

## Prevalence of Selected Chronic Diseases in Israel

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**Key words:** chronic diseases, diabetes, epidemiology, hypertension, ischemic heart disease, prevalence

### Abstract

**Background:** Knowledge of the prevalence of chronic disease in the population is essential for health planners and providers.

**Objectives:** To present the results of a concentrated effort by the largest health maintenance organization in Israel (Clalit Health Services) in order to develop a comprehensive register of chronic diseases.

**Methods:** In 1998, all 2,704 primary care physicians in Israel's largest health provider were requested to report on all patients with selected chronic diseases. In addition, all the filled prescriptions for medications relevant to the investigated diseases and all relevant hospitalization events were added to the database. Prevalence rates were calculated based on the reporting practices only (1,653 physicians responsible for a total of 1,409,725 adults).

**Results:** Hypertension (10.2/100), diabetes (6.1/100), hyperlipidemia (5.7/100), peptic ulcer (4.7/100) and ischemic heart disease (4.3/100) were the most prevalent. Females had significantly higher rates of hypothyroidism, psychoses, neuroses and malignancies, and lower rates of ischemic heart disease, chronic obstructive pulmonary disease, heart failure and asthma. Arabs had higher rates of diabetes mellitus and lower rates of ischemic heart disease, hypertension and hyperlipidemia than Jews. About 20% of the adult population had one or more of the selected chronic diseases.

**Conclusions:** Differences in rates noted between physicians, not explainable by population characteristics, may reflect differences in the quality and delivery of health services. Rate differences between demographic subgroups call for further studies on the etiology, susceptibility and natural history of these diseases.

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Chronic diseases are responsible for most human suffering, for a heavy burden at all levels of medical services, and for the majority of expenditures on health in the western world [1-4]. Efforts to correctly estimate the prevalence of chronic diseases in the population are therefore crucial for health planners and providers [5-8]. Such estimates can help achieve better resource allocation, assist in planning the size and location of medical services, and provide clues for etiological research [9,10].

Data on the prevalence of various chronic diseases are usually estimated from the results of sample-based studies and surveys, which often rely on self-reported health status. These smaller studies, due to their methodological qualities, may be biased and might therefore not reflect the real prevalence of one or more of the studied diseases [11-13]. While population-based rates derived from large or whole populations are expected to be more valid, they are harder to achieve with high quality.

This article presents the results of a concentrated effort by the largest health maintenance organization in Israel (Clalit Health Services) to develop a comprehensive register of chronic diseases.

### Materials and Methods

The Clalit Health Services Registry database includes information collected from a variety of sources: primary care physician reports, medication-use files, hospitalization records and out-patient clinic records.

#### Primary care physician reports

At the beginning of 1998 all 2,704 primary care physicians in the largest HMO-type health provider in Israel (Clalit Health Services, responsible for about 3.5 million clients) were requested to report to a central database on all patients under their medical care who were over the age of 20 and who had any of 16 diagnoses of chronic diseases. Diseases chosen for reporting were based on their prevalence, severity and economic burden [Table 1].

The physicians were provided with CHPPC codes (Classification of Health Problems in Primary Care) for these diseases. In addition, they were given a list of names and I.D. numbers of all their patients known to the system to be receiving prescriptions for chronic medical states, as well as names of all their insurees over the age of 65 (whether chronic patients or not). The lists also included all historical reporting of diseases for the insurees of the corresponding physician. These lists were provided in order to foster better reporting and reduce the probability of omitting chronic patients. New patients could be added freely at the end of the printed list. Medical definitions of the diseases to be recorded were not provided. Thus, for the

HMO = health maintenance organization

**Table 1.** Chronic diseases reported in the Clalit Health Services Register

Hypertension
Ischemic heart disease
Diabetes mellitus
Hyperlipidemia
Cancer
Peptic ulcer
Asthma
Chronic obstructive lung disease
Cerebrovascular event
Psychiatric disorder (psychoses and neuroses)
Congestive heart failure
Arrhythmia
Hypothyroidism
Epilepsy
Parkinson's disease

sake of this register, a patient was diagnosed as having a disease if so reported by the patient's primary care physician. This working definition was chosen because it is the physician's diagnosis, whether correct or erroneous, that defines the level of health services utilization by the patient.

