;155:177[13]; Weinberg CR. Am J Epidemiol 1993;137:2[14].

Assume that we detected confounders, how should we control for them?

Several methods exist to control for potential confounders. The first method is to exclude individuals with certain characteristics and to restrict the study group to a homogeneous group of individuals. For example, if presence of a preceding surgery affects the mortality risk of intensive care patients, the study could be restricted to patients with no history of surgery. In case-control studies, controls could be matched to cases on factors, which may act as potential confounders (e.g., age, sex, place of residence). Stratified analyses assist the researcher to decide whether a particular factor is a confounder and to estimate adjusted effect estimates. Lastly, multivariate analyses, such as logistic regression or Cox modeling, may provide simultaneous control for potential confounders and other risk factors, while studying an association between a particular exposure and disease.

Evaluation of confounding step-by-step

The following steps summarize the procedures for effective control of confounding in medical research:

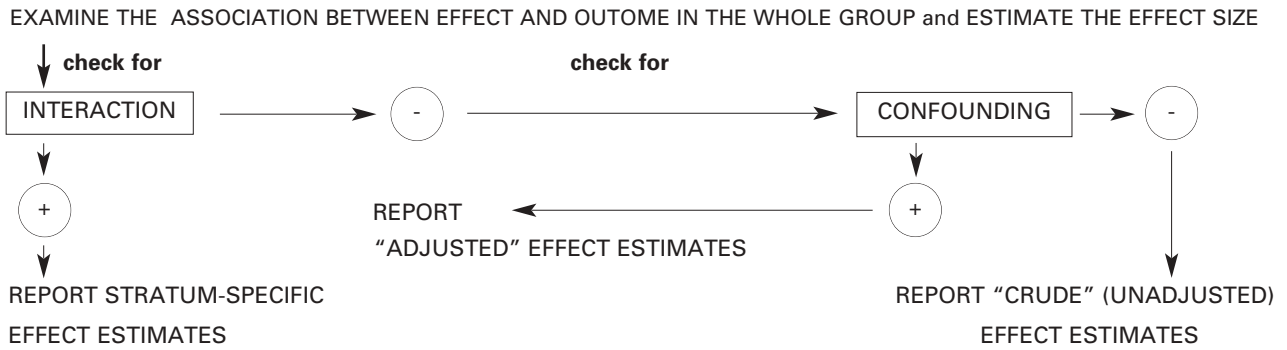
Step 1: Conduct a thorough literature review on the association between disease (outcome) and exposure, and all potential confounders and/or effect modifiers. Clinicians with sufficient expertise on this particular topic should take active role in planning the study. If there are definite confounders, then these factors could be controlled for during study design (exclusion, restriction, matching or randomization) or in analyses (stratification or multivariate adjustments).

Step 2: Enter data, complete the required corrections and/or editing, evaluate the frequency and percent distributions, means, standard deviations, medians, quartiles etc.

Step 3: Conduct bivariate and stratified analyses. If stratum-specific effect estimates vary significantly (i.e., >10-15% change in effect estimate), report stratum-specific estimates and state that there is an interaction.

Step 4: If there is no interaction, further study the potential for a confounding effect. Comparison and

Figure 2. Evaluation of the exposure-disease association through stratified analysis



contrast of "crude" versus "adjusted" estimates may reveal whether a significant confounding effect is present or not. Confounders cause systematic error rather than random error and, thus, p-values are not appropriate measures for deciding whether the difference between the crude and adjusted estimates is significant. The researcher could preset level of significance for a difference in effect size and usually a 10 to 15% of a change is considered as statistically significant: this value should be reported in the manuscript.

It is important to emphasize that "intermediate" variables should not be controlled for as "confounders", even if they are associated with both the exposure and the disease.

When a confounding effect is present, the "adjusted" effect estimates should be reported. Mantel-Haenszel procedure could be used to reach an adjusted odds ratio (or risk ratio), provided that there is no interaction[8]. Multivariate analyses provide effective control of potential confounders and/or effect modifiers; yet, the study size should be large enough. Expert consultancy should be sought for from epidemiologists and biostatistician to reach the "best" model.

