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TJPH

Original Research Articles

Reviews

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

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Contents

From the Editor

In this issue, there are four original research articles, each about a different global health problem or health service application: obesity, factors affecting birth weight, utilization of health facilities and cold chain refrigerators.

A cold chain refrigerator is an important link in the cold chain process which keeps the vaccine potent. The 6th Round Review of the Global Alliance for Vaccines and Immunization (GAVI) Independent Review Committee stressed the importance of cold chain management, registering its strong concern that skills related to logistics and cold chain management and, indeed, overall management for immunization programs have been eroded. Turkish Journal of Public Health aims to encourage more articles on this very important issue by printing an article about cold chain by Bugdayci *et al.*

Besides the lack of potency in vaccines, lack of immunization is another important factor influencing the prevention of vaccine-preventable diseases . Among all such vaccine-preventable diseases, measles is the first cause of death in children. Failure to deliver at least one dose of measles vaccine to all infants is responsible for this high mortality; so the World Health Organization based the sustainable measles mortality reduction on a strategy of routine immunization and periodic campaigns[1]. Moreover, in the Cape Town Measles Declaration on 17 October, 2003, the Measles Initiative stated that the critical importance of strengthening routine immunization services included the provision of a second opportunity to give measles immunization[2]. Consequently, Turkey recently initiated a measles catch-up campaign. The difficulties and successes of the first application of this catch-up campaign, carried out in a region of Istanbul, are presented in the "Notes from the Field" of this issue.

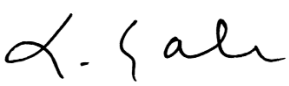
Critical reviews bring up two major topics for discussion. Sarp Uner and Zafer Oztek point out briefly the weaknesses of both vertical and horizontal health care systems in Turkey.

The ninth National Public Health Congress of Turkey 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 hope you enjoy the second issue of the Turkish Journal of Public Health and we would like to encourage all our readers to communicate with us on anything related to public health and community medicine.

Wishing you all a happy New Year,

Editor



Sanda Cali

1 Why is the global measles meeting important? Available at: www.who.int/vaccine_research/diseases/measles/events/2003/10/why/en. Accessed November 24, 2003.

2 Cape Town Measles Declaration. Available at: www.measlesinitiative.org/meeting/declaration.asp. Accessed November 24, 2003.

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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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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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All figures (photographs, drawings, diagrams, charts) should be clear, easily legible, and cited consecutively by Arabic numerals in the text (Figure 1, Figure 2, etc) and should be placed on separate sheets. Legends should contain sufficient detail to permit figure interpretation without reference to the text. Units should be indicated in the figures. All line graphs and their respective data points should accompany charts so that they can be replicated on the journal's computers. Cost for printing of color plates will be charged to the authors.

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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.

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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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Prevalence and risk factors of obesity among women 20 years of age and over in a rural area of Eastern Turkey

Serhat VANCELIK[a], Tacettin INANDI[b], Asuman GURAKSIN[c]

Abstract

The objective of this study was to determine the prevalence of obesity and its risk factors among women aged 20 years and over in a rural area. In this cross-sectional study, a questionnaire was applied to 585 healthy women selected by the cluster-sampling method. Individual weight and height statistics of the target population were compiled during the study to calculate the body mass index.

It was determined that 28.3% of the participants were overweight, and 14.5% of them were obese. A significant association was found between the prevalence of obesity and the age, number of pregnancies, number of meals consumed per day, economic status, employment status, and marital status of the individuals studied.

There was no significant association between obesity and the number of people living in the household, or between obesity and smoking habits, level of education, and use of hormonal contraceptives. Although obesity prevalence among women in this rural area was lower than in urban areas, it remains a common and important public health problem.

Key words: Obesity prevalence, women, rural area, risk factors

Introduction

Obesity is known to be the most common metabolic disorder characterized by excess fat storage. The World Health Organization (WHO) acknowledges obesity to be epidemic, or even pandemic[1]. Factors other than nutritional factors, such as physical inactivity, genetic factors, socio-economic status, age and sex, contribute to the condition of obesity[2,3].

Obesity increases the risk of cardiovascular disease, type 2 Diabetes Mellitus, muscular skeletal-system disease, some cancer types, and overall mortality[4,5]. Since it increases the morbidity and mortality rates of various diseases and causes a great financial burden to society, it is an important public health problem[6,7]. Recently, obesity prevalence has risen in most European countries. In the United States, 34% of adults are overweight and 27% are obese. These rates are over 50% higher than they were 30 years ago[8].

Various nutritional problems leading to conditions such as being overweight, obese, underweight, or undersized, are common in Turkey. According to the results of the 1993 Demographic and Health Survey (DHS) of Turkey (which is the most recent one providing data on this issue) 50.7% of married women were overweight or obese[9]. In another research carried out in 1999 in an urban region consisting of about 25,000 people, it was found that the overweightedness rate was 19.0 % among men and 27.0% among women; similarly obesity prevalence was 13.0% among men and 30.0 % among women[10]. The scope of this problem and the factors determining obesity in rural areas in Turkey are still unknown. The aim of this study was to explore the prevalence and determine the risk factors governing obesity in a rural area in Eastern Turkey.

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Materials and methods

This study was carried out in 1998 on a group of 585 women aged 20 years and older in the town of Pasinler in the province of Erzurum. Pasinler is the research and training area of Ataturk University. Most of its inhabitants work in agriculture and husbandry, which characterizes a rural population in Turkey[11].

Subjects were selected by the cluster-sampling method. A total of 8624 women recorded in the health centres of Pasinler were eligible for the selected age-group. The minimum sample-size was calculated as 368 by using the prevalence of obesity given in the 1993 Demographic and Health Survey. We planned to interview 600 women in order to obtain more trustworthy results. Each village in the district of Pasinler was taken as one cluster, making a total of 59 villages in the study population. From these, ten villages were selected randomly and women from the selected villages were included in the study. The response rate was 97.5% (585 women).

The participants were interviewed using standard questionnaire forms. The weight and height of each individual was measured by a researcher using the same procedure for each. The height of the participant was measured by using a piece of sturdy cardboard to ascertain the apex of the head as each stood upright against a wall, and then measuring the distance between this and the floor. Weight was measured using a portable weighing machine on which the individual, lightly-dressed, stood to be weighed.

The subjects who had a body mass index (BMI) value of 20.0-24.9 were classified as normal; those with 25.0-29.9 as overweight; with 30.0-39.9 as obese, and with ≥ 40.0 as morbid obese[12]. The level of economic status was based on self-evaluation. Chi-square, Spearman rank correlation techniques together with the Statistical Package for the Social Sciences Program (SPSS) were used for data analysis.

Results

The mean age (SD) of study participants was 37.2 (14.5), mean height (SD) was 157 cm (6.6), mean weight (SD) was 61.7 (11.0) kilograms and mean BMI (SD) was 25.1 (4.5). Table 1 shows the distribution of participants by age group, education level, economic status, number of people living in the household, and BMI.

BMI values show that 10.4% of women were underweight, 46.0% were within the normal range, 28.7% were overweight, 14.9% were obese, and that there was nobody in the morbid obese group (Table1).

Table 1. Distribution of participants by some independent variables

		Mean BMI	n	%
Age groups (n=585)	20-29	23.2 ± 3.8	242	41.4
	30-39	25.1 ± 4.2	122	20.9
	40-49	27.2 ± 4.2	81	13.8
	50-59	27.1 ± 4.5	73	12.6
	60 +	26.8 ± 4.8	67	11.3
Education level (n=585)	Illiterate	25.7 ± 4.5	251	42.9
	Primary school	25.1 ± 4.2	287	49.1
	High school or university	22.1 ± 3.0	47	8.0
Marital status (n=585)	Married	25.5 ± 4.5	463	79.1
	Widowed	22.3 ± 3.3	87	14.9
	Unmarried	26.8 ± 4.1	35	6.0
Economic status (n=585)	High	26.6 ± 4.8	124	21.2
	Intermediate	25.0 ± 4.3	381	65.1
	Low	22.8 ± 3.8	80	13.7
No. of household members (n=585)	1-3	25.1 ± 5.2	61	10.4
	4-6	25.2 ± 4.4	278	47.5
	7-9	25.2 ± 4.4	180	30.8
	>9	24.1 ± 4.2	66	11.3
BMI classification (n=585)	Underweight	18.8 ± 0.9	61	10.4
	Normal	22.6 ± 1.4	269	46.0
	Overweight	27.2 ± 1.4	168	28.7
	Obese	32.9 ± 2.7	87	14.9

Table 2. BMI classification of women by age groups (Pasinler town of Erzurum province, 1998)

	BMI classification									
	Underweight ≤ 19.9		Normal 20.0 - 24.9		Overweight 25.0 – 29.9		Obese ≤ 30.0		Total	
Age groups	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[b]
20-29	48	19.8	130	53.7	49	20.2	15	6.2	242	41.4
30-39	8	6.5	59	48.4	41	33.6	14	11.5	122	20.9
40-49	2	2.5	25	30.9	29	35.8	25	30.9	81	13.8
50 +	3	2.1	55	39.3	49	35.0	33	23.6	140	23.9
Total	61	10.4	269	46.0	168	28.7	87	14.9	585	100.0

[a] Row rate
[b] Column rate

BMI values by age groups indicate that overweightedness-obesity prevalence was 26.4% at 20-29 years of age, 45.1% at 30-39, 46.7% at 40-49 and 58.6% at 50 years and over, and the difference between the groups was statistically significant (p<0.001, Table 2).

The difference between BMI values of the different educational level groups was significant (p<0.01). While the highest overweightedness-obesity prevalence was in the illiterate group (48.6%), the lowest obesity prevalence (14.9%) was in the high school or university group (Table 3). We found that overweightedness-obesity prevalence in unmarried women was lower (18.3%) than in the married or the widowed (48.0%). The difference was statistically significant (p<0.001, Table 3).

Overweightedness-obesity prevalence was 45.8% in smokers and 34.8% in non-smokers but this difference was not statistically significant (p>0.05). The prevalence of overweightedness-obesity was 41.2 % in oral contraceptive users, and 43.8 % in non-users. Again the difference here was not statistically significant (p>0.05, Table 3). Housewives (49.6%) seemed to have a significantly higher prevalence of overweightedness and obesity than other women (18.2%) (p<0.01, Table 3).

A positive relationship was observed between the number of pregnancies and BMI values (p<0.01, Table 3) when controlled for age. In Spearman rank correlation, we also found that BMI values went up as the number of meals consumed per day increased (p<0.01, Table 4).

Table 3. BMI classification of women by some independent variables (Pasinler town of Erzurum province, 1998)

	BMI classification									
Independent variables	Underweight ≤ 19.9		Normal 20.0 - 24.9		Overweight 25.0 – 29.9		Obese ≥ 30.0		Total	
	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[b]
Education level (p <0.01)										
Illiterate	16	6.4	113	45.0	73	29.1	49	19.5	251	42.9
Primary school	33	11.5	128	44.6	89	31.0	37	12.9	287	49.1
High school or university	12	25.5	28	59.6	6	12.8	1	2.1	47	8.0
Marital status (p <0.001)										
Married or widowed	34	6.8	225	45.2	157	31.5	82	16.5	498	85.1
Unmarried	27	31.0	44	50.6	11	12.6	5	5.7	87	14.9
Smoking (p >0.05)										
Yes	46	9.8	209	44.5	138	29.4	77	16.4	470	80.3
No	15	13.0	60	52.2	30	26.1	10	8.7	115	19.7
Contraceptive use (p >0.05)										
Yes	8	15.7	22	43.1	18	35.3	3	5.9	51	8.7
No	53	9.9	247	46.3	150	28.1	84	15.7	534	91.3
Employment (p <0.01)										
Housewife	47	8.7	247	45.7	163	30.1	84	15.5	541	92.5
Employed	14	31.8	22	50.2	5	11.4	3	6.8	44	7.5

[a] Row rate
[b] Column rate

Table 4. The correlation of crude and age adjusted BMI with various variables by spearman rank analysis

	Variables	Age	Education	No. of household members	No. of meals	Economic level	No. of pregnancies
BMI	Correlation coefficient	0.399	-0.177	0.020	0.145	0.246	0.350
	Two tailed, p value	0.000	0.000	0.635	0.000	0.000	0.000
	Number	585	585	585	585	585	585
BMI	Correlation coefficient	1,000	-0.422	0.052	-0.022	-0.029	0.654
Age adjusted	Two tailed, p value	–	0.000	0.213	0.589	0.486	0.000
	Number	585	585	585	585	585	585

It was observed that there was a positive relationship between economic level and BMI values (r: 0.246, p<0.01, Table 4). The number of people living in the household had no effect on BMI (r: 0.020, p>0.05, Table 4).

Discussion

In surveys carried out in other regions of Turkey, the prevalence of being overweight and of obesity in women was between 35%-40%, and 18%-32% respectively[13,14]. According to the results of the 1993 Demographic and Health Survey, 32% of women were overweight and 19% were obese[9]. A survey in 1999 indicates that 27% of women were overweight and 30% were obese[10].

Our prevalence figures for being overweight or obese are lower than the other studies mentioned above. This difference may be due to the specific nature of the region, which is a rural and less developed area. When compared to other regions in Turkey, in this area poverty is a more common condition[15]. Because of poverty, people living here usually have difficulty in obtaining essential foods. Poverty is probably an influential factor in lowering overweightedness and obesity prevalence. Moreover, it has been suggested that obesity prevalence among women in rural areas may be lower than that of women in urban areas because the former help men with work on the farm[16].

In two different studies carried out by Kocoglu and Yurttagul, it was reported that there was a positive relationship between age and obesity prevalence[17,18]. This was an expected relationship because of decrease in physical activity and basal metabolism as growing older, and increase in pregnancy number[19].

In two studies, it was determined that people with higher education were physically more active, and that healthy diet was also related to the level of education[3,20]. When age was under control, no relationship was found between education and BMI. Therefore it is probable that the relationship between education and obesity in our study was not directly related.

Bingol's research indicated that the highest overweightedness or obesity prevalence (82.8%) was among the widows and the lowest was among the unmarried (11.8%)[21]. In a research carried out in the USA, it was determined that there was a positive relationship between widowhood and BMI values[22]. Kahn *et al.*, analysing the national nutrition studies of USA, reported that marriage was a significant risk factor for obesity[20]. Our findings related to marital status and obesity are similar to other studies.

