Mortality from Ischemic Heart Disease and Cerebrovascular Disease in Israel 1969–1978

LEON EPSTEIN, M.B., CH.B., M.P.H., AND MENASHE ZAAROOR, M.D.

SUMMARY Age standardized mortality data from Ischemic heart disease (IHD) and Cerebrovascular disease (CVD) for the population of Israel were analyzed for the years 1969 to 1978. There has been a clear fall in mortality from both diseases over this period that has been more pronounced in relation to CVD.

The mortality from IHD is considerably higher in the total population and in each of the ethnic groups except for those born in North Africa, in whom the difference is small.

The mortality in males from IHD is higher than that for females but the reverse is the situation in relation to CVD.

CARDIOVASCULAR DISEASES are the major cause of death in the Western world. Ischemic heart disease (IHD) has been termed the epidemic of the 20th century, and is the most common cause of mortality in industrialised society, while cerebrovascular disease (CVD) is the third. In addition, the latter is the most frequent cause of neurological disability among adults and comprises 50% of all neurological hospital admissions.1

There is, therefore, little doubt of the importance of these diseases to the health of the population in those areas in which they are prevalent. The study of patterns of mortality in these countries (especially over time) can provide an understanding of their epidemiology and the possible factors that are determining it.

The past 15 years have seen a decline in the mortality from ischemic heart disease in the United States and the same is true in relation to cerebrovascular disease. This fall in IHD deaths followed almost two decades of a constant rise in the mortality rates. This finding has been reported from other countries as well.

In Israel, Peritz et al have reported on the mortality from IHD for the period 1950–1967. They indicated that there had been a continuous rise over this period in all the age, sex and ethnic groups.2 Epstein has recently reported the apparent fall in mortality between 1974–1977.3 This has been confirmed by Goldbouret al, who also commented on the trends in mortality from CVD over the same period.4

The present paper reports on a comparison of the mortality from the two conditions and the changes that have occurred over the ten year period 1969–1978. The multiethnic population of Israel (with its different cultural and health-experience backgrounds) provides the opportunity for studying the possible importance of these ethnic differences on a major disease entity.

Materials and Methods

The data on mortality from IHD (410–414, International Classification of Diseases, 8th revision) and CVD (430–438) in the Jewish population of Israel for the years 1969–1978 were obtained from the publications of the Israel Central Bureau of Statistics.5 It related to all Jewish persons age 25 and over. Since 1971 unclear causes of death are clarified as far as is possible (especially when they occur in hospital) and the necessary corrections are made. The major changes are in the determination of a cause of death in cases that had previously been reported as “symptoms and ill-defined causes.”

The denominator population used was that calculated by the Central Bureau of Statistics on the basis of the census and updated yearly by the use of birth and death notifications and information on migration. This is considered to be accurate in this population when considered annually. The data for each sex and continent of birth grouping were age standardized using the world population in 1970 as the standard population.6 It was chosen for use in this study as it is used in this connection in official publications of the Israel Bureau of Statistics and considered by them to be suitable.7 The countries of birth were grouped in four categories, reflecting an approximate ethnic division: persons born in Europe or America, persons born in North Africa, persons born in Asia (not including Israel), persons born in Israel.

Each of the above groups were analyzed separately in the two sexes. In each of these sex/ethnic groupings there were substantially more than 100,000 persons.

Results

In the total population of Israel aged 25 and over, the mortality in both sexes from IHD is considerably higher than that from CVD (fig. 1). The sex relationship in each disease is, however, different. Male mortality from IHD is markedly higher than that of the females, while in relation to CVD the females have a consistently higher rate except in 1976. Over the ten year period there has been a steady decline in mortality from CVD. In relation to IHD, this has occurred since 1974 in the females and over the total period in the males (but especially since 1974).

The relative fall in standardized mortality rates over the ten years from CVD is higher than that for IHD in both sexes (CVD — 33% in males and 36.3% in females; IHD — 19.9% in males and 12.4% in females).

These findings are duplicated among those people...
Mortality in Israel from IHD and CVD 1969-78, Standardised Rates in Total Population.

- IHD males
- IHD females
- CVD males
- CVD females

**Figure 1.** Mortality in Israel from IHD and CVD 1969-78, standardized rates in total population.

Mortality in Israel from IHD and CVD 1969-78, Standardised Rates in European/American Born population.

- IHD males
- IHD females
- CVD males
- CVD females

**Figure 2.** Mortality in Israel from IHD and CVD 1969-78, standardized rates in European/American born population.

Mortality in Israel from IHD and CVD 1969-78, Standardised Rates in Israel Born Population.

- IHD males
- IHD females
- CVD males
- CVD females

**Figure 3.** Mortality in Israel from IHD and CVD 1969-78, standardized rates in Israel born population.

For those born in Europe and America (fig. 2) and in Israel (fig. 3). For those born in Asia (fig. 4), the relationship between the sexes is similar for each disease but the difference between the rates for IHD and CVD is smaller. This is largely due to the fact that the mortality rates for IHD are lower among the Asian born population.