Step 5: If neither interaction nor confounding is present, the researcher reports "crude" (unadjusted) estimates of the effect (Figure 2).

Self-exercise

Assume that a cross-sectional study was conducted to study the association between exposure X and disease D in a group of 200 females and 200 males. Researchers also collected data on age, gender, and Factor Z, which were thought as potential confounders and/or effect modifiers.

The following coding scheme was used in analyses:

Dependent variable:	Disease (D) (1= presence, 0= absence)
Independent variable:	Exposure (E) (1= presence, 0= absence)
Other covariates:	Age (1= aged 65 years or above, 0= below 65 years old)
	Gender (1= male, 0= female)
	Factor Z (1= none/low, 2= medium, 3= high)

Let us analyze the association between exposure and disease and determine whether age, gender, or Factor Z distorts this association.

The first step will be the bivariate analysis for exposure and disease:

	Disease		
	Present	Absent	Total
Exposure +	34	126	160
Exposure -	20	220	240
Total	54	346	400

X^2= 13.716 d.f.=1 p< 0.001

Odds Ratio= 2.97 95% Confidence Interval (CI)= 1.64-5.38

Table above suggests that 54 individuals had the disease and 346 were disease free at the time of the study. The proportion of disease was 34/160 among those who had the exposure and 20/240 for those unexposed to X. The odds of exposure was about 3 times higher among those with the disease compared to those without the disease and this difference was statistically significant at alpha=0.05 (Note: 95% CI does not include the null value, i.e., 1).

When the exposure-disease association is further studied stratifying on age, the association was not statistically significant among individuals aged below 65 but the odds of exposure was 6.4 times higher among individuals with the disease compared to their counterparts (p<0.05), in the group aged 65 years or above.

Below 65 years old

	Disease		
	Present	Absent	Total
Exposure +	22	98	120
Exposure -	10	70	80
Total	32	168	200

X^2= 1.215 d.f.=1 p= 0.270

Odds Ratio= 1.57 95% CI= 0.70-3.53

Aged 65 years or above

	Disease		
	Present	Absent	Total
Exposure +	12	28	40
Exposure -	10	150	160
Total	22	178	200

X^2= 18.437 d.f.=1 p< 0.001

Odds Ratio= 6.43 95% CI= 2.53-16.31

This finding suggests that age is an effect modifier for the exposure X-disease D association. There is no need for further evaluation for the potential role of age as a confounder; rather, stratum-specific estimates of effect should be reported separately.

On the other hand, assume that analysis was repeated stratifying on gender and gender-specific estimates were not different. In such a case, gender should be further studied as a potential confounder. In medical research, gender is usually treated as a potential confounder given that physiologic characteristics and exposure risks are usually quite different in males and females.

Let us study gender as a potential confounder:

Step 1: Is gender associated with the Disease (D), regardless of the Exposure (E)?

Among those unexposed (N= 240):

	Disease		
	Present	Absent	Total
Males	6	10	16
Females	14	210	224
Total	20	220	240

X^2= 19.091 d.f.=1 p< 0.001

Odds Ratio= 9.00 95% CI= 2.30-31.87

Step 2: Is gender associated with the Exposure (E), regardless of the Disease (D)?

	Exposure		
	Present	Absent	Total
Males	108	16	124
Females	52	224	276
Total	160	240	400

X^2= 166.090 d.f.=1 p< 0.001

Odds Ratio= 29.08 95% CI= 4.62-181.69

The analyses above indicate that "gender" provides the first 2 requirements for being a confounder. Given that any exposure might change gender, it cannot be an "intermediate variable". Assume that the odds ratio for exposure and disease association is calculated as 1.5, with a 95% CI of 1.1 and 2.8, controlling for gender. If so, the researched should report that the estimate of effect for Exposure X as 1.5, adjusting for gender.