Yurttagul and Bingol reported that there was no relationship between smoking and obesity[17,21]. Similar results were obtained in this study where there was no significant relation between smoking habits and obesity.

Our data does not show a significant difference between the use of oral contraceptives and obesity (Table 3). The prevalence of overweightedness-obesity was higher among housewives than among other women. Similar results were also reported in the two other studies carried out in Turkey [17,21].

There was a positive relationship between the number of pregnancies and the BMI (Table 4). This finding is similar to many other studies, which show a positive relationship between the number of pregnancies and the prevalence of obesity[18,23,24]. BMI values also seem to be affected by the number of meals consumed per day (Table 4). Toksoz *et al.* similarly reported a significant increase in obesity prevalence among women who were used to having four meals or more per day[24].

A study conducted in Zonguldak, Turkey, among women 20 years of age or over showed that overweightedness or obesity prevalence there in women with low socio-economic level was 52.7%, and in women with high socio-economic level 45.2%[25]. A study conducted among white women in the USA also showed that the prevalence for being overweight among women with an income of less

than twenty thousand dollars per year was 22.1%, while for those with higher incomes it was 14.7% [21]. Our findings concerning economic status and BMI are different from previous studies. This may result from the fact that our study was carried out only in a rural and underdeveloped area where the poor found it difficult to obtain food. In other words, economic determinants of obesity in this area may be more dominant than in urban areas. There was no relationship between the number of people living in the household and obesity prevalence (Table 4).

In conclusion, while a significant relationship between BMI and age, marital status, number of pregnancies, number of meals consumed per day, employment, and economic status was discovered, no significant relationship between BMI and education, oral contraceptive use, smoking and household-number was observed. Nevertheless, although the obesity prevalence among the women of this rural area is lower than that of those living in an urban area, it remains a significant public health problem.

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Univariable and multivariable analysis of the effects of some factors on the birth weight

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Abstract

This investigation was carried out using various statistical methods to determine the effects of some factors on the birth weight. 320 births were chosen randomly out of all the single live births, which took place at Kayseri Maternity Hospital within the last three months of 1997. The babies' measurements were taken within 15-30 minutes following delivery and then the mothers were interviewed using the face- to- face method of interview, which included a questionnaire of 46 questions. The birth weights of the babies were between 1,610-4,700 g and the mean birth weight was 3,184±26 g. The percentage of low birth weight was found to be 7.5 percent. According to the results of univariable statistical methods, it was found that the maternal age, height, parity, pre-gestational weight, pre-delivery weight, interval between previous pregnancy, and smoking-habits during pregnancy, as well as family income and the gender of the baby, affected the birth weight significantly. But, according to the results of stepwise multiple regression analysis, only parity, pre-delivery weight, pre-natal care, gestational age at delivery, and the gender of the baby affected the birth weight. It was concluded that parity, pre-delivery weight, pre-natal care, gestational age at delivery and the gender of the baby were the most important determinants of the birth weight.

Key words: Birth weight, maternal factors, social factors, multiple linear regression

Introduction

Birth weight is one of the important factors affecting the health and future life of the infant. Some problems, such as insufficient control of body temperature, respiratory distress, asphyxia, some gestational metabolic disorders, or immune deficiency to the infectious agents, are more common in low-birth-weight babies. Perinatal and neonatal mortality rates among the low-birth-weight babies are also higher[1,2].

Birth weight is related to foetal growth rate in the pre-natal period and the gestational age at delivery. Insufficient weight gain of the foetus during the intra-uterine period is described as intra-uterine malnutrition. On the other hand, even if foetal development was normal, birth weights of premature infants are lower than those of mature infants because foetal weight-gain after the 20th week of gestation is very important. For this reason, the factors affecting foetal development and weight gain, and the factors causing premature delivery, directly or indirectly affect the birth weight[1,2].

Some of the important factors affecting foetal development and premature delivery are the age, height, weight, obstetrical history, history of acute or chronic disease, habitation, pre-natal nutritional status, pre-natal care, and physical or emotional stresses of the mother, the economical status of the family, and the educational level and genetic characteristics of the parents[1,2]. On the other hand, there may be various interactions between these factors. For example, economical status and educational level may affect pre-natal nutritional status and pre-natal care.

This investigation was carried out in order to determine the effects of some factors on the birth weight, to compare the results of univariable and multivariable statistical methods and to determine the percentage of low birth weight in the study area.

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Materials and methods

This investigation was carried out in 1997 at the maternity hospital in the province of Kayseri, Turkey. According to hospital records, 8295 live births, 46 percent of the total live births in the province, took place at the hospital in 1997. All the live births, which took place in the hospital, formed the study population. In order to calculate the sample size, the percentage of low birth- weight was assumed to be 8 percent[3]. At a confidence level of 95%, the minimum sample size was calculated as being 312. As a result, it was planned to take 320 births as the study sample.

In the last three months of 1997, two days of every week were chosen randomly and all the single live births on these days were taken into the study group. Multiple deliveries were not included in the study.

The pre-natal measurements of the mothers were taken just after they were received into the hospital. The measurements of the babies were taken 15-30 minutes after delivery. The babies were weighed naked on a weighing-machine for infants, which was capable of measuring as little as 5 g. After being measured, the mothers were given a questionnaire of 46 questions during face-to-face interviews with the investigators.

The economical status of the family, pre-gestational weight, pre-natal care, and smoking-habits of the mother were evaluated according to the statements of the mother. Gestational age at delivery was calculated from the date of last menstruation as stated by the mother.

Pre-gestational weight of 76 mothers could not be established, and for 131 mothers the interval between the previous pregnancy could not be evaluated because they were primaparae. Therefore these variables could not be included in the multiple linear regression analysis.

All the variables included in the study are shown in Table 1.

The data were evaluated through EPI INFO 5 and SPSS programs on a PC. Mean birth weights of the groups were compared by unpaired t test. Pearson simple correlation coefficients were calculated between numerical variables. Then the effects of all the independent variables on the birth weight were analysed by the stepwise multiple regression method. For parity, logarithmic transformation was carried out, because the original values were not distributed normally.

Table 1. The dependent and independent variables in the study

Variables	Variable charasteristics
Dependent variable	
Birth weight	Numeric
Independent variables	
Maternal age (years)	Numeric
Maternal height (cm)	Numeric
Pregestational weight of mother (kg)	Numeric
Predelivery weight of mother (kg)	Numeric
Parity of the mother	Numeric
Gestational age at delivery (week)	Numeric
Family income (USD/month)	Numeric
Educational level of mother	0 Primary or lower 1 Secondary or over
Smoking during pregnancy	0 Yes 1 No
Prenatal care	0 No 1 Yes
Gender of baby	0 Female 1 Male

Results

The birth weights of the 320 babies in the study group were found to be between 1,610 and 4,700 g and the mean birth weight was found to be 3,184 ± 26 g. It was seen that the values were distributed normally. The percentage of low birth weight in the study group was 7.5%.

Comparison of the mean birth weights of various groups are shown in Table 2 and correlation coefficients between all the numerical independent variables and birth weight are shown in Table 3.

As seen in Tables 2 and 3, maternal age, height, parity, pre-gestational weight, pre-delivery weight, and smoking-habits during pregnancy, the gestational age at delivery, the family income, and the gender of the baby affect the birth weight significantly, according to the results of univariable statistical analysis.

The effects of all the categorical and numerical variables on the birth weight were analysed through stepwise multiple linear regression method. Variables affecting the birth weight significantly are shown in Table 4.

As seen in Table 4, only five independent variables significantly affecting the birth weight were

Table 2. Comparison of the mean birth weights of various groups

Characteristics	n	Birth weight (g) (mean ± SEM)	t	P value
Mother's educational level				
Primary or lower	267	3187.2 + 28.2	0.30	0.765
Secondary or over	51	3166.3 + 58.4		
Taking prenatal care				
No	293	3195.9 + 29.4	1.63	0.113
Yes	25	3042.4 + 92.6		
Smoking during pregnancy				
Yes	36	3065.6 + 54.5	2.18	0.035
No	282	3199.0 + 29.2		
Gender of the baby				
Female	160	3132.3 + 32.8	2.04	0.048
Male	160	3235.4 + 38.6		

chosen in accordance with the results of the stepwise multiple linear regression analysis. These variables were maternal parity, pre-delivery weight, pre-natal care, gestational age at delivery, and the gender of the baby.

Discussion

The percentage of low birth weight was 7.5 percent. Confidence interval for the percentage of low birth weight was found to be between 4.6 and 10.4 percent at 95 % confidence level. This confidence interval included the percentage of low birth weight assumed for the investigation area. Mean birth weights and the percentage of low birth weight in various other investigations were reported to be different. For example, in an investigation carried out in the slums of Dhaka, the mean birth weight was found to be 2,516 g, and the incidence rate of low birth weight was 46.4 percent. But, among infants in Kuwait, the same values were found to be 3,500 g and 3.4 percent respectively[4-6].

Table 3. Pearson simple correlation coefficients between numerical independent variables and birth weight

Dependent variable: Birthweight			
Independent variables	R	t	P value
Maternal age	0.21	3.81	0.001
Maternal height	0.13	2.33	0.026
Pre-gestational weight	0.32	5.99	0.000
Pre-delivery weight	0.26	4.48	0.000
Parity (log)	0.30	5.58	0.000
Gestational age	0.25	4.58	0.000
Family income	0.15	2.69	0.011

The groups were formed according to the various independent variables, and the mean birth weights of these groups were compared by unpaired t test. As shown in Table 2, the smoking-habits of the mother during pregnancy, and the gender of the baby affected the birth weight significantly. But the effects on the birth weight of the educational level and pre-natal care of the mother could not be shown.

Pearson simple correlation coefficients between all the numerical independent variables and the birth weight were calculated (Table 3). The simple correlation coefficients between maternal age and the height, parity, pre-gestational or pre-delivery weight, gestational age at delivery, family income and the birth weight of the baby were found statistically significant. According to the results of univariable analysis shown in Tables 2 and 3, none of the eleven independent variables affected the birth weight significantly. There are a number of investigations, which report that maternal age, weight, height, parity, and smoking-habits during pregnancy, and the gestational age at delivery and gender of the baby could affect the birth weight[4-16]. In some investigations, significant correlation coefficients have been found between the birth weight and the economic condition of the family, the maternal edu-

Table 4. The results of stepwise multiple linear regression analysis

Dependent variable: Birthweight Independent variables in the regression equation	B	SEB	Beta	t	P value
Parity (log)	307.4	82.3	0.20	3.73	0.001
Predelivery weight (kg)	10.3	2.6	0.21	4.02	0.000
Prenatal care	350.1	89.4	0.20	3.92	0.000
Gestational age (week)	109.9	24.8	0.23	4.44	0.000
Gender of the baby	138.8	47.3	0.15	2.92	0.006
Constant	-2888.5	997.9		2.90	0.006
N=317 F=17.17 P=0.000	Multiple R^2=0.216		Adjusted R^2=0.204		

cational level and pre-natal care[15-17]. On the other hand, there are other investigations in which no significant correlation has been found between the birth weight and the economic condition of the family or the maternal educational level[7-8]. In some of these investigations, only univariable statistical methods had been used and the interactions between the independent variables had not been taken into consideration. But in others, both univariable and multivariable statistical methods had been used[8,12,15-17]. In these investigations, some of the results of univariable and multivariable statistical methods were different. For example, in one investigation, the effect of maternal age on the birth weight was found to be statistically insignificant according to multivariable analysis, whereas it was significant according to univariable analysis[15].

In our investigation, the correlation between all the independent variables and the birth weight was also analysed through multiple linear regression method in order to eliminate the interactions between the independent variables.

According to the results of stepwise multiple linear regression analysis (Table 4), maternal parity, pre-delivery weight and prenatal care, the gestational age at delivery, and the gender of the baby were found to affect the birth weight significantly. The results of the univariable and multivariable analysis are partially different. The effects of maternal age, height and smoking-habits during pregnancy were found significant according to the univariable analysis but not significant according to multiple linear regression analysis. On the other hand, the effect of prenatal care was found significant in the multiple linear regression analysis although it was not significant in the univariable analysis.

According to the results of multiple linear regression analysis, the multiple correlation coefficient was found to be 0.465 and the multiple regression equation was calculated as:

Birth weight = –2,888.5 + 307.4 Parity (log) + 10.3 Pre-delivery weight + 109.9 Gestational age +350.1 Prenatal care + 138.8 Gender of the baby.

Some of the independent variables in the regression equation, such as gender of the baby and the pre-natal weight of the mother are hardly amenable to public health intervention. But pre-natal care is an important public health intervention, which may affect the birth weight.

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Assessment of cold chain refrigerator and applications of pharmacies: a cross-sectional study in Mersin, Turkey

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Abstract

The purpose of this study was to evaluate cold chain refrigerator and applications of pharmacies in the province of Mersin. This study was carried out on 147 of 407 pharmacies in Mersin, which were selected by systematic stratified sampling. The data were collected through a pharmacist inquiry form and a refrigerator checklist. In 98.0% of the refrigerators there were no thermometers. In 68.7% of the refrigerators the temperature was not within the appropriate range. The internal temperature of the refrigerators varied with regard to the sex of the pharmacist ($p=0.035$), and as to whether there was a thermometer in the refrigerator (Fisher's exact test $p=0.029$). In 97.3% of the refrigerators, there were food and drinks. The internal temperature of the refrigerators did not vary in accordance with the location of the pharmacy, the presence of an air-tight rubber door-seal, the thickness of the ice in the freezer or the balance of the refrigerator ($p>0.05$). In pharmacies, deficiencies in the cold chain equipment and errors of application are considerable.

Key words: Cold chain, vaccine, refrigerator, pharmacy.

Introduction

One of the most important aspects of primary health care services is the immunization service. However, the effectiveness of the immunization service is directly related to the potency of the vaccine used. Conservation of the potency of vaccines and drugs can be achieved if they are kept at the appropriate temperature during production and transportation, and during the stages of storage and application. Therefore, cold chain equipment and its application constitute the most important stage of immunization services. In developing countries, insufficient supplies of electricity and faulty refrigeration constitute important obstacles in the continuity of the cold chain. Contrary to expectations, however, it has been demonstrated that vaccines are not always kept under optimal conditions in developed countries even, and cold chain requirements are not invariably complied with either[1,2].