The data relating to those born in North Africa are different (fig. 5). The mortality from IHD in the males is high (approximating the levels of European/American and Israel born), while that of the females is the highest of any of the ethnic groups. In relation to the CVD the rates for both males and females are the highest of all the groups and are not markedly different from those for IHD. It should be noted that the female predominance in CVD is maintained.

The mortality from IHD is highest (in both sexes) amongst Israel born persons followed by Europe/America, African and Asian born persons. In relation to CVD, African born persons have the highest rates, followed by those of Asian, Israel and Europe/American origin.

The greatest relative fall in mortality rates is among the Israel born population in relation to both disease conditions (IHD — 37.3% in males and 33.8% in females; CVD — 47.4% in males and 43.8% in fe-
Mortality in Israel from IHD and CVD 1969-78, Standardised Rates in Asian Born Population.

- IHD males
- IHD females
- CVD males
- CVD females

except for the African females who were considerably higher and almost reached the level of the Israel born group (41.7%).

The possibility did arise that the differences found between the standardized rates were related to the process of the standardization itself. The age, sex and continent of birth specific mortality rates for both disease conditions were reviewed. The sex differences in the two conditions were the same as those found in the standardized data as were the major ethnic differences and time trends that have been described.

It should further be noted that the general trend in the mortality rates with time has been summarized. There were fluctuations in the different sex and ethnic groups for the two diseases but they did not occur in the same years and for the purposes of the present paper were not further considered.

Discussion

The data in this paper raise three major subjects for discussion: the fall in mortality from IHD and CVD in Israel over the ten year period under examination, the sex differences in mortality from the two conditions, and the differences in mortality rates in the ethnic groups as defined by country of birth. These conclusions were based on analysis of both specific and standardized mortality rates.

Mortality from CVD has been falling in the United States for almost 30 years, with an acceleration of this tendency in the last decade or two. The drop in mortality from IHD has been a much later phenomenon and became apparent only in the middle of the 1960's. In contrast the fall of the mortality in Israel occurred very much later (from about 1969 for CVD and 1974 for IHD. The possible causes for this change in the United States have been discussed extensively and it does seem likely that it is a real fall in morbidity as well, possibly in relation to a change in risk factor status as well as more efficient and effective treatment of the acute phase of the disease. The causes in Israel are more obscure. Planned programs of preventive action (including the stress on early diagnosis and treatment of high blood pressure) have become a feature of the health services only in the last five years. This cannot therefore explain the findings in this study.

The data presented here reveal a clear difference in the effect of sex on the mortality rates. In IHD there is a marked male predominance that is reversed in relation to CVD. The excess male mortality in IHD is well documented from many parts of the world and is possibly related to differences in the risk factors in the two sexes. The situation in relation to CVD is different. While there has usually been the report of higher male mortality, similar findings to these presented here were reported by Haberman et al in their study in England and Wales. They found a clear female predominance in the age-adjusted cerebrovascular disease mortality. Librach, studying an aged institutionalized population in Israel, found that there was no difference in the mortality between the two sexes.

In a recent paper that reviewed sex differences in
the incidence of CVD, Haberman et al found that in 15 of 16 studies there was a male excess in incidence (this included a study in Israel). The only exception reported was in a study of non-whites in Evans County, U.S.A.

A possible explanation for the sex difference in mortality in Israel is related to the fatal age of the disease. It could be hypothesized that while the incidence is lower in females, the case mortality is higher and therefore the overall mortality from the condition. There is no data in Israel in this connection. Haberman et al attempt to assess this point by using hospital fatality rates for cerebrovascular disease as an approximation of the case fatality rate. Over the age of 45 the rate was higher in females. It is in addition possible that those males that die from vascular disease do so from IHD, whereas the females suffered more extensively from CVD with consequent mortality. These subjects certainly require further investigation.

An interesting observation in this connection was made by Baker and Katsuki, following a study in an American and Japanese population. They found that in each of the groups the onset of atherosclerosis of the Circle of Willis was at an earlier age in men but that its progression was at a faster rate in women than for men. Over the age of 80 it was more pronounced in women.

The interethnic differences are probably the most interesting finding in this study. There is an apparent similarity in the mortality of those born in Israel or Europe/America. They have very high rates of IHD deaths in males, less in females and very much lower, in both sexes, for CVD.

In Asian born persons the difference between IHD and CVD is smaller because of the lower rates of IHD. In African born people these differences are almost obscured — the female rate for CVD being almost equal to that for IHD.

The high rates of IHD in European/American and Israel born males (and to a lesser extent females) mirror the findings in other Western countries. It also reflects the known risk status of these population groups.

The data relating to African born persons are more complicated. Dreyfuss et al reported some years ago on the high level of blood pressure among new immigrants to Israel from