All disease reports were mailed to the HMO headquarters where they were subjectively evaluated for the degree of effort invested

in completing them (for example: Were diseases coded for the majority of patients? Were all categories of diseases reported? Were new patients added to the report?). Reports judged to have been filled unreliably were excluded from the data analysis.

### Medication-use file

All community pharmacies in use by the HMO are computerized and report to a central repository. A list of relevant medications directly related to specific diseases was prepared. When run against this list, the database produced an additional file of patients with relevant chronic diseases. The medication file contributed to the registration of patients with hyperlipidemia, diabetes, malignant diseases, hypothyroidism, epilepsy, Parkinson's disease, psychiatric disorders, peptic disease and asthma, but not of those with hypertension or ischemic heart disease, for which the exact disease cannot be defined based solely upon the type of drug registered. The pharmacy file is estimated to cover more than 80% of the actual prescriptions filled by HMO members.

### Hospital records

All computerized hospitalization files of the target population were studied, and the ICD codes appearing on discharge letters or of procedures performed were linked with the relevant diseases in the chronic disease registry. This effort was carried out using data of about 30% of the general hospitalizations for which ICD codes were available, and the data of 100% of the patients undergoing certain procedures for which the Israeli medical system provides special compensation (mostly relating to ischemic heart conditions and malignant diseases).

Prevalence rates, both crude and age adjusted, were calculated for the total population and separately for the eight districts of the HMO. Age adjustment was carried out using the age structure of the total population of Clalit members as the reference for adjustment. Rates were further compared to those published by the Israel Central Bureau of Statistics, which

conducts periodic household surveys on the prevalence of chronic diseases based on self-reports by household members.

## Results

Reports were returned by 1,653 physicians, who are responsible for a total of 1,409,725 adult insurees of the HMO (62.2% of the insurees). All but 20 reports were graded as satisfactory, based on the evident effort invested in completing them. This effort was found to be unequal for all diagnoses, and was estimated to be highest for hypertension and diabetes. Arrhythmias and congestive heart failure were judged to be under-reported and were excluded from this analysis. The proportion of reporting physicians varied between the administrative districts, ranging from 30% in the lowest reporting district to 88% in the highest. The medication-use and hospitalization files were of the same high quality and coverage in all districts. Based on comparisons of these computerized files and the physician reports, the following estimates of accuracy were calculated for selected diseases [Table 2].

Prevalence rates were calculated based on the population of the reporting practices only. Table 3 presents prevalence rates

**Table 2.** Degree of accuracy in the Chronic Disease Register

Accuracy	Diseases
90-100%	Diabetes, hyperlipidemia, peptic disease, asthma, hypothyroidism, epilepsy, Parkinson's disease
85-89%	Hypertension, ischemic heart disease, malignancies, COPD, psychoses
Under 85%	Neuroses, arrhythmias, congestive heart failure, cerebrovascular event

COPD = chronic obstructive pulmonary disease

**Table 3.** 1998 prevalence rates (age adjusted and crude) of selected chronic diseases reported in the Clalit Health Services Register for members over the age of 20

Diagnosis	Age-adjusted prevalence rate/100	Variation between districts	Crude prevalence rate/100
Hypertension	10.2	8.8-11.2	11.2
Diabetes mellitus	6.1	5.4-6.6	6.6
Hyperlipidemia	5.7	3.8-6.6	6.1
Peptic ulcer	4.7	3.8-5.3	5.0
Ischemic heart disease	4.3	4.1-4.7	5.1
Psychiatric (neuroses)	3.3	2.6-4.0	3.6
Asthma	3.3	3.0-4.3	3.5
Malignancies	1.8	1.5-2.0	2.1
Hypothyroidism	1.4	0.7-2.2	1.4
Arrhythmia	1.3	0.9-1.8	1.7
Epilepsy	1.2	1.2-1.3	1.2
Psychoses	1.1	1.1-1.7	1.4
Parkinson's disease	0.9	0.6-1.1	0.9
COPD	0.8	0.4-1.2	1.1
Cerebrovascular event	0.7	0.7-0.8	1.0
Congestive heart failure	0.4	0.3-0.5	0.6

for the studied diseases. The age-specific prevalence rates of three of the most common diagnoses are presented in Table 4.