A breakdown in the cold chain system leads to an increase in the morbidity and mortality rate of diseases that can be prevented by vaccination, a reduction in the effectiveness of certain treatments, as well as entailing the destruction of drugs which have deteriorated. The loss in health, time, manpower and money occurring as a result of this places a heavy burden on the public[3].

In Turkey, vaccines and drugs that must be kept under cold chain, as well as vaccines which may or may not be included in the routine vaccination program, are sold in pharmacies. Thus, there is a great need for cold chain refrigeration in pharmacies and standardization of its application. This study aims at investigating cold chain refrigerator and its application and also at helping to correct misuse of these.

Materials and methods

This study, which was designed to be a cross-sectional type, was carried out between 10 August, 2001 and 10 September, 2001 in Mersin, a province situated in the south of Turkey on the Mediterranean coast which has an average year-round temperature

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of 19-20°C. In summer, the average temperature is in the range of 25-33°C. The population of Mersin, which is the 10th biggest city in Turkey in terms of population and development, is 1,478,800. (Urban 1,040,070, rural 438,730)[4].

Of the 407 pharmacies in Mersin, 155 (38.1%) were selected by systematic stratified sampling method. Data for 147 pharmacies were collected from those which agreed to participate in the study. Seven pharmacists did not agree to participate (4.5%) and one pharmacy did not have a refrigerator (0.7%). Therefore these eight pharmacies were excluded.

The research physician visited the pharmacies in the study group without prior notice. After the pharmacist had been informed about the study, he/she was asked whether he/she agreed to participate. Data were collected in two stages. In the first stage, a questionnaire, in which there were demographical items concerning the pharmacist, was to be filled in. In the second stage, the research physician completed the refrigerator checklist, by observing which items concerning the position and physical condition of the refrigerator, the cold chain equipment and its application were being complied with. A standard, round thermometer (Fackelman-Tecno 16375-10) was hung from the middle shelf of the refrigerator for 20 minutes and the internal temperature of the refrigerator was then measured. A 30 cm hydrostatic balance of the brand "Rico Professional" was used to conduct a balance check of the refrigerator.

Descriptive statistics were used to summarize the data. Chi-square was used to compare the categorical variables and t-test was used to compare continuous variables. In significance tests, a p-value smaller than 0.05 was considered to be a statistically significant relationship.

Results

Of the 147 pharmacies participating in the study, 76 (51.7%) were situated in the provincial centre and 71 (48.3%) were in the district centre. 70 (47.6%) of the pharmacists were male and 77 (52.4%) were female. The average age of the pharmacists was determined to be 38.9±10.7 (min=23, max=63) and the average work experience was determined to be 12.7±9.6 years (min=1, max= 37).

In 142 of the pharmacies (96.5%), there was one refrigerator; in 5 (3.5%) there were two refrigerators. 13 (8.8%) of the pharmacies had bureau type and 134 (91.2%) had domestic type refrigerators. In one pharmacy visited within the scope of the research, it was observed that there was no refrigerator; therefore this pharmacy was excluded from the study.

122 of the refrigerators (83.7%) were not appropriately balanced. None of the refrigerators had a temperature follow-up schedule. 144 (98.0%) did not have a thermometer and 143 (97.3%) contained food. 78.2% of the refrigerators had either vaccines or drugs in the door shelves. Other findings concerning the physical condition of the refrigerators, cold chain refrigerator and applications are given in Table 1.

The internal temperatures measured turned out to be 1°C in 2 refrigerators (1.4%); 2-8°C in 46 refrigerators (%31.3); and 9°C or above in 99 refrigerators. The internal temperature of the refrigerators was between 2°C and 8°C in 16 of the pharmacies staffed by male pharmacists (22.9%); in 30 in those staffed by female pharmacists (39.0%); in 16 of those staffed by apprentices (22.5%) with 5-8 years of training period; in 30 of those staffed by apprentices (39.5%) with a training period of 9 years or more; in 3 of those pharmacies where there was a thermometer in the refrigerator (100%); and in 43 of those which did not have a thermometer in the refrigerator (29.9%). According to this, the internal temperatures of the refrigerators varied with respect to the sex of the pharmacist (x^2=4.42, p=0.035), the training period of the apprentice (x^2=4.89, p=0.027), and with respect to there being a thermometer in the refrigerator (Fisher's exact test=6.72, p=0.029). The internal temperature of the refrigerators did not vary with respect to the location of the pharmacy, the presence of an airtight rubber door-seal, the thickness of the ice in the freezer or the balance of the refrigerator (p>0.05). In addition, there was no correlation between the temperature in the refrigerators and the average age or experience of the pharmacists (p>0.05).

Discussion

For cold chain, the internal temperature of the refrigerator must be between 2°C and 8°C [1,5]. In studies carried out in various countries [6-16], a discrepancy of between 19.2-92.6% has been reported (Table 2). In the 147 pharmacies in our study, the internal temperatures of the refrigerators were between 2°C and 8°C in 68.7%. Factors that increased the chances of

Table 1. The status of cold chain refrigerator and applications in pharmacies in the province of Mersin

Cold Chain Refrigerator Status (n=147)	n	%
Issues concerning the positioning of the refrigerator		
Insufficient gap between the wall and the refrigerator	122	83.0
Not balanced	17	11.6
Exposed to the sun	2	1.4
Issues concerning the physical condition of the refrigerator		
There is no lock	147	100.0
The door of the freezer is not tightly closed	62	42.2
There is no internal illumination	44	29.9
The door rubber is not fit	24	16.3
The refrigerator is small	13	8.8
Deficiencies in cold chain refrigerator		
There is no temperature follow-up schedule	147	100.0
There are no water bottles in the vegetable section	144	98.0
There is no thermometer in the refrigerator	144	98.0
There are no ice batteries in the freezer	88	59.9
Issues concerning cold chain applications		
Food in refrigerator	143	97.3
Vaccine/drug in the door shelves	115	78.2
Insufficient air circulation between vaccines/drugs	56	38.1
Vaccines/drugs are not appropriately placed on shelves	107	72.8
Refrigerator internal temperature <+2oC or >+8oC	101	68.7
Thickness of icing more than 0.5 cm	98	66.7

the internal temperature of the refrigerator being in the desired range (2-8°C) were that the pharmacist was a female, or that the apprentice had had more than 9 years of schooling, or that there was a thermometer in the refrigerator.

Various methods may be used to monitor the continuity of the cold chain. The most practical solution is to use an appropriate thermometer[5]. If an ordinary thermometer is used to measure the internal temperature of a refrigerator, it only gives the temperature at the instant of measurement. However, a digital type min-max thermometer provides information over a longer time-range and gives the maximum and minimum temperatures reached over an uncontrolled time-range[2,6]. The researchers cold not obtain min-max thermometers which posed an important limitation to the study.

In the studies conducted[6-16] (Table 2), the temperatures of the refrigerators, which were measured with a thermometer, varied in range between 1.9% and 100.0%. However, in our study, only 2.0% of the refrigerators had a thermometer, which was considered to be a very low value.

The internal temperature of a refrigerator must be monitored twice a day (morning, evening) and the result recorded on a follow-up chart[2,5]. Although this is a very important proviso in the cold chain, numerous studies[6,9-16] have shown that it is being neglected. In these studies it was reported that temperature monitoring was carried out in 1.6% to 46% of the cases (Table 2). In a study conducted in Turkey in 24 Primary Health Centers[17], it was reported that in 85.4% of the cases daily temperature checks were performed. In our study, none of the pharmacies was carrying out daily monitoring.

Apart from faulty cold chain maintenance, the most frequent misuse was keeping food and drink[2,5] in the refrigerators. The studies conducted[6-14] report that there was food in 27% to 96% of the refrigerators (Table 2). This inappropriate application is the most common one in the breakdown of the cold chain. In a study carried out by Eskiocak *et al.*[17] in Turkey, this rate was reported as 45.8%. In our study, this rate was determined to be 97.3%. Keeping food and drink in the refrigerator together with vaccines and drugs leads to frequent opening of the

Table 2. Comparison results of the current study with other studies

Author Study unit N, Country	Temperature not appropriate[d] %	Temperature measurement with any method %	Temperature follow-up conducted %	Vaccine in refrigerator door shelf %	Vaccines not protected while melting %	Usages other than vaccine, drug %
Haworth et al.[6] General Practices N=29, USA	–	63.6	9.5	–	40.0	27.2
Finnegan and Howell[7] Family Physicians N=111, Irish	37.8	8.1	–	–	19.8	56.8
Yuan et al.[8] PCP[a] N=135, Canada	31.9	8.1	–	80.3	–	79.0
Lewis and Reimer[9] General Practices N=102, Australia	68.6	51.0	19.7	–	74.2	–
Bishai et al.[10] Pediatric Office N=50, USA	22.0	100.0	6.0	46.0	–	62.0
Liddle and Harris[11] GP[b] N=174, Australia	30.0	84.0	5.0	–	–	70.0
Reimer and Lewis[12] Pharmacies N=52, New Zealand	19.2	1.9	1.9	2.5	–	94.3
Pai and Ko[13] PCP[a] N=63, Taiwan	22.0	47.6	46.0	–	–	93.7
Woodyard et al.[14] Physicians Office N=26, USA	92.6	33.0	11.2	–	–	96.3
Thakker and Woods[15] GP[b] and CHC[c] N=45, England	40.0	47.5	2.5	–	–	–
Ozaydin[16] Pharmacies N=188, Turkey	42.5	16.1	1.6	39.2	–	45.2
Current study Pharmacies N=147, Turkey	68.7	2.0	0.0	78.2	75.5	97.3

[a] Primary Care Physicians; [b] General Practitioners; [c] Child Health Clinics
[d] <2°C and >8°C

refrigerator door, thus leading to changes in internal temperature.

In refrigerators, the door shelves are warmer. Therefore vaccines and drugs should not be put on these door shelves[2,5]. However, in numerous studies[8,10,12,16] it has been reported that in 25% to 80% of the cases, there are vaccines on door shelves (Table 2). In our study, the average number of the pharmacists who kept vaccines and drugs on the door shelves was 78.2%.

Keeping water-filled bottles in the vegetable shelves of the refrigerator is important in order to keep the temperature constant in cases of power failure[2]. In their studies, Eskiocak *et al.*[17] reported that there were no water bottles in 33.3% of the refrigerators, and Ozaydin reported that[16] in 64.5% of the refrigerator there were no water bottles. In our study this percentage was found to be higher (98.0%).

To ensure effective operation of the refrigerator, the ice accumulated in the freezer must be regularly

melted[18]. The thickness of the ice in the freezer should not exceed 0.5 cm[3,19]. Ozaydin reported that [16] in 57.0% of the refrigerators there was excessive icing in the freezer section of the refrigerators. In our study this percentage was found to be 66.7%.

Information on cold chain equipment and its application in Turkey and, indeed, throughout the world, is somewhat lacking. In order to make a comparative evaluation, we used the results of studies performed in health centers where there were physicians. Due to the fact that the personnel in these centers are better trained and more conscious of the issue, and that control is more stringent in these centers, the results, with respect to the continuity of cold chain, were better than those in pharmacies. The results of this study are closer to those of the other studies conducted in pharmacies.

After data had been collected in each pharmacy visited in this study, a meeting lasting about 30-40 minutes took place in which theoretical and practical information was provided on cold chain applications in order to correct the misuses of refrigerators, and solutions were discussed.

In the province of Mersin, where the spring and summer months are rather warm, major misuses were found in the refrigerators of the pharmacies with respect to cold chain equipment and cold chain application. This suggests that efforts taken concerning training of personnel, and control and standardization of equipment are insufficient.

There are Turkish Ministry of Health regulations concerning the storage of products in pharmacies and pharmaceutical stores. Yet there are no laws or regulations concerning cold chain equipment and its application in pharmacies. In order to ensure standardization of application, the Directorate of Health in each province and the Chamber of Pharmacists must act in close co-ordination to:

- provide training on the use of cold chain for the pharmacist and other personnel
- prepare a cold chain guide,
- conduct regular checks

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Utilization of health facilities in Southeast Anatolian project (SEAP) region

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Abstract

The aim of this project was to evaluate public health issue and problems such as utilization of health facilities in the SEAP (Southeast Anatolian Project) region, to find solutions to these problems, and to promote access to primary health services and the use of preventive health services.

Most families preferred to apply to the central government hospitals (32.4 %) for treatment of their health problems. Private doctors and hospitals were the second choice of preferred health facilities (21.6 %). However, applications to health-centres as the preferred facility constituted only 16.0% of the families; this was an important finding which showed an insufficient utilization of health-centres in the SEAP provinces. Half of the families living in the SEAP region did not have social security; thus restricting their use of health services especially in families with low socio-economic status. 17.9 % of the families in the region had never applied to health-centres. Of the families which had, 1/3 of them were not satisfied with the services given at the health-centre. The main reason for dissatisfaction was the lack of interest displayed by the health workers (64.7 %).

Houses not visited by health-centre personnel comprised 43.1 % and of the houses visited, most visits were for immunization. Only 4.8 % of the children aged 0-59 months and only 7.8 % of the women who have given birth within the last five years were visited by health-centre personnel.

People living in SEAP region prefer to apply to hospitals, therefore health-centres are underused. Only by increasing the utilization of health services can the protection and promotion of health become a viable target.

Key Words: Utilization of health facilities, social security, health-centre, SEAP

Introduction

Protecting and promoting health is a target that may be made viable by promoting the use of health services[1]. In Turkey, health-centres are first-step health facilities practicing preventive and curative health services together. The aim of the law concerning Socialized Health Services is to make health services equitable and accessible. Health-centres pursue this goal[2] and are important because they are the only health facilities which provide preventive health services free, or for a nominal fee. In rural areas health units operate under health-centres. Each health unit has one nurse-midwife who is responsible for monitoring maternal and child health in the defined area. Central government hospitals are secondary-care facilities attached to the Ministry of Health. Patients with social security of any kind can apply to the central government hospitals or Social Insurance Association hospitals for free treatment. People with no social health insur-

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ance can also use any hospital by paying for services utilized. Curative health services given by private doctors and hospitals must be paid for. University hospitals are tertiary-care facilities giving free curative health services to referred patients who have social security of any kind. Although the maintenance of preventive services depends on the health organization, the use of curative services depends on the demands of the patients[3]. If the health-centres work properly, only referred patients will apply to the secondary and tertiary care-units, thereby decreasing the vast number of patients applying to hospitals.