Table 3 below presents the association between Factor Z and the Disease (D) and suggests that Factor Z is a protective factor for the Disease (D):

Table 3. Association between the Disease (D) and the level of Factor Z

	Disease		
	Present	Absent	Total
Level of Factor Z			
None/low	32	94	126
Medium	18	98	116
High	4	154	158
Total	54	346	400

X^2= 31.953 d.f.=2 p< 0.001

Assume that Factor Z is neither an effect modifier nor a confounder. Logistic regression modeling could be used for multivariate analysis of the effect of Exposure (E) on Disease (D), controlling for other covariates. In accordance with the coding scheme presented above, the Logit model will be as follows:

Logit P (Disease D)=$\alpha+\beta$ Exposure X+δ_1 Gender+ δ_2 Factor Z+δ_3 Age+δ_4 (Exposure X* Age)

Logistic model is as follows:

Variable	B	s.e.	Wald	df	Sig	Exp(B)
Exposure X	0.3591	0.5766	0.3878	1	0.5334	1.4320
Gender	1.5008	0.4470	11.2731	1	0.0008	4.4854
Factor Z	-2.4392	0.5938	16.8757	1	0.0000	0.0872
Age	0.8707	0.5171	2.8355	1	0.0922	2.3885
ExposureX*Age	-0.8098	0.0692	1.3681	1	0.0242	0.4449
Constant	-3.1710	0.3678	74.3289	1	0.0000	

Bivariate analysis suggests a statistically significant association between exposure and disease, with an odds ratio of 3 and indicates that gender is a confounder. Controlling for age, gender, factor Z and the interaction term (Exposure X*Age), on the other hand, the association is no longer significant: adjusted OR= 1.43 (95% CI= 0.46-4.43).

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A unique model in general practice training: Turkish Medical Association's Institute of General Practice

Ozen ASUT[a]

Introduction

The significance of primary health care for community health in Turkey, had been realized long before the Alma-Ata Primary Health Care Conference. The legislation on the socialization of health services was adopted in 1961 and the implementation of the socialized health services was started in 1963. The health centers established according to the socialization of health services are still in practice 40 years after the initiation of the first primary health care unit in the country.

A number of national and international expert opinions point to the specific need of a well-trained physician focused on primary health care (PHC), namely the general medical practitioner (GP)[1]. Primary health care premises are the workplace of GPs where integrated health services, including promotive, preventive and rehabilitative aspects, are provided comprehensively and continuously to all members of the society in equity. PHC is the point of first contact of the health system and should be accessible to all people without discrimination regarding age, gender, disease or any other characteristics. The function of the GP is to guarantee the quality of the services of the primary health care organisation[2,3]. Professor Nusret Fisek, the founder of the socialized health system in Turkey had pointed out to the necessity of a specialization oriented towards general practice and PHC[4].

The objective of this presentation is to describe the structure, organization, educational activities and the future perspectives of the Turkish Medical Association's (TMA) Institute of General Practice, established for the purpose of specific vocational training in general practice for the final aim of increasing the quality of care in PHC.

International progress and documents on general practice

The last 2-3 decades of the 20th century experienced magnificent changes in medicine and specialization has increased both in number and in depth, resulting more than ever in the need of a multi-function physician to evaluate the individual patient and the community in a comprehensive manner. Specific vocational training in general practice has become a focus of special interest in Europe during the last two decades. The Europian Community has developed certain criteria for the training required of GPs to provide PHC of high quality in order to promote community health. A great majority of the European countries have developed GP training programs in compliance with the EU principles and criteria. With the EC Directive EC 86/457, specific vocational training in general practice is recognized by all EC countries since 1990[5].

Consequently, all new general practitioners appointed to work in the social security system of EC countries from 1995 on must have received a minimum of two years vocational training (93/16/EEC). European Union of General Practitioners (UEMO), representing 400 thousand GPs throughout Europe has insisted on a minimum period of three years for GP vocational training, considering the contents and the quality of the profession[6].

The European Union (EU) has recently become more involved in health and health manpower affairs. EU Doctors' Directive 93/16/EEC has guaranteed high quality training for both specialists and GPs. The efforts of UEMO at the European Parliament has ended up by an amendment of Directive 93/16, increasing the duration of vocational training of GPs to three years, starting January 2006[7,8].

[a] MD, Associate Professor, Turkish Medical Association
Correspondence:
Ozen Asut, Turkish Medical Association, Ankara, Turkey e.mail: ozenasut@interaktif.gen.tr

The features of general practice training programs differ broadly even in the EU countries.