A comparison of the prevalence rates of hypertension [Figure 1] and diabetes mellitus [Figure 2] in Israel with those reported in U.S. surveys [14–17] reveals similar age-specific magnitudes of rates among those aged 65–74 years, but lower rates among those aged 45–64 in Israel and higher rates among those aged over 75 in Israel. The latter is probably due to differences in the methodology of the U.S. survey, which is household based and therefore might not have reached the elderly institutionalized population. The same phenomenon is seen when the Israeli HMO data are compared to the Israel Central Bureau of Statistics household survey data [18].

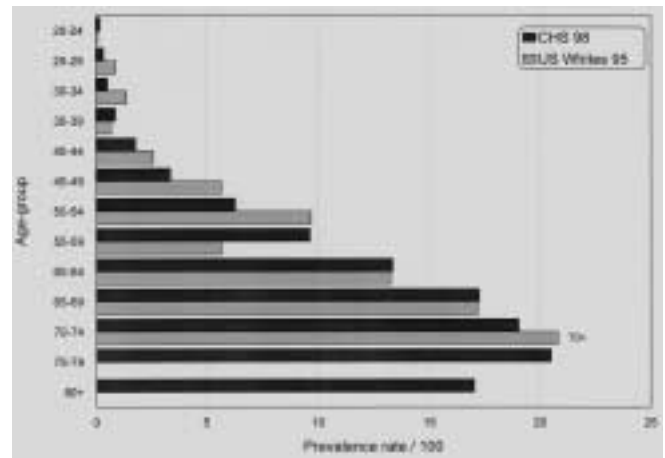
The Clalit register showed marked differences in disease prevalence between males and females [Figure 3]. The prevalence rates of hypothyroidism, psychoses, neuroses and malignancies were significantly higher in females than in males. Lower rates were noted for ischemic heart disease, chronic pulmonary obstructive disease, cerebrovascular event, Parkinson’s disease, heart failure, and asthma.

Arabs were found to have lower prevalence rates of ischemic heart disease, hypertension and hyperlipidemia than Jews, while diabetes mellitus was more prevalent among Arabs than Jews [Table 4].

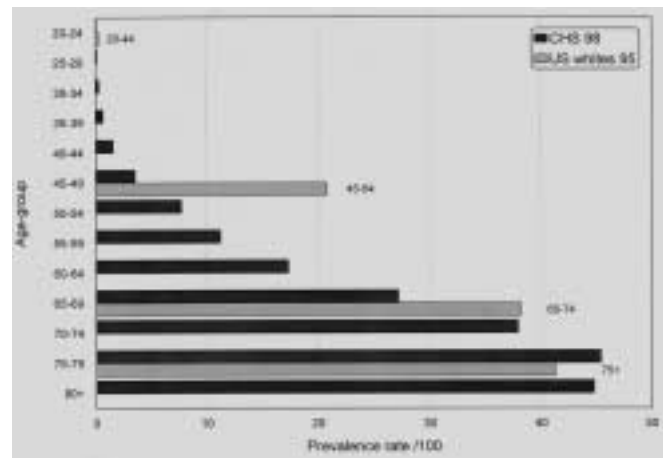
**Discussion**

This report summarizes a comprehensive effort to measure chronic disease prevalence in a population that constitutes more than 60% of the adult population in Israel. Issues of reliability and validity need to be addressed before these rates can be accepted as reference figures.

The current figures are based on data regarding just one (albeit the largest) health provider in Israel. There are differences among health providers with respect to the number, age distribution and socioeconomic status of insurees. The data in this analysis are reported as age-specific and age-adjusted rates, which take into account the variability between the health providers in both the number and age distribution of their insurees. Differences in social status cannot be weighed however, since lack of information precludes the calculation