Studies show that the following factors affect the use of health services: the knowledge, attitude and behaviour of the individual, and the socio-economic and cultural features of the society[4]. Besides the age, gender, marital status, type of residence, education, socio-economic status, job, social security, and health level of the users, the distance between the family home and health facilities, the type of health service, and the opinion of the users about the effectiveness and quality of the health services are other factors affecting the usage of health services.

SEAP (Southeast Anatolian Project), which covers the provinces of Adiyaman, Batman, Diyarbakir, Gaziantep, Kilis, Mardin, Siirt, Sanliurfa, and Sirnak, is the most important and most inclusive project aiming to decrease disparities in regional development. The population of these nine provinces is more than 6 million. In the year 2000, there were 435 health-centres, 1,049 health units, 25 maternal/childcare and family planning centres, and 24 tuberculosis-control dispensaries in the region. However, 12.4% of the health-centres have since been closed (19.8% in the rural areas and 1.2% in the urban areas). Population per active health-centre was 16, 238 in the region (68,016 in the rural areas and 211,450 in the urban areas). 71.7% of the health units in the region were not active (73.9% in rural areas and 69.7% in the urban areas). There were 1,009 doctors, 788 nurses, 1,154 midwives and 545 health officers in the region. Population per doctor was 6,279, population per nurse was 7,654, population per midwife was 5, 093 and population per health officer was 1,1048.

In this study, data were collected about public health issues and problems such as reproductive health, malnutrition, environmental health, and parasitic diseases in the SEAP region in 2001 and 2002. The objective of this study was to evaluate the utilization of health facilities in SEAP region.

Materials and methods

The data for this study were collected in the course of the SEAP Public Health Project. This project was supported by the SEAP Regional Development Management of the Republic of Turkey and conducted by a consortium consisting of the Turkish Parasitology Association, Gaziantep University, Dicle University and Harran University. In this project, data were collected on public health issues and problems of the SEAP region in 2001 and 2002. In this study, data about utilization of health facilities were also evaluated.

The population of the nine provinces in the region was 6,128,973. In order to investigate the public health problems of the region, an optimum sample size representative of both rural and urban areas of the region was determined as being 6,900 [d= 0.03, p=0.04 (the prevalence of the least prevalent parasite), α=0.01]. This number (6,900) was divided into the average number in each household (approximately 6 people) and the number of houses in the sample was calculated as 1,150. Then an optimum sample size representing both rural and urban areas of the region was chosen by the State Institute of Statistics by a sampling method proportional to size. Of the 1,150 houses chosen for the sample, 1,126 houses were accessed and data collected.

Four questionnaire forms were designed by the public health departments of two universities (Gaziantep and Dicle). Two questionnaires were for individuals (one for females over the age of 5, and one for males over the age of 5). One questionnaire was about household conditions and the last one was about infants aged 0-59 months. Before the study, the questionnaires were tested on a similar sample and revised accordingly.

A team was formed and trained for data collection in every province. A public health specialist headed each team. These teams visited households and filled in the questionnaires during face-to-face interviews. Data about health facility utilization, type of residence, social security, and user opinion on the quality of the health services were obtained. The socio-economic status of the families was evaluated by a composite index.

The data were computer-analysed by the SPSS 5.0 and Excel programs. Chi-square test was used in the statistical analyses.

Table 1. Type of health facility utilized for the last sick family member by type of residence in SEAP region

Type of residence	Type of health facility utilized									
	Secondary/ tertiary care*		Private doctor/ hospital		Health-centre		Others**		Total***	
	n	%	n	%	n	%	n	%	n	%
Rural	178	43.3	98	23.9	86	20.9	49	11.9	411	100.0
Urban	382	57.9	133	20.2	85	12.9	59	9.0	659	100.0
Total	560	52.3	231	21.6	171	16.0	108	10.1	1070	100.0

x^2= 23.0 p < 0.001

* Central government hospitals, social insurance association hospitals, university hospitals.

** Pharmacy, home drugs, traditional healers, nothing has been done, others.

*** Data could not be obtained from 56 families.

Results

In the SEAP region, 58.0% of the families (63.9% in urban areas and 48.4% in rural areas) had social security; however, 42.0% of them had none. The percentage of families having no social security was 36.1% in urban areas, and 51.6% in rural areas (x^2= 26, p<0.001).

There are four official social security institutions in Turkey. These are: the Retirement Association (Emekli Sandigi) for government employees, the Social Insurance Association (SSK) for workers, Bag-Kur for tradesmen and Green Card (Yesil Kart) for poor people having no other social security. The social security health institutions most widespread in the study were: Social Insurance Association (18.7%), Green Card (17.4%), Retirement Association (12.6%) and Bag-Kur (8.8%), respectively.

In order to determine which facility was preferred for the treatment of any health problem, people were asked "Where did the member of your family who was last sick apply for treatment?". Central government hospitals were the first preferred facility (32.4%), private doctors and hospitals were the second (21.6%), and health-centres came third (16.0%). Other answers given were: Social Insurance Association (14.3%), university (5.5%), other (3.2%), home remedies (0.8%), traditional healers (0.5%) and nowhere (3.2%). Table I shows the type of health facility utilized by the family member last sick according to type of residence in the SEAP region. Secondary and tertiary care-facilities were more often chosen in rural areas than in urban areas (p<0.001).

Table 2. Type of health facility utilized for the last sick family member by type of residence and social security status in SEAP region

Type of residence	Social security	Type of health facility utilized									
		Secondary/ tertiary care*		Private doctor/ hospital		Health-centres		Others**		Total***	
		n	%	n	%	n	%	n	%	n	%
Rural	Present	98	46.2	52	24.5	39	18.5	23	10.8	212	100.0
	Absent	80	40.2	46	23.1	47	23.6	26	13.1	199	100.0
	Total	178	43.3	98	23.8	86	21.0	49	11.9	411	100.0
x^2= 2.70 p=0.40											100.0
Urban	Present	196	58.5	84	25.1	29	8.7	26	7.7	335	100.0
	Absent	186	57.4	49	15.1	56	17.3	33	10.2	324	100.0
	Total	382	57.9	133	20.2	85	12.9	59	9.0	659	100.0
x^2= 18.70 p<0.001											
Total		560	52.3	231	21.6	171	16.0	108	10.1	1070	100.0

* Central government hospitals, social insurance association hospitals, university hospitals.

** Pharmacy, home drugs, traditional healers, nothing has been done, others

*** Data could not be obtained from 56 families.

Table 3. Type of health facility utilized for the last sick family member by type of social security

Type of social security	Type of health facility utilized: Secondary/ tertiary care* %	Private doctor/ hospital %	Health-centres %	Others** %	Total*** n	Total*** %
Social insurance association (SSK)	82.0	10.2	2.4	5.4	186	100.0
Green card	44.0	22.8	24.5	8.7	165	100.0
Bag-Kur	51.0	27.7	12.8	8.5	79	100.0
Retired association	63.9	6.8	19.5	9.8	115	100.0
Other	50.0	25.0	0.0	25.0	2	100.0
Presence of social security	53.8	24.9	12.4	8.9	547	100.0
Absence of social security	50.8	18.2	19.7	11.3	523	100.0
Total	52.3	21.6	16.0	10.1	1070	100.0

* Central government hospitals, social insurance association hospitals, university hospitals.
** Pharmacy, home drugs, traditional healers, nothing has been done, others
*** Data could not be obtained from 56 families.

The type of health facility utilized for the last sick family member according to their type of residence and kind of social security is given in Table 2. The type of health facility used did not differ according to the incidence of social security in rural areas (p=0.40). Private doctors and hospitals were used more and utilization of health-centres was low in families having social security in urban areas (p<0.001). Regardless of the type of social security, people in the region seemed to prefer secondary and tertiary care facilities over all others (Table 3).

Table 4 shows the type of health facility utilized for the family member last sick according to the socio-economic status of the family. The type of health facility utilized did not differ in accordance with the socio-economic status of the family (p= 0.12).

17.9% of the families had never gone to health-centres. Of the 924 families using health-centres, 640 families (65.4%) (61.1% in rural areas and 68.2% in urban areas) were satisfied with the services given by the health-centres, and 320 families (34.6%) were not satisfied (38.9% in rural areas and 31.8% in urban areas) (x^2 =5.15, p=0.02). The reasons for this dissatisfaction are presented in Table 5. The main reason for dissatisfaction was the lack of interest on the part of health workers (64.7%).

One of the important services given by health-centres in primary health care is the home visiting done by the staff. The question, "*Did health-centre staff visit your home at any time?*" was asked in order to evaluate the preventive health services of health-centres in the SEAP Region. 43.1% of families replied in the negative to this question (Table 6). Although the number of houses visited was 64.7% in rural areas, this number decreased to 52.0% in urban areas (p<0.001).

Table 4. Type of health facility utilized for the last sick family member by socio-economic status

Socio-economic status	Type of health facility utilized: Secondary/ tertiary care* n	%	Private doctor/ hospital n	%	Health centres n	%	Other** n	%	Total*** n	%
Poor	187	51.8	70	19.4	64	17.7	40	11.1	361	100.0
Medium	335	51.8	144	22.2	101	15.6	67	10.4	647	100.0
Good	38	61.3	17	27.4	6	9.7	1	1.6	62	100.0
Total	560	52.3	231	21.6	171	16.0	108	10.1	1070	100.0

x^2=10.02 p=0.12

* Central government hospitals, social insurance association hospitals, university hospitals
** Pharmacy, home drugs, traditional healers, nothing has been done, others
*** Data could not be obtained from 56 families.

Table 5. Reason for dissatisfaction from services of health-centres by type of residence

Reasons for dissatisfaction	Type of residence: Rural n	Rural %	Urban n	Urban %	Total n	Total %
Uninterested behaviour of health workers	82	56.5	125	71.3	207	64.7
Unpleasant behaviour of health workers	6	4.1	11	6.3	17	5.3
Inadequate physical examination	11	7.6	9	5.1	20	6.3
Insufficient number of personnel	31	21.4	19	10.9	50	15.6
Inadequate treatment	2	1.4	0	0.0	2	0.6
Wrong diagnosis	2	1.4	8	4.6	10	3.1
The staff do not obey working hours	4	2.8	1	0.6	5	1.6
Waiting for a long time	2	1.4	1	0.6	3	0.9
The health-centre is far away	5	3.4	1	0.6	6	1.9
Total	145	100.0	175	100.0	320	100.0

It was determined that most of the visits made by the staff of health-centres in the SEAP Region were only for immunization purposes (97.8%) and immunization was only carried out as part of a polio eradication program (Table 7). Home visits done for purposes other than immunization were found to be few (family planning 10.9% and prenatal care 7.6%).

Families having children in the 0-59 month age group were asked whether health-centre staff conducted any follow-up procedures on their child. 4.8% answered positively to this question (Table 8). In rural areas (p=0.01) follow-up of children decreased to 2.8%. Similarly, only 7.8% of women who had given birth within the last 5 years were visited by a health-centre staff during their pregnancy.

Discussion

Understanding the factors that influence health-care utilization is helpful in identifying reasons for differences in utilization, consumer satisfaction, and outcome, and for formulating policies and programs that encourage appropriate utilization, discourage inappropriate utilization, and promote cost- effective care. For many patients, provider and environmental factors influence health-care utilization[5]. Some of these factors have been investigated in this study.

Many studies have found that previous utilization of services is a strong predictor of current utilization[5]. It has been determined that 16.0% of families preferred to apply to health-centres and 32.4% of them preferred to apply to central government hospitals for their most recent health problem. Application to health-centres, which was expected to be the first facility applied to, was only 16.0%: this was an important finding showing an insufficient use of health-centres in the SEAP provinces. The preference for health-centres and hospitals was 40.3% and 33.3% respectively in a study conducted in 1994 in the city centre of Gaziantep[6]. The same rates were 12% and 56% in our study in the same city. It may be seen that health-centre usage decreased as time went on. Health-centre usage was 24.4% in Antalya, 42.9% in Kayseri, and 35.1% in Sivas[7-9]. The application percentage rate of 16.0% found in the study shows that people do not benefit from the services given by the health-centres. It has been deter-

Table 6. Status of house visits by health-centre staff according to type of residence

Type of residence	Status of house visits: Visited n	Visited %	Not visited n	Not visited %	Total n	Total %
Rural	284	64.7	155	35.3	439	100.0
Urban	357	52.0	330	48.0	687	100.0
Total	641	56.9	485	43.1	1126	100.0

$x^2 = 17.18$ $p<0.001$

Table 7. Reasons of house visits by health center staff by type of residence

Reasons of visits done by staff of health-centres	Type of residence: Rural n	Rural %	Urban n	Urban %	Total n	Total %
For polio eradication campaign*	279	98.2	348	97.5	627	97.8
For prenatal care	20	7.0	29	8.1	49	7.6
For family planning	22	7.7	48	13.4	70	10.9
For health education	16	5.6	18	5.0	34	5.3
For establishing population	18	6.3	31	8.7	49	7.6
For delivery	13	4.6	10	2.8	23	3.6
For environmental health services	1	0.4	4	1.1	5	0.8
Total number of visits*	369	43.1	488	56.9	857	100.0

* Some households were visited more than once

mined in a study performed by Health Ministry of Turkey that 48.7% of the people in urban areas choose to be treated in hospital, and 14.1% of them choose health-centres for their health problems. This correlates with the findings of our study[10]. In a study conducted in the SEAP region in 1992[11]. Toros and Oztek found the sequence to be: central government hospitals (30.8%), health centers (26.9%), private doctors (25.4%) and Social Insurance Association hospitals (9.5%). In a study by Pala et al.[12] this sequence was as follows: central government hospitals, health-centres, and private doctors. In a study done in Kayseri in 2002[13], the usage rate for health-centres was 21.2% and took second place in the sequence. All these findings show that there was an important decrease in the number of applications made to health-centres, not only in the SEAP region but in the country as a whole. This may be because the primary health care units in the region are insufficient and because 19.8% of the health-centres in the rural areas and 1.2% of the health-centres in the urban areas have been closed. Moreover, 73.9% of the health units in the rural areas and 69.7% of the health units in the urban areas are not active. Most of the population of the SEAP region live in rural areas where almost 1/5 of the health centers and 3/4 of the health units are closed. Health centers give primary health care. Preventive and curative health services are given together in the health-centres. Health-centres offer free or cheap services and are easily accessible. Home visits, follow-ups of children of 0-59 months and of females between the ages of 15 and 49, immunization, prenatal care, postnatal care, family planning, health education and many other primary health care services are among the duties to be carried out by the health-centres. If the health-centres, which are the first - step health facilities, work properly, only referred patients will apply to the secondary and tertiary care units, as is laid down in the law concerning the Socialization of Health Services. This will decrease to a large extent the number of people applying for treatment at hospitals.