The general practitioners of Europe agree on the necessity of a common European core content for vocational training in general practice. A number of activities have been performed by relevant organizations in efforts to develop documents setting up minimum standards for GP specific vocational training. These documents include[9]:

1. UEMO Policy Statement (Adopted in 1991, expanded in 1991 and 1995)
2. UEMO Criteria for General Practitioner Trainers (Adopted in 1992)
3. UEMO Consensus Document on Specific Training for General Practice (Adopted in 1994, in cooperation with the European Comission, World Organisation of Family Physicians (WONCA), International Society of General Practice (SIMG) and WHO European Regional Office)

UEMO has also developed particular documents on specific issues of the general practice discipline such as equal opportunities, cancer training, palliative care, shared care, continuing medical education, therapeutic prescription and telematics.

General practice vocational training in European countries

The specific vocational training in general practice presents differing features in countries of Europe. As a common characteristic, the adopted minimum period of two years is generally implemented throughout the countries. In a similar way, the criterion of assuming control of all the training process by GP trainers is accepted and implemented in most of the countries.

The prerequisite for GP trainers is proper selection and trainers' training education.

On the other hand, other aspects of the vocational training programs are far from being standardized[10]. The necessity of a core curriculum for all European countries is emphasized by the experts on the discipline. The question on whether GP is a specialist or not is currently answered by the diverse characteristics and jobs of the GP and the relevant education-training program, which obviously demands a different kind of specialty training[11].

The activities of the Turkish Medical Association and the Foundation of the Institute of General Practice (IGP)

Introduction

The Turkish Medical Association (TMA) has endeavoured to point out to the community-based solutions of health problems prevailing in the country, starting as early as the beginning of 1970's. The necessity of a well-trained general physician working at the frontline of the health system has been emphasized in almost exclusively all activities of TMA. The adoption by the Turkish Parliament of "the law on full-time employment of public doctors" was a consequence of the intense efforts of the executives of the TMA in 1979. The public benefits of this legislative action was experienced all over the country.

TMA has also supported the socialized system for the last three decades, in spite of the negligence of the primary health care system by governments, who promoted secondary health services and continued to construct hospitals.

The governments of the 1980s adopted the objective of increasing the number of physicians in the management of health care problems. A number of new medical faculties without adequate infrastructure were founded and the number of the medical students in the previous faculties were increased without any improvement of the facilities. These conditions resulted in a degradation of the quality of the medical manpower in the country. The governments continued these policies disregarding the opposing opinions of the relevant expert groups and organisations, including the TMA[12].

The increases in the number of doctors ended up with an enlargement of the GP population both in size and in proportion because of the limitations of specialisation chances. Only about 10% of the medical graduates were able to start post-graduate specialist training. Consequently, the proportion of GPs rose up to 39% in 1980's and to over 50% in 1990's, compared to the 36% of 1970's[12,13]. The ratio of GP/specialist was 58% in 1998. According to the data of 2000, 53% of the total 89 thousand doctors were GPs, whereas 47% were specialists[14]. The distribution in years of GPs and specialist doctors is reflected in Table 1. The conspicuous increases in

the number and proportion of GPs started a debate on the discipline of general practice.

Table 1. Specialist/GP Status in Turkey[13]

		Specialist		GP	
Year	Total	Number	%	Number	%
1950	6.895	3.647	53	3.248	47
1955	7.077	3.192	45	3.885	55
1960	8.214	4.181	51	4.033	49
1965	10.895	6.657	61	4.238	39
1970	13.843	8.818	64	5.025	36
1975	21.714	12.698	58	9.016	42
1980	27.241	16.699	61	10.542	39
1985	36.427	20.878	57	15.549	43
1990	50.639	24.900	49	25.739	51
1993	61.050	26.322	43	34.728	57
1994	65.832	27.564	42	38.268	58
1995	69.349	29.846	43	39.503	57
1996	70.947	31.126	44	39.821	56
1997	73.659	32.511	44	41.148	56
1998	77.344	34.189	44	43.155	56
1999	81.988	36.854	45	45.134	55
2000	88.768	41.717	47	47.051	53

The establishment of the IGP and relevant TMA activities

Realizing the meaning and importance of the general practice discipline and primary health care services, a group of GPs started a discussion in the TMA late 1980's and early 1990's. The TMA General Practitioners' Division (TMA GPD) was established in 1989 and branches of the Division were organised in medical chambers throughout the country. One of the subjects of interest in the GPD was GP vocational training, which ended up in the formation of a new working group to work on GP training.