**Figure 1.** Comparison of age-specific rates of hypertension. Clalit Health Services 1998 and U.S. whites 1995

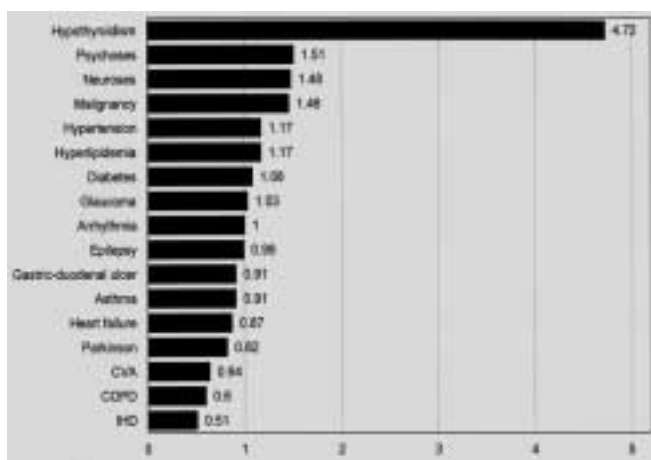


**Figure 2.** Comparison of age-specific rates of diabetes. Clalit Health Services 1998 and U.S. whites 1995

of class-specific rates. It is difficult to estimate the direction of this bias on the point estimate for the whole Israeli population. The population of the largest HMO is less affluent than the total Israeli population; this usually results in worse health status on the one hand, but might also carry lower prevalence of some of the diseases common to more affluent societies on the other [19,20]. Some bias could have been introduced by the different compliance rates of the physicians. However, physician reports were only one of the sources for this database, and rates were calculated only for insurees for whom a physician report was available.

**Table 4.** Selected chronic disease age-specific prevalence rates/100,000 in Jews and Arabs

Disease by origin	15–24 yr	25–34 yr	35–44 yr	45–54 yr	55–64 yr	65–74 yr	75+
<b>Hypertension</b>							
Jews	18.8	139.8	795.5	3,663.6	11,017.5	24,716.2	33,268.4
Arabs	13.6	79.2	551.7	2,946.7	7,643.9	14,878.2	18,946.1
<b>Diabetes</b>							
Jews	168.9	299.2	380.1	642.2	1,468.4	2,006.1	1,464.7
Arabs	74.0	117.5	354.4	767.2	1,688.5	2,096.4	1,086.4
<b>Ischemic heart disease</b>							
Jews	12.8	19.0	156.5	957.1	3,893.1	11,039.0	19,344.8
Arabs	10.4	28.1	189.8	955.4	3,154.7	6,436.1	8,092.2
<b>Hyperlipidemia</b>							
Jews	27.9	148.7	810.7	3,567.2	9,111.7	15,035.9	10,251.4
Arabs	13.0	47.7	383.3	1,757.7	3,204.8	3,610.8	1,807.3



**Figure 3.** Female to male proportion of age-adjusted rates of chronic diseases. CVA = cerebrovascular accident, IHD = ischemic heart disease

The between-districts variability in rates of the common diseases was small, thus supporting their reliability. The differences among rates in specific regions can be explained either by real differences that have an etiological or demographic explanation, or by differences in the comprehensiveness of reports or in the quality of the medical diagnosis.

The validity of diagnoses could not be addressed in this study due to its service-based nature. Nonetheless, since the treatment of a specific patient is based on diagnoses given by his or her physician, these diagnoses – whether right or wrong – determine much of the clinical behavior, prescription practice and other medical work-up and follow-up activities that create economic and administrative demands on the health system. Thus, it is essential that a health provider know the current health profile of its population as reflected by the definitions of the treating physicians even if the figures are different from those reported in more sterile studies. It is the role of the providers' professional leaders to identify the practices that are outliers to the commonly accepted rates in order to investigate whether such deviance is the result of medical under- or over-diagnosis.

In this report, as in others from the U.S. as well as China, hypertension emerges as the most common chronic disease – affecting more than 10% of the adult population [14,21,22]. Diabetes mellitus, hyperlipidemia and ischemic heart disease are the next most common diseases, prevalent at 5–6% each in the adult population in Israel as well as in most [14,15,23–25] but not all [26–28] western countries. For more than 20% of the adult population some type of chronic disease was reported with a strong correlation with age.

Unique disease prevalence patterns are noted for females compared to males, and Jews compared to Arabs. These differences may reflect either actual differences in incidence or a different natural history [24,25,28,29]. Both mechanisms play a major role in determining disease prevalence [30]. Differences in rates noted between physicians that cannot be explained by

population characteristics possibly reflect differences in the quality and delivery of health services. Disease registers can serve as a powerful tool for health providers, health services planners and clinical practice improvement teams.

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