The type of health facility that had been applied to for treatment did not differ in accordance with the socio-economic status of the family. This may be because there were only 62 families who had a high socio-economic status.

Table 8. Follow-up frequency by health center staff for selected groups by type of residence

Type of residence	Follow-up by health-centre staff: For 0-59 month-old children N*	n	%	For women who gave birth within last 5 years N*	n	%
Rural	430	12	2.8	257	18	7.0
Urban	628	39	6.2	432	36	8.3
Total	1058	51	4.8	689	54	7.8
	x^2=5.78 p=0.01			x^2=0.6 p=0.53		

* Some households were visited more than once

Provider-related variables include patient factors that may be influenced by providers (e.g., whether individuals have a regular source of care)[5]. Social security membership was determined to be a factor affecting the family's choice of health facility. Whether the family had social security or not, the most preferred health facility was the central government hospital. Social Insurance Association hospitals were the first choice of those who had Social Health Insurance. However, the preference for university hospitals was higher in families with Retirement Association membership and the preference for health-centres was higher in families with Green card facilities than with the other groups. Half of the families living in the SEAP region did not have social security; restricting the use of health services, especially for families whose socio-economic status was low. As a matter of fact, in a study in Antalya, the use of health services was found to be high among those families with social health insurance[14]. In a study conducted by Philips *et al*. the most frequently used provider-related variable in health-care utilization was whether an individual had a regular source of care. Having a regular source of care is usually assumed to have a one directional relationship with the use of health-care; in other words increasing the use of services. However, the relationship may be two-directional in that heavy users are more likely to have a regular source of care also, and therefore studies that assume a one-directional relationship can be biased and misleading[5].

Another finding that attracts attention is the preference for private hospitals and doctors by 24.9% of families having social security. The preference for private hospitals and doctors was higher in families with Bag-kur than with the other groups (27.7%). Private hospitals and doctors are not expected to be the first choice of families having social health security. People having social health security should be able solve their health problems within their social health insurance systems. But the findings of the study show that people had had to find solutions for their health problems other than through their social health security systems. The preference for private hospitals and doctors was low in families with Retired Association membership (6.8%). Private health systems were the first and second choices in a study in Antalya performed within an interval of 2 years[14]. Kilic found in his study carried out in Golbasi that the most preferred health facilities there were health-centres, central government hospitals and private facilities respectively, and the reasons for choosing private facilities were related to the patient's knowing the doctor and the quicker services given in these facilities[15]. Green card usage is widespread in the SEAP region (17.4%) and takes second place to social health security in the sequence. Although Green Card facilities are given to families with low socio-economical status, a fairly large number of Green Card families preferred private hospitals and private doctors (22.8%).

Families with Social Health Insurance applied to Social Health Insurance Association hospitals (64.5%) mostly, but approximately 35% of them preferred other health facilities. In a study carried out in Kayseri, these numbers were 77.5% and 19.8% respectively[16]. The utilization of health-centres was only 2.4% in families with Social Health Insurance because the Social Insurance Association does not pay for medicines. If patients with Social Health Insurance would use health-centres, this would prevent overburdening Social Insurance Association hospitals and reduce treatment costs. A low number of families having social health insurance preferred first-level health facilities (12.4%). The low usage of health-centres and the preference for hospitals that have higher overheads increases the cost of social health systems.

There were differences in health facility preferences in rural and urban areas. The most preferred health facility was hospital in both rural and urban areas. Health-centres were preferred at a rate of 20.9% in rural areas but this decreased to 12.9% in urban areas. In urban areas, there are different health facilities and social security rates are high. So these factors decrease the preference for health-centre.

All these data show that most of the people in the SEAP region prefer hospital treatment for their health problems, as is true for the whole of Turkey[10]. It is considered in the SEAP region that health-centres, that ought to be the first level of health service in the socialized health system, do not give effective health services. That 17.9% of people in the region have never gone to health-centres was another indicator of this view.

Provider-related variables include patient factors that may be influenced by providers, as well as provider characteristics that interact with patient

characteristics to influence their utilization of health centers[5]. 34.6% of the families using health-centres were not satisfied with the treatment they received. The first reason for dissatisfaction was the lack of interest or the poor attitude towards the patient on the part of health workers (64.7%). Complaints about wrong diagnosis (3.1%) or long waits before being attended to (0.9%) were few in number. Attributes of the physicians, such as gender and training, have been shown to influence utilization of preventive services and much of the variation in the number of patients who use these services may be due to decision-making on the part of the physician[5]. In our study this seemed to have little influence on utilization of health facilities. We did not ask the gender of the physician, which may influence utilization of health facilities, especially in rural areas.

Approximately one third of the families using health-centres (34.6%) were not satisfied with the service given them. Wrong diagnosis was low (3.1%), so it is thought that the real reason for dissatisfaction is related to the management of health-centres. In a study carried out in Kayseri, 64.4% of the people were satisfied with health center services and this rate was higher in the rural areas. In the same study, reasons for dissatisfaction were: lack of specialist doctors (61.1%) and lack of interest on the part of the health workers (48.9%)[16]. In another study conducted by Senol *et al*., the lack of interest displayed by health workers took second place in the sequence after absence of instruments[13]. In the management of health-centres, the needs of the people must be taken into account and a structure appropriate for the users must be established.

The number of houses visited by the health-centre staff at any time was 56.9%: this rose to 64.7% in rural areas. As every house should be visited at least once in order to establish the number of people in the household and whether it includes any married women between the ages of 15 and 49, and several times subsequently for follow-ups of children and pregnant women, it was thought that these percentages were low. As a matter of fact, approximately all of these visits were for immunization purposes only. Regular follow-ups of children and pregnant women are very important for reducing maternal and childhood mortality and neglect of this is an important factor in the high maternal and childhood mortality in our country. Supporting this idea, the percentage of children aged 0-59 months followed up by the staff of health-centres was 4.8% and follow-up rates for women who have given birth within the last 5 years was 7.8%. In a publication by the Turkish Ministry of Health, the number of follow-up per child was said to be 3.2 in the whole of Turkey in 2000, and 1.0 in the SEAP region. Similarly, the number of follow-ups per pregnant women was 1.7 in the whole of Turkey and 0.4 in the SEAP region[20]. This means that the findings given for the region in the Turkish Ministry of Health publication support the low child and pregnant follow-up rates found in the region in our study.

Protecting and promoting health is a target that may be attained only by increasing the utilization of health services. It has been determined that the use of primary health care services are insufficient for both ambulatory care and preventive care services. In order to increase the use of primary health care services, everybody must have social health insurance, the services given at health-centres must be satisfactory, the health-centres health units now closed must be re-activated, patients with Social Health Insurance should be urged to use the health-centres, the management of health-centres must take into account the needs of the people and a structure that will be appropriate to the users must be established.

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Vertical vs horizontal health care models: the Turkish case

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Abstract

Before the Second World War, health services in many countries were provided through vertically organized systems. After the war, many countries gradually reorganized their health services and adopted an alternative model; in other words, they changed from the vertical type of organization to the horizontal type.

Both of these models have their strengths and weaknesses. In Turkey, these models can be compared by evaluating past and current experiences. In practice, the change to the horizontal system caused several difficulties. In spite of all the efforts made during the last 40 years in Turkey, it is difficult to say that the horizontal model currently functions well.

Key words: health systems, horizontal, vertical

Introduction

Before the Second World War, the universal principle in organizing health services was to fight a single disease or health problem over a wide area. This type of single purpose organization is known as "vertical organization" which reflects the idea of organizing services in such a way that the central, regional and peripheral levels of service are structured in a vertical hierarchical model. In this model, each vertical organization deals with a single (specific) health problem such as malaria, trachoma, tuberculosis etc. The alternative model to this approach is to integrate the care provided by all types of health services into a single unit. This type of organization is known as "horizontal organization" which reflects the idea of structuring the organization unilaterally in a unique hierarchical model. The main principle of this model is to combat all the health problems of a specific community living in a regionally-defined area. This approach was well demonstrated at the Primary Health Care Conference held in Almaty in 1978. Here it was recommended that, in order for primary health care to be comprehensive, all development-oriented activities should be interrelated and balanced so as to focus on problems of the highest priority as mutually perceived by the community and by the health-care system, and that culturally-acceptable, technically- appropriate, manageable, and appropriately-selected interventions should be implemented in combinations that meet local needs[1]. This implies that single-purpose programs should be integrated into primary health-care activities as quickly and smoothly as possible.

Presently, reorganization of health care is on-going in many countries, including Turkey. However, a small group of planners in Turkey recommends reverting from the existing "horizontal" model to the previous "vertical" model. The aim of this article, therefore, is to make a general assessment of both vertical and horizontal health care models and to review the experiences undergone in Turkey in implementing both models.

The strengths and weaknesses of the models

In regions where a health problem is hyper-endemic and is seriously threatening the health of the community, it is better to organize the services vertically so that the problem can be controlled quickly and effectively. However, this approach often neglects other health-care issues in order to concentrate fully

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on a single type of work. This contradicts the holistic approach in health care.

A vertical type of health-care organization requires the training and employment of single-purpose health-workers such as "malaria surveillance agents" or "trachoma agents." Generally, the training of such personnel is short and easy and, in this way, many low-level (single-skilled) personnel can be trained. When such vertical programs are terminated, however, these personnel loose their jobs. One of the risks of deploying such staff is that although they are trained for limited skills only, they can be perceived by the community served as having the ability to deal with situations beyond their scope. In some instances, the staff may over-evaluate their skills in the same way or they may easily turn into traditional healers during their work or after completion of the program. For example, it is a fact that in some parts of rural Turkey, trachoma agents are consulted for eye diseases and malaria- surveillance agents perform routine injections.

Vertical programs need separate cadres of staff. For example, the government has to hire separate physicians for each of the malaria, trachoma, and leprosy programs. In contrast to the vertical approach, the alternative model (horizontal approach) needs multi-functional personnel who can do different tasks simultaneously. Therefore, fewer personnel are needed in the horizontal approach than in the vertical type of organizations. No doubt a consideration of the importance of the health problem to be tackled may be seen as a political matter. The vertical approach is generally used in the countries where there are insufficient resources. In these countries, governments commit themselves to the priority of eliminating any very serious health problem, but they should be aware that, by concentrating on this, they might be neglecting, or condoning the neglect of other health problems.

In the regions where the health status of the community is reasonably stable and the resources are sufficient, horizontal types of organizations are preferred. In this model, the units serve a specific population living in a regionally-defined area. One of the advantages of this model is that the health-care staffs are acquainted with the problems of the families and understand the local culture better than those working in a vertical model. Also, the staff can easily see connections between health problems and other factors, which in turn may bring about a solution to those health problems.

The main strength of the horizontal model is that it allows for the assessment of the health problems of a community as a whole. Therefore, in this model, it is easy to identify associated problems, which affect the overall health of a community. On the other hand, in the vertical system, each of these problems is handled by a separate organization, thus creating difficulties in assessing the big picture and making it difficult to come to terms with the problems.

Another advantage of the horizontal model is that patients, whatever their needs may be, are supposed to apply to the same unit and even to the same health care staff. This makes the use of health services easy and practical.

The major difficulty in running horizontal services is to train and use multipurpose professionals. It needs qualified management as well as supervisory activities. It should be borne in mind that the vertical and horizontal approaches are alternatives and governments should avoid using both these models at the same time. The advantages and disadvantages of the two models are shown in Table 1[2].

The Turkish model

Before 1961, national health policy in Turkey gave priority to the control of hyper-endemic diseases such as malaria, tuberculosis, trachoma, syphilis and leprosy through vertical programs similar to those in use in many other countries at that time. After the army overthrew the government in 1960, an intersectoral body entitled the State Planning Organization was set up. Under its coordination, each sector, including health, was reorganized to meet planned social and economic targets. As early as 1961, the government established health objectives emphasizing the integration of public health services (referred to as socialization) and the increase of health-service coverage in rural areas. Services formerly provided by separate agencies were unified under the same health-care system. Health centres provided basic medical care, integrated maternal and child care and family-planning services, preventive treatment of contagious diseases, environmental health care and school health- services, all of which were organized to reach even the most peripheral localities. By this means, the Turkish Government had already realized the recommendations of the Almaty Conference 17 years before the meeting was held[3].

Through vertical programs, successive Turkish governments succeeded in controlling several

Table 1. Advantages and disadvantages of vertical and horizontal models*

Vertical model

Advantages

- May set clear objectives and targets, which motivate those working in the program.
- Operational planning of activities may lead to more efficient and effective delivery of the service.
- May provide performance incentives leading to higher quality of care.
- Ability to monitor the restricted outputs and outcomes related to the program may improve identification and resolution of problems.

Disadvantages

- May concentrate resources on a limited range of problems, detracting from development of comprehensive health systems.
- Heavy dependence on donor-funding with consequent sustainability problems and vulnerability to changing fashions in donor policy.
- Single-purpose structure parallel to the general health service, with budgets controlled and targets set from above rather than by area health authorities.
- May overload grassroots health services with many uncoordinated tasks, training programs and reporting systems, usually determined by the central level of the health system
- May fail to mobilize sustained political and community support because intervention is imposed from above
- Cost-effectiveness may decrease as time goes on

Horizontal model

Advantages

- Allows delivery of a range of services selected to suit national health policies and local needs.
- Incorporates inputs from different components of the health system and thus reflects the multi-dimensional component of health.
- Has the capacity to take on new activities and react to disasters.
- Allows multi-purpose use of resources, such as personnel, and allows more output to be achieved for a given input.
- Allows for planning and management of area health services according to local circumstances with appropriate political, inter-sector and community involvement.
- Makes it easier to respond to user needs, which saves time and encourages personalized service as well as continuity of care, and thus increases convenience and user satisfaction.
- Allows for a more holistic approach to health needs of individuals and communities.