The working group on the vocational training for general practice started activities to evaluate national and international experiences. Data were collected on country practices and representatives of GPD attended international meetings, including UEMO plenums.

In the light of all the experience and data collected, the GPs organised in TMA declared that general practice is a specific medical discipline, after a workshop in Bolu attended by GPs from all over the country.

Afterwards, dicussions on the need for the institutalization of general practice vocational training started among the GPs of the GPD. This new concept was considered and evaluated broadly among the GPs of the TMA. Finally, the establishment of the Institute of General Practice under the organisational responsibility of TMA was approved by the Annual National Congress of TMA in 1996. After technical preparations of two years, TMA Institute of General Practice was founded in 1998[12].

Activities of the Institute of General Practice (1998-2004)

Definition and objectives

The TMA IGP, established to organize the postgraduate education and training of GPs working in PHC settings was defined in the IGP Regulations as follows[15]:

"TMA IGP is an autonomous institution with representatives of other relevant organisations established under the organisational responsibility of TMA to organize the vocational training in general practice."

Organisation

Central bodies of IGP:

The foundation of IGP was followed by the formation of an Executive Board (EB), some members of which were from the IGP Working Group, to work in the transitional period of general practice training. An Executive Committee of five members, a president and a general secretary were elected from among the Executive Board. The compositon and functions of the EB were described in the *IGP Regulations* as follows[15]:

"The IGP EB comprises 21 members, who are elected

**5 members from IGP General Assembly (GPD in the transitional period)*

**5 members from the GP Trainers Board*

**2 members from the IGP Scientific Advisory Board*

**4 members from the TMA divisions (2 of whom come from the GPD)*

**2 members from the General Practitioners' Association and*

**1 member representing the medical faculties*

**1 member representing the Ministry of Health*

**1 member representing the Ministry of Labor ."*

The EB elects a president, a general secretary and the Executive Committee."

Another central structure of the Institute is the Scientific Advisory Board.

The composition and functions of the Board were described in detail in the Regulations.

The Scientific Advisory Board comprises two representatives from each of the six basic modules, one member from each of the 12 clinical modules, 5 members from the IGP General Assembly, one representative of the Continuing Medical Education Journal of TMA, one member from the General Practitioners' Association and the general secretary of IGP. The Board convenes every three months.

The third central body of the IGP is the GP Trainers Board. As described in the *IGP Regulations*,

"The GP Trainers Board comprises GP trainers elected from among the GP trainers in the various regions of the country. The Board convenes every three months..."

The regions have been determined by the IGP EB. At the present time, there are 10 regions throughout the country, where GP trainers have formed groups to train other GPs in the region.

IGP general assembly

The utmost body of the IGP is the IGP General Assembly, where the basic policies of IGP are determined. According to the definition in the *Regulations*:

"IGP General Assembly, comprising all GP trainers of the IGP, is the body which determines the fundamental policies of IGP. The Assembly elects five members for repesentation in the EB and five members for the Scientific Advisory Board."[15]

IGP regions and local bodies

The regional organisation of IGP is made up of two bodies as a projection of the central IGP organisation. The regional activities of IGP, formerly performed by the GP commissions organized in the local medical chambers are in the responsibility of these local IGP bodies since the beginning of 2003, namely the IGP Regional Committee and GP Trainers Local Committee.

IGP Regional Committee is described in the regulations as follows:

"The IGP Regional Committee comprises representatives of the following groups: Local medical chamber, GP committee of the medical chamber, local health administration, local medical faculty, General Practitioners' Association local branch. The committe is responsible for organising the GP training activities in the region on behalf of the IGP."