Disadvantages

- May fail to set appropriate priorities.
- May fail to adopt a programming approach, with clearly defined objectives; targets operational planning and monitoring by output/outcome.
- May fail to achieve the levels of output and impact in key health care areas that would be reached by single-purpose programs.
- May cause uncertainty and dissatisfaction among health service employee if adequate explanations and reassurances are not given

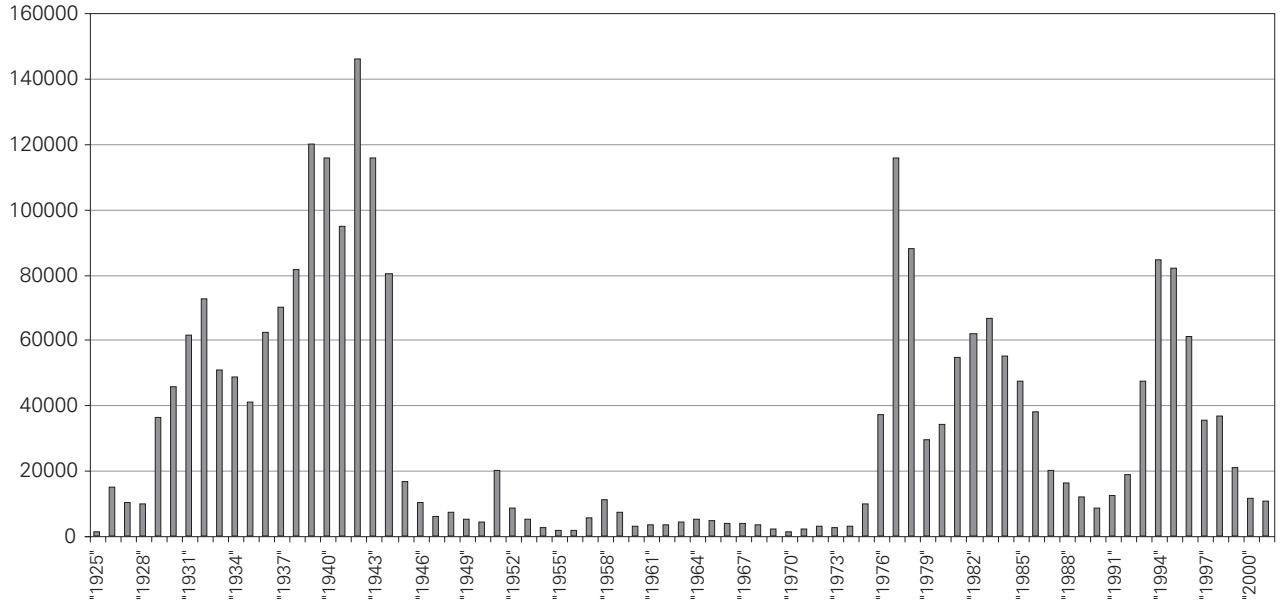
* Reference no. 2.

communicable diseases such as malaria, trachoma, leprosy and syphilis. For example, in the early 1920s, the parasite index for malaria was over 80 percent over almost all of Anatolia. Between 1925 and 1945, the number of new malaria cases was over 100,000 per year. In the year 1970, this figure decreased to 1,263. The government interpreted this level as a great success and, subsequently, the services were relaxed. (Figure 1) However, local transmission of the disease continued especially in the Cukurova and South East Anatolian regions, which showed that malaria had not yet been eliminated throughout the country.

The morbidity rate from malaria stayed low between 1970 and 1975. After this period, it started to increase and reached its maximum in 1977 with 115,512 cases. By this time, the malaria control program had already become one of those administered at health centres. Despite some efforts, the morbidity rate did not decrease as it had in the 1960s and early 1970s, and the annual number of malaria cases is still high.

This is a discouraging fact about the effectiveness of the integrated (horizontal) program in Turkey. However, it is difficult to attribute this failure completely to the new system and further analysis is

Figure 1. Number of new malaria cases in Turkey (1925 – 2001)*



* Reference no. 4.

needed. One of the factors involved might be the minimal time devoted to the subject of malaria in the medical curriculum during the 1970's. So, physicians who graduated after that time knew very little about this endemic disease and therefore could not carry out the "passive surveillance" of malaria in the integrated model.

Terminating the training programs of "malaria surveillance agents" could be another factor in the re-emergence of malaria in Turkey. Because, in principle, when and wherever the number of malaria cases starts increasing in areas where passive surveillance is carried out, "active surveillance" should be added to the system. This could not be realized in Turkey due to the lack of malaria surveillance agents after the middle of the 1970's.

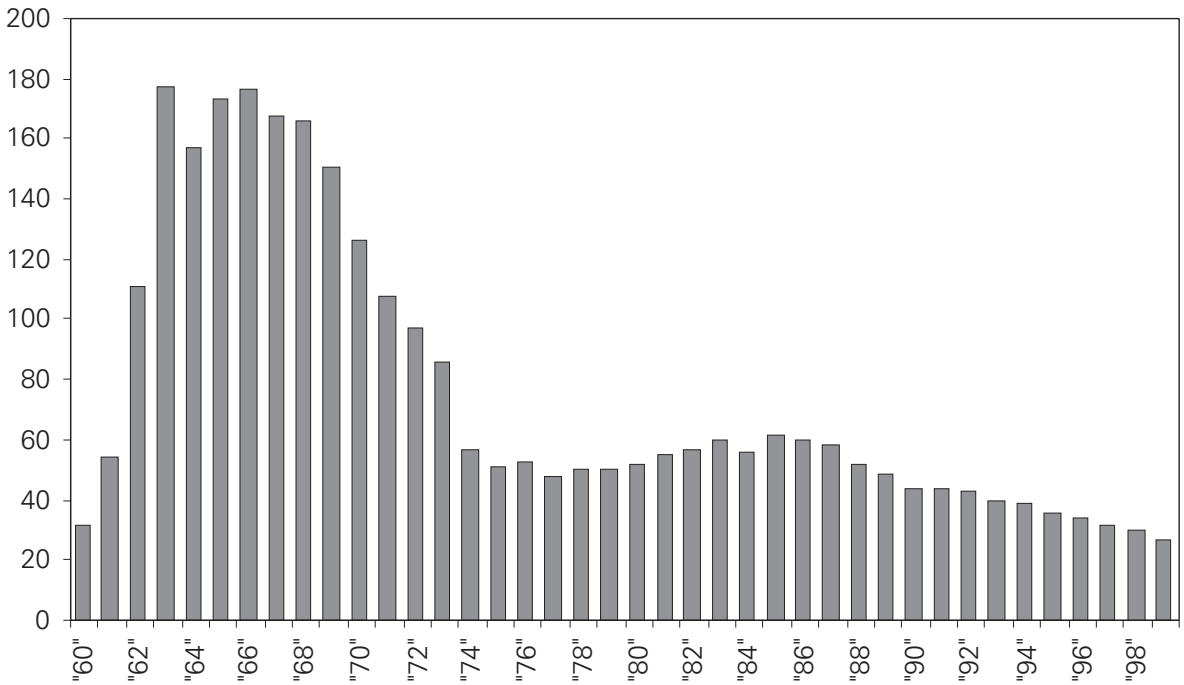
Before 1961, the tuberculosis-control program was another vertical-type program in Turkey. After the horizontal system was implemented, BCG vaccinations and patient follow-ups were integrated into the existing health centre programs. However, unlike the malaria-control program, the vertical-control institutions, namely the tuberculosis dispensaries, were kept on as health centre referral units. But, in fact, besides assisting the health centres, these dispensaries continued to work as before. In other words, the vertical and horizontal approaches to the control of tuberculosis are carried on simultaneously in Turkey.

The control of tuberculosis in Turkey is generally accepted to have been a success. The major factor behind this success was, without doubt, the vertical control program. The activities of the health centres can be seen as an additional or supportive input to the existing program. In fact, the incidence of tuberculosis has been gradually declining since the early 1960s. (Figure 2)

Maternal and child health-care and family planning (MCH & FP) were other vertical programs extant in Turkey before the initiation of a socialized health-care system. These were provided through MCH and FP centres in urban, and MCH units in the rural areas. After 1961, maternal and child health-care and family planning issues became the major tasks of health centres and dispensaries. Although, the governments did not put an end to the earlier system (vertical program) and kept the MCH and FP centres in urbanized areas open, nearly 6,000 health centres, 2,000 of which are in villages, are the main units where MCH and family planning services are provided. In rural Turkey especially, where maternal and child health problems are more serious, the only units for MCH care are the health centres or dispensaries.

Although, we do not have exact figures for the immunization rates before the advent of socialized health services, the Institute of Population Studies at Hacettepe University reports that the immunization

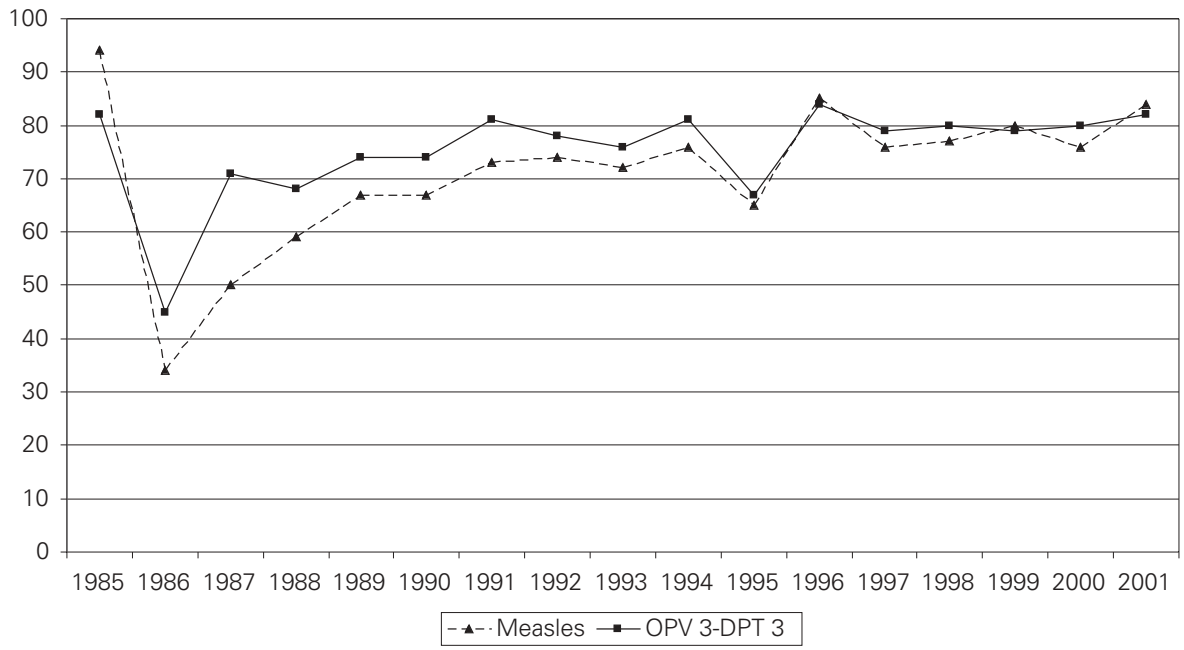
Figure 2. The incidence rate of tuberculosis in Turkey (1960 – 1999) (per 100,000)*



* Reference no. 5.

rate before 1985 was 37 percent for polio and DPT[7], and 12 percent for measles[8]. As is seen in figure 3[9], the immunization rates rapidly increased, especially in the late 1980s. The main factor for this success may be the input of midwives working in dispensaries, and that of the health centre staff.

Figure 3. Percentage of fully immunized (DPT, polio, measles) children in Turkey (1985 – 2000)



Conclusion

Turkey has experienced two alternative health care approaches, namely the vertical and horizontal models. The first was the system employed before 1961 and the other was implemented after 1961. Each of these models was the contemporary approach of its time. However, Turkey has had considerable trouble in changing its health-care system from vertical to horizontal. Currently the country is faced with serious difficulties, concerning management, finance, infrastructure, human resources etc. in running the horizontal model (socialized health services). This article does not aim to discuss these problems in detail. It is the common understanding that the current model is appropriate for Turkey. However, unless these problems are eliminated, it will not be possible to say that it is completely effective in promoting the health of the Turkish people.

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Global status of infectious diseases in 2003

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Abstract

In these first years of the 21st century, as the second leading cause of death worldwide, infectious diseases continue to be an important global problem in public health. The five leading infectious diseases, which are major causes of death, are acute respiratory infections, AIDS, diarrheal diseases, tuberculosis, and malaria. The emergence of new pathogens, the re-emergence of already known infections, and the spread of antimicrobial resistance are the cornerstones of this problem. The populations of developing countries and children are still the people at risk. The spread of HIV/AIDS, drug-resistant tuberculosis and malaria has reached enormous dimensions in developing countries. Fighting infectious diseases is made possible through the use of effective strategies and interventions such as improvement of health services, encouragement of research to develop new antimicrobials, and safe, efficient, affordable vaccines. Extraordinary global effort at the economical, political and institutional level, involving governments and nongovernmental organizations, foundations, and international agencies, is needed to solve main health problems in this era of infectious diseases.

In this article the recent status of infectious diseases is reviewed, by explaining the concept of emergence and re-emergence and by focusing on the five leading infectious diseases as the major causes of death worldwide.

Key words: infection, emerging, vaccine, prevention, antimicrobial resistance

Introduction

In these first years of the 21st century, infectious diseases, the second worldwide cause of death, continue to be an important global problem of public health. However, most of the 20th century was a period of success for the treatment, control and prevention of infectious diseases so that chronic illnesses replaced them as a more important cause of death. Towards the end of the century, the emergence of new infections with unknown microorganisms and the re-emergence of already- known infections attracted attention to the infectious diseases; moreover, resistance towards antimicrobials became a serious problem and contributed to the emergence of infections.

In this article, the recent status of infectious diseases is reviewed by explaining the concept of emergence and re-emergence; by focusing on the five leading infectious diseases, (acute respiratory tract infections, AIDS, diarrheal diseases, tuberculosis, and malaria) as the major causes of death worldwide,[1-4] (Table 1-2) and on the role of antimicrobial resistance in this process.

History

By the end of 20th century, the quality of life had improved in most of the economically developed countries: better nutrition and housing, better hygiene and sanitation, safer food and water resources, together with the development of vaccines, antibiotics and chemotherapeutics, had reduced mortality rates from infectious diseases. Under these conditions scientific interest and resources were diverted to chronic illnesses such as heart disease, cancer and strokes, which had become more important causes of death. However, in developing countries, despite global technological progress, infectious diseases remain the major cause of morbidity and mortality[2,5].

At the end of the 20th century, important developments occurred that influenced greatly the health of both the developed and the developing countries. These developments were: the *emergence* of new infectious diseases and microorganisms such as Legionnaire's disease, toxic shock syndrome, Lyme disease, HIV, Nipah virus, Ebola virus, Escherichia coli 0157:H7, and, lately, SARS; the *re-emergence* of

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Table 1. Leading causes of deaths worldwide. Estimates for 2001 (WHO Health Report 2002)

Causes	Deaths n(000)	Deaths % Total
Non-communicable diseases:CV diseases, malignant neoplasms, respiratory diseases	33 077	58.5
Communicable diseases, maternal and perinatal conditions and nutritional deficiencies	18 374	32.5
Injuries	5 103	9.0
Total	56 554	100.0

* Adapted from World Health report 2002 Geneva: World Health Organization[4]

diseases such as cholera, tuberculosis, dengue fever, yellow fever and malaria, which had once been controlled in many parts of the world; and the evolution of antimicrobial resistance into a serious global problem[3]. These developments showed that much is still unknown about infections and the scientists diverted their interest once again toward the subject of infectious diseases[1,2].

Emerging and re-emerging infections

Emerging diseases are new infectious diseases, which have not been recognized before; re-emerging infections are infections that existed before but that have re-occurred or increased in incidence due to the influencing factors cited in the following:

1- Changes in demographics

Human population movements caused by migration or war and movement of workers from rural areas to cities gave infections the means to reach larger populations.

2- Changes in behavior

Risky behavior such as unsafe sexual intercourse, drug abuse and intravenous drug use has facilitated the spread of infections, such as HIV and Hepatitis B and C infections, by blood-borne transmission especially, and of other sexually transmitted diseases, such as gonorrhoea, and chlamydial infections, by direct contact.

3- Changes in technology and industry

Advances in medical technology have increased the survival of persons with malignancies by the use of new chemotherapeutics. Improvements in intensive care units and in organ transplantation have increased the use of these. Such changes have resulted in the increase of susceptible persons, and provided opportunities for the emergence of new diseases. Advances in food technology, use of antibiotics for promoting growth in animals, changes in rendering, the preservation of food by refrigeration, and transport of food to other countries has resulted in increased resistance to antibiotics, the emergence of mad cow disease and listeriosis, and the occurrence of food-borne outbreaks of infection.

4- Changes in environment and land use

Ecological changes due to agricultural development, changes in water ecosystems, deforestation/reforestation, have given rise to parasitic and zoonotic infections.

5- International travel and commerce

Constant use of highways and airways has resulted in the spread of infections such as SARS, food-borne diseases and sexually transmitted diseases.

6- Breakdown of public health measures

A sign of inadequate public health services, continue to occur in developing countries.

7- Microbial adaptation and change

The evolution of microorganisms through genetic mutation related to frequent and unnecessary use of antimicrobials has resulted in the occurrence of new pathogenicity and virulence factors (e.g. influenza) and antimicrobial resistance (e.g. multidrug resistant Mycobacterium tuberculosis)[1,2,3,6]. *Antimicrobial resistance* has become a serious global problem. Antimicrobial drugs are essential weapons in fighting infections. The effectiveness of antimicrobial drugs has been severely decreased in the last two

Table 2. Leading infectious and parasitic diseases as causes of death worldwide (WHO Health Report 2002)

Causes	Deaths n(000)	Deaths % Total
Respiratory infections	3 947	7.0
(lower respiratory infections)	3871	6.8
HIV/AIDS	2 866	5.1
Diarrheal diseases	2 001	3.5
Tuberculosis	1 644	2.9
Childhood diseases	1 318	2.3
• Measles	745	1.3
• Pertussis	285	0.5
• Tetanus	282	0.5
Malaria	1 124	2.0
STDs excluding HIV	189	0.3
Meningitis	156	0.3

* Adapted from World Health Report 2002 Geneva: World Health Organization[4]

decades due to the ability of microorganisms to adapt to new environments by acquiring new defense mechanisms against antimicrobials. Antimicrobial resistance is not limited to bacteria: fungi such as candida, viruses such as HIV, and parasites such as malaria can also change their characteristics[2]. Drug resistant microorganisms that cause a global health problem are: *penicillin-resistant Streptococcus pneumoniae, multidrug resistant tuberculosis, drug resistant malaria; meticillin-resistant Staphylococcus aureus; vancomycin-resistant enterococci.* The first three microorganisms will be discussed together with the leading infectious causes of death worldwide. *Meticillin-resistant Staphylococcus aureus* (*MRSA*), first recognized in 1961, is now a global problem. *Vancomycin-resistant enterococci* (*VRE*) are increasingly common causes of nosocomial infections and are likely to become an increasing problem in the new millennium. Limiting the use of antimicrobials in agriculture, reducing unnecessary use of glycopeptics in hospitals, and infection control-measures may change resistance patterns[1].

During the last three decades, the scientific world has been faced with several emerging or re-emerging infectious diseases[6,7,8]. The causative agents of these diseases are summarized in Table 3. Human immunodeficiency virus (HIV) is a new microorganism and acquired immunodeficiency syndrome (AIDS) is a prototype of an emerging disease; it will be reviewed among the leading causes of death later in this article.

Severe acute respiratory syndrome (SARS) is a recent emerging disease and also a good example of the global effort to find out the causative agent and to limit the spread of a disease. SARS is a new clinical entity, the symptoms of which are a dry cough, fever, dyspnea, headache and hypoxemia, and, following its first occurrence in Foshan City, Guangdong Province, China, further cases were reported in Hong Kong and Canada, and then SARS cases spread to over 19 countries on four continents including Africa[9]. It caused a global outbreak within the first half of the year 2003. This unforeseen outbreak, subsequent to the first case which occurred on the 16th of November, 2003, involved a global effort, under the leadership of WHO, to identify the causative agent. Then diagnostic tests and preventive measures to stop the spread of the disease were carried out. Collaborative research resulted in the discovery of an entirely new coronavirus as the etiologic agent of the disease[10,11,12]. On the 17th October, 2003, a WHO consensus document was published on the web site of WHO[13]. In this report, recent data about the infection, such as the main route of transmission (direct contact via infectious respiratory droplets to the eyes, nose, and mouth), the group at risk (health care workers, especially those involved in procedures generating aerosols),

and the days of maximum virus -excretion from the respiratory tract (during the first 10 days of illness) were determined.

Infectious diseases as leading causes of death worldwide

1- Acute respiratory infectious diseases (ari)

These are estimated to cause 3.9 million deaths worldwide, 7% of the total number[4]. They are among the leading causes of death in children under 5 years of age and are often associated with measles. In 2000, 1.9 million children (95% CI 1.6-2.2 million) died from ARI throughout the world, 70% of them in Africa and Southeast Asia. The main etiological agents responsible for ARI in children include Streptococcus pneumoniae (SP), Haemophilus influenza (Hi), Respiratory syncytial virus (RSV), and Parainfluenza, virus type 3 (PIV-3)[14].

Bacterial infections: Streptococcus pneumoniae (S. pneumoniae) is the major cause of lower respiratory tract infections and death in children and adults in the developing countries. Severe manifestations of pneumococcal disease are pneumonia, febrile bacteremia and meningitis; less severe but more common manifestations are middle-ear infection, sinusitis or recurrent bronchitis. Pneunomococcal infections can affect all age groups; but the most sensitive populations are young children, the elderly, and individuals with chronic conditions and immune deficiencies. In developing countries, it is the most important pathogen of infants, aged <3 months. In Europe and the United States, it is the most common agent for community-acquired bacterial pneumonia. Even in economically-developed regions, the mortality rate from invasive pneumococcal disease is 10-20%; it may exceed 50% in the high-risk groups.

Penicillin-resistant Streptococcus pneumoniae: Pneumoccocal resistance to essential anti-microbials such as penicillins, cephalosporins and macrolides poses a serious problem for both the developed and the developing world; because respiratory system infections are the leading infectious cause of death worldwide. Before 1987, antibiotic resistant S.pneumoniae was uncommon. Between 1993 and 1997, the frequency of penicillin resistance increased in the United States from 14% to 25%[2]. In Europe, Spain is a focus of penicillin-non-sensitive strains with a prevalence of over 45%. A high incidence of resistance has been reported for Eastern European countries[15]. In Turkey, the results of different studies indicate an intermediate resistance of between 25.8%-29% of pneumococci to penicillin and a high resistance of 3%-3.9%[16,17]. Immunization as a preventive tool is suggested as the most rational approach to increasing antibiotic resistance. Two types of pneumococcus vaccine are currently licensed: One is a polyvalent polysaccharide and the other is a conjugate vaccine. The administration of inactivated whole bacteria intranasally is another approach. Immune response to the polysaccharide vaccine is poor in children < 2 years and in immunocompromised individuals; for this reason it is not recommended for routine use in childhood immunization programmes. In healthy adults a single dose can elicit relatively good responses. In some countries vaccination is recommended for healthy, elderly people over 65 years old, particularly for those living in institutions. The conjugate vaccines are more efficient in infants and in immunodeficient persons. Recent data from trials of pneumococcal conjugate vaccines are very promising, with high levels of protection against pneumococcal pneumonia and meningitis from early infancy[18]. They have been shown to suppress nasopharyngeal carriage of the pathogen; therefore conjugate vaccines could be used to reduce bacterial transmission in the community.

Viral respiratory infections: Viruses are common causes of acute lower respiratory infection (LRI) in children worldwide. The most common causative viral pathogens are **Respiratory syncytial virus** (**RSV**) and the **Parainfluenza viruses** (**PIV**)[14].

RSV is the single most important cause of severe lower respiratory tract infections in infants and young children, especially up to 2 years of age; clinical manifestations include rhinitis, otitis, pneumonia and bronchiolitis. The global annual infection and mortality numbers are estimated to be 64 million and 160,000 respectively. In developing countries RSV is responsible for a high proportion of LRI in children. RSV disease occurs as well-defined seasonal outbreaks during the winter and spring months. Two groups of RSV (A and B) strains have been described; all current vaccine efforts are directed towards these two groups.

PIV-3 infections are the second leading cause of serious ARI in children. Para-influenza viruses with

RSVs are also leading causes of hospitalization in adults with community-acquired respiratory disease. Outbreaks of PIV-3 infections occur yearly, mainly in spring and summer, and last longer than outbreaks of types 1 and 2. The trials for an effective vaccine are still continuing[14].

2- HIV/AIDS

The acquired immunodeficiency syndrome was recognized in 1981 with a sudden outbreak of opportunistic infections, pneumocystis carinii pneumonia and Kaposi's sarcoma. A new human retrovirus was determined to be the etiologic agent; the development of a diagnostic test enabled detailed understanding of the virus and new, therapeutic combinations resulted in improvement of the clinical course[19].

WHO and UNAIDS estimated that, during 2002, 5 million people (including 800, 000 children aged under 15 years) became infected and 3.1 million died of the disease (WHO, 2002) (AIDS Epidemic Update 2002). During 2002, highly active antiretroviral therapy has continued to reduce progression in AIDS deaths and mother-to-child transmission in the industrialized countries of North America, Western Europe and the Pacific. In industrialized countries an estimated 1.6 million people are now living with HIV but in both industrialized and developing countries, the number of HIV-positive people that can live longer and healthier is increasing, due to successful antiretroviral therapies. In some Asian countries large-scale prevention programmes have reversed epidemic trends. The estimated number of new infections in most Central/East/West African countries seems to be on the decline. Despite all these advances, during 2002 AIDS killed 2.4 million people in sub-Saharan Africa, and an estimated 3.5 million people have been newly infected with HIV, bringing the number of Africans living with HIV/AIDS to 29.4 million. In South Africa, 10% of the entire population and 20% of the adult population are infected with HIV. As the adult population is the economically active part of the entire population, the economical impact of the disease is enormous. The increasing number of orphans and children infected with HIV is a huge threat to the development of new generations and the socio cultural structure of these countries. India and other southern and southeastern Asian countries will be the next epicenters of the HIV/AIDS pandemic. It is estimated that in India 4 million people are infected with HIV 3,14. The prevalence of the disease is increasing in Eastern Europe and Central Asia. Most of the infections continue to occur among injecting drug users. In Turkey, according to Ministry of Health data, the total number of HIV/AIDS cases between 1985-2001 was 1,325,[20]. The development of resistance to anti-retrovirals is a major problem in the management of HIV-infected persons. The development of a safe and effective vaccine is hampered by the high genetic variability of HIV, lack of knowledge of the immune mechanisms of protection, and the complexity of the implementation of efficacy trials, especially in developing countries. Over 30 candidate vaccines have been tested in healthy human volunteers (adults and infants). The majority of these trials have been conducted in the US and Europe, and also in developing countries. Recently, following an initiative by WHO and UNAIDS, African AIDS Vaccine Programme (AAVP) has been established to strengthen the efforts of developing an effective, safe and affordable vaccine. This remains the scientific and public health challenge of this new century[21].