According to the regulations,

"IGP GP Trainers Local Committee is formed by all the GP trainers in the region. During the transitional period, it is sufficient to have attended the training course of one of the six basic modules to become a member of the GP Trainers Local Committee, valid only on the condition of continuing the rest of the training program.

Methods of training and GP trainers

The IGP has adopted a group-based modular training program using interactive and participatory methods and mainly taking place at the PHC settings[12,16].

The trainers are selected from experienced GPs working at the health centers of the socialized public health system, preferably with training experience and willing to take part in the GP education program.

Contents of vocational training and relevant activities

IGP modules

The contents of the GP training program of the IGP were finalized after the discussions in the EB of IGP with consideration of the feedback from the field, reflecting the opinions of GPs working in PHC centers. The final decision of the EB was that the program would consist of six basic and 12 clinical modules. The modules are listed below:

Basic modules of IGP GP vocational training program:

1. The philosophy and basic features of general practice
2. Training skills
3. Communication skills
4. Epidemiology for PHC
5. Health administration
6. Utilization of computers at PHC

Clinical modules of IGP GP vocational training program:

1. Emergency medicine
2. Risk groups: Child care
3. Risk groups: Geriatrics
4. Risk groups: Health of the working people
5. Forensic medicine
6. Reproductive health
7. Chronic diseases
8. Minor surgery
9. Laboratory and radiology for PHC
10. Environmental health
11. Mental health
12. Infectious diseases

Workshops for goals and learning objectives of the modules

The first activity of IGP with broad participation was the workshop on the goals and objectives of the basic educational program, organized on 5-8 November, 1998 in Ankara.

A total of 33 physicians consisting of GPs, family physicians and public health specialists attended the meeting. The goals and learning objectives of the basic modules were determined at this workshop.

A similar workshop was organised for the clinical modules on 12 -13 June, 1999 in Ankara, with the participation of 77 physicians, comprising both GPs and clinical specialists. In this workshop, the goals and objectives of the 12 clinical modules were determined[17].

Training courses for GP trainers

The IGP EB and Scientific Advisory Committee jointly decided to start the education of GP trainers by training courses. Thus, the first trainer groups were determined to initiate the courses. The first course of the IGP was organised in Istanbul on 22-26 November 1999, which was a "Training Skills" course. Since then, 62 courses of basic modules have been organised in different regions of the country. The number of trainees who have started the IGP educational program is 260. Of these, 72 trainees have completed the six basic modules, as of May 2004 (Table 2). The GP trainers' training program is to continue in the coming years to manage the education of the great number of GPs in the country. The training program for GP trainers was published by the IGP in 2003[16].

Table 2. IGP basic module training courses

Module	Number of courses	Duration (hours)
Training skills	14	40
Communication skills	10	32
Utilization of computers	9	40
GP philosophy and features	11	32
Health administration	10	32
Epidemiology	8	40
Total	62	216

Transitional period

The duration of the post-graduate educational program of GPs in Turkey is determined as three years by TMA IGP. However, the duration of the program in the transitional period evidently will be shorter and planned to be one year. The transitional period for GP training in Turkey is defined as follows by the IGP:

"The transitional period is the interval of voluntary GP training program, which will last until the recognition of general practice as a specific medical discipline by the national authority."[15]

At the present time (May, 2004), the training programs for all the IGP modules are being developed and modified for the field training of GPs working at PHC settings and specifically the health centers of the socialized system. The GPs have been informed about the IGP program and the training of voluntary GPs shall be started in summer 2004 at the different regions by the IGP GP trainers at the region.

Conclusion

The GP education and training program of IGP has been developed in compliance with the maximum content of the European and other country programs. The program has also utilized the national experiences of the previous GP training programs oriented towards PHC. Nevertheless, the IGP program is a unique model, covering a broad area of the knowledge and skills needed for the general practice discipline and practice. Another chacteristic

of IGP is that all of the activities have been realised by national non-governmental facilities and manpower, with almost no support from the government.

An important feature of te IGP experience is the democratic, voluntary and participitative nature of the activities in the whole progress. The TMA IGP is a unique experience started and developed creatively by GPs actively working in the field, by the assistance and guidance of their professional organisation, the Turkish Medical Association.

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