3- Diarrheal diseases

Infections of the gastrointestinal tract, especially infectious diarrhea, are among the most common debilitating infectious diseases, afflicting people of all ages around the world. In the last two decades, much has been learned about the bacterial and viral agents of disease, such as Escherichia coli that produce enterotoxins, rotaviruses, and Norwalk-like viruses[22]. In the developing world, the annual incidence of diarrhea among children under 5 years of age is estimated to be 1.5 billion cases, accounting for 3 million deaths[14]. Acute infectious diarrhea exacerbates nutritional deficiencies which are associated causes of death. There is also a complex interaction between poor nutritional status and persistent diarrheal illnesses lasting longer than 14 days. **Rotavirus** (**RV**) is the leading cause of severe diarrheal disease and dehydration of infants in both developed and developing countries, with seasonal peaks according to the latitude and climate (7,14). Symptomatic disease occurs between 3 months and 2 years of age with a peak incidence between 7 and 15 months (0.07 to 0.8 cases per child per year). Currently two RV vaccines are licensed. **Enterotoxi-**

genic Escherichia coli (**ETEC**) is the most frequently isolated enteropathogen in developing countries. In children, the tendency of ETEC to cause dehydrating diarrhea is less than that of rotavirus. Travellers from industrialized to developing countries constitute a target population for vaccination against ETEC, known as the most common causative agent of traveller's diarrhoea. **Shigellosis** is endemic throughout the world. Each year 1.1 million people are estimated to die from Shigella infection. More than two thirds of 164.7 million cases occur in developing countries. A total of 69% of all cases and 61% of all deaths involve children <5 years of age. The combination of Shigella infections and HIV epidemics has serious consequences; HIV speeds the spread of Shigella among immune-compromised HIV positive individuals. Shigella infection also occurs in industrialized countries. Poor hygiene, military service, and travel to the developing world are major risk factors. S. dysenteriae type 1 (Sd1) is the only cause of epidemic dysentery throughout the world. The resistance to many antimicrobial drugs is a major obstacle to the control of Sd1. The candidate shigellosis vaccines are currently in an advanced state of development; progress has been made with two candidate live oral vaccines in clinical trials[14].

4- Multidrug-resistant tuberculosis (MDR-TB)

Tuberculosis is an infection caused by Mycobacterium tuberculosis which can affect every organ, most importantly the lungs. Although it has been known since neolithic times, it became a major problem during the industrial revolution when crowded living conditions favored its spread. With the use of chemotherapeutics its incidence declined until the 1980s; since those years tuberculosis (TB) cases have increased because of drug resistance and co-infection from HIV. Tuberculosis continues to be a public health challenge: an estimated one third of the world (approximately 2 billion people) is infected with Mycobacterium tuberculosis; among those carrying the pathogen, about 1.64 million die[4]. Over 1.5 million TB cases per year occur in sub-Saharan Africa and nearly 3 million in Southeast Asia. In Eastern Europe deaths are now increasing after almost 40 years of steady decline. Current problems, each speeding the other's progress, are the rise of MDR strains and their fatal relationship with HIV, together with the failure to develop new antimycobacterial drugs, The global epidemic is growing and becoming ever more dangerous[5]. In the past decade, MDRTB has become a major public health problem. Multiple drug resistance means the rise of bacilli resistant to at least isoniazid and rifampicin, the two most powerful anti-TB drugs. This suggests that MDRTB has arisen as a result of inadequate therapy[1]. In 1993, WHO declared tuberculosis a global emergency. It is estimated that between 2000 and 2020, nearly one billion people will be newly infected, 200 million people will get sick, and 35 million will die from TB - if control outcomes are not achieved. In a study performed in two cities in Turkey, MDR-TB rates were found to be 6.6% between 1992-99; resistance rates for streptomycin and isoniazid were highest between 1972-1999[23]. In another study, resistance was present to at least one drug in 39.2% of the cases and MDR was found in 5.8% of the materials[24]. MDR-TB is rising at alarming rates in some countries, especially in the newly independent states of the former Soviet Union, and threatens global TB control efforts. Treatment of drug-resistant bacilli is more expensive and more toxic than the treatment of susceptible ones. The increase in global air-travel and an increasing number of refugees and displaced persons help the spread of the bacilli. The Directly Observed Treatment, Short-course (DOTS) programme and the BCG vaccine are not sufficiently effective to stop the spread of the bacteria. Against miliary TB and TB meningitis in children, BCG's efficacy ranges were reported to be from 46-100%. However, against pulmonary TB, efficacy ranges were from 0-80%. Therefore development of improved TB vaccines has become a necessity for the adequate control and elimination of tuberculosis[14].

5- Malaria

The world's most important tropical parasitic disease is caused by one or more of the four plasmodia that infect humans: P. falciparum, P. vivax, P. ovale, P. malariae, all transmitted by the Anopheles mosquito. P.falciparum is reponsible for the majority of infections and is the most lethal form. Malaria continues to be a public health problem today in more than 90 countries, inhabited by 40% of the world's population. Mortality due to malaria is estimated to be over 1.1 million deaths each year. The vast majority of deaths occur among young children in Africa, especially in rural areas with poor access to health

services. Malaria kills 3, 000 children under five years of age, per day. Pregnant women are another risk group, because malaria causes severe anemia during pregnancy and contributes to maternal deaths in endemic regions. Pregnant mothers who have malaria and are HIV-positive are more likely to transmit HIV to their newborn infants[14]. Malaria exercises its effects on the native population in the 101 countries or territories where it is endemic, and on non-immune travelers, refugees, displaced persons and laborers entering endemic areas. Transmission of malaria is affected by climate and geography, and often coincides with the rainy season. Malaria has been eradicated from industrialized countries due to extensive work on vector control, but its presence in developing countries has increased because of neglect or drug resistance[5]. Environmental changes, due to dam building and irrigation projects, have changed the ecology of the Anopheles mosquito thus causing large increases in the population of the vector, which, as a consequence, have given rise to increases in disease activity.

Turkey is situated in an area where malaria is a risk because of climatic conditions that encourage the vector to proliferate. An article that reviews the current malaria situation in Turkey estimates that malaria can be a potential danger in the future due to agricultural changes, irrigations projects, favorable environmental conditions and population migration, but that successful integration with the global Roll Back Malaria project could provide prevention and control of malaria in this country[25]. Important international efforts to combat malaria are: Global Malaria Control Strategy, Roll Back Malaria (RBM), and Multilateral Initiative on Malaria (MIM). Resistance to antimalarial agents is an increasing problem worldwide and, as a consequence, with the limited number of antimalarial drugs available, treatment of malaria is becoming increasingly difficult. Although some new drugs have appeared in the last 20 years, new inexpensive drugs and more practical formulae for existing drugs/compounds are urgently needed. Efforts to control malaria by vaccination continue but progress is hampered by the complex nature of the organism, limited knowledge about important immune mechanisms and targets for immunity, antigenic variation and diversity, and absence of good in-vitro correlates for immunity.

Discussion

Investigation of the five leading infectious diseases show that the most important problem seems to be antimicrobial resistance since this is especially true for lower respiratory tract infections (S. pneumoniae), and for HIV infections as well as for tuberculosis and malaria. Incomplete drug regimens, overprescription, self-medication, poor compliance and inadequate training of medical personnel are also contributing factors[26]. The important consequences of antimicrobial resistance are: increased health care costs, increased mortality and morbidity and the risk of global epidemics[2,14]. Besides the need for new and effective chemotherapeutic agents, one of the most important challenges of the 21st century is the development of safe and effective vaccines for the leading infectious causes of death, especially for the three greatest killers: HIV, TB and malaria[4]. Encouragement of research to deal with drug resistance, to develop new antimicrobials, and to find efficient and affordable vaccines is essential. Improvement of communication technology for rapid information exchange among countries is another important point that must be supported worldwide.

In the transmission of HIV/AIDS, risky behavior, such as unsafe sexual intercourse, drug abuse and intravenous drug use, plays an important role[2]. Effective strategies for HIV/AIDS control are grouped as follows: 1- Preventing the spread of the disease by promoting safe sex: the use of condoms, voluntary testing and counselling, harm- reduction approaches to injection drug-use, and the treatment of other sexually transmitted diseases; 2- Preventing mother-to-child transmission; 3-Providing care and support to those infected with HIV/AIDS[21].

Education is essential for teaching basic health concepts to prevent diarrheal diseases such as personal hygiene and breast-feeding. Governments must undertake additional efforts to use resources more effectively to help the most vulnerable groups, and to implement infrastructure for the improvement of health services by the provision of health centres with trained and well-motivated staff, laboratories with microscopes, and vehicles for visiting remote areas.

Deaths caused by diarrheal diseases are closely related to nutritional status; acute infectious diarrhea exacerbates nutritional deficiencies through high caloric demands, and increased breakdown of

structural proteins and undernutrition appears to reduce resistance to acute infectious diarrhea and to predispose a more prolonged diarrheal illness. Population density, living conditions, type of housing, sanitation facilities and water sources are major determinants of environmental exposure to enteric pathogens[22]. Food-borne diseases and their agents are among re-emerging infections. Causes of food-borne outbreaks are increased travel, changes in the susceptibility of populations to enteral infections, increase in the rate of individuals with immunodeficiencies, increase in the consumption of raw or lightly cooked food, increase in the use of restaurants, and changes in food production and distribution. Inadequate public health services cause infectious diseases to remain the leading cause of increased mortality and morbidity in developing countries[1,2,3,6]. In the developing countries, the nutritional status and living conditions of the population as well as food hygiene and water sanitation must all be improved. Travelers to these countries must be protected by being giving information, vaccination or chemoprophylaxis.

Conclusion

Infectious diseases have always been a global health problem and, with the impact of emerging and re-emerging infectious diseases on global health, this situation is likely to persist in the new millennium. Improvements in public health services, education and immunization facilitate the control of infectious diseases, but such a goal is complicated by politics and economical insufficiencies. Extraordinary global effort at the economical, political and institutional level, involving governments, nongovernmental organizations, international agencies, foundations and business leaders, is needed to solve the main health problems in this era of infectious diseases.

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Measles Elimination Programme: Vaccination of school-children in a district of Istanbul, Turkey

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In this article the vaccination of school-children carried out in Umraniye, a district of Istanbul, as a part of the measles elimination programme in Turkey is discussed briefly in order to provide guidance for future action. Umraniye is an administrative region of the health directorate of Istanbul. Health directorate of Istanbul's medical services in Umraniye are supported by Marmara University. It also serves as a training centre for medical students and residents.

Measles is a highly infectious disease which causes over one million deaths each year among children all over the world. Hence even one measles case can cause an epidemic in a non-immune community. Effective prevention can be achieved through vaccination by attenuated live virus vaccine. In Turkey, according to the national immunization programme, children are vaccinated against measles both at the age of nine months and in the first year of schooling. The prevention rate among vaccinated children is 80-85%, but, since at least 95% of the people should be immune or have developed the disease in order for the community to be immune to measles, as time passes the number of susceptible individuals rise which increases the risk of epidemics[1,2].

Measles has a high morbidity and causes epidemics every 3-4 years in Turkey. In order to eliminate measles by the year 2010, the Turkish Ministry of Health planned to vaccinate all children between 9 months and 14 years with one dose of measles vaccine without taking into consideration their previous vaccinations[2]. This is defined as the "catch-up" activity. In this programme, the first step was to vaccinate 2 million children in 1, 570 schools in Istanbul through a school vaccination programme on specified dates between 29th September and 17th October, 2003.

Vaccination in Umraniye

Target population and preliminary work

The goal was to vaccinate 112,000 students in 73 schools in the Umraniye research and training area which has a total population of 605,855[3]. Six teams, formed from 48 nurses, 8 doctors and 22 sixth grade medical students took part in the vaccination procedures. Each team was instructed on the objectives and activities of the programme. The school teachers were also instructed on the programme in order to increase their collaboration. Forms were sent to the parents via the teachers in order to find out whether the child had a contra-indication to the measles vaccine.

All students in grades 1 through 8 of primary schools were vaccinated if their parents indicated that they had no reaction to the measles vaccine.

Each team sent class lists to the school to be filled out by the teachers. On each list, the teacher noted down the name and birth date of each student. On the vaccination-day, the team collected the consent forms from the teachers and noted on the list whether the student had obtained the consent of his/her parents. The students having this consent were vaccinated and the date of vaccination was noted down. The names of the students who were absent on the day of vaccination were also noted down in order to vaccinate them on the next visit.

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Table 1. Vaccination rates of primary school students in Umraniye according to grade

	Target population	Number of children vaccinated	%
1st grade	14.944	14.237	95.2
2nd grade	14.417	13.691	94.9
3rd grade	14.496	13.771	94.9
4th grade	14.965	14.288	95.5
5th grade	13.827	13.220	95.6
6th grade	13.458	12.735	94.6
7th grade	13.264	12.668	95.5
8th grade	12.405	11.868	95.6
Total	111.776	106.478	95.3

Field activity

On going into a class, each team introduced itself and gave a brief explanation concerning the vaccine. This was followed by vaccination and registration. The students who were absent on the day of vaccination, or who did not have a consent form, or had a reaction to measles vaccination were noted on the school lists. Schools were visited a second time in order to vaccinate the students who had been absent during the first visit. Used syringes and vaccine flacons were disposed of in cardboard boxes manufactured for contaminated waste. Cold chain was maintained throughout the vaccination process.

Each team had a doctor and equipment for emergency intervention. Moreover, priority for ambulances was given to calls from the schools in the province.

Difficulties faced during the campaign

- A number of conditions diagnosed as syncope or panic attacks developed among the students within the first hour. This showed the importance of being able to deal with adverse effects during campaigns.
- In some schools, effective collaboration between the teams and the teachers was not achieved, thus causing the following problems: the class lists were not filled up appropriately; some of the parents did not have access to detailed information about the measles vaccination.
- Some classes were overcrowded which caused difficulties in the vaccination proceedings.
- Some of the consent forms sent to the parents were not returned to the teams.
- Transportation of the teams to the schools was difficult because of an insufficient number of vehicles.
- The training of the team members did not include improvement of the skills needed in emergency situations. Therefore the personnel were not calm enough to face serious side effects, especially in over-crowded conditions.
- The reason why some of the children were not vaccinated was not clearly noted by the team; this posed a problem in singling out these children on the team's next visit.
- When the vaccination percentages were calculated, it was observed that there were huge discrepancies between the public and private schools in terms of vaccination. In public schools the vaccination percentage-rate was generally over 95%, whereas this rate was only 70-75% in private schools. The main reason for this was that, in private schools, students went to private doctors who declared that the routine number of two measles vaccinations was sufficient. This caused the parents to reject the school vaccination.

Conclusion and recommendations

In Umraniye a total of 106,478 students from 73 schools, including 4 private ones, were vaccinated which yielded a rate of 95.3% (Table 1).

All the participants in the campaign (students, teachers, doctors, nurses, parents and managers) were aware of the objectives and approved them. This was one of the most important factors towards improving the success of the campaign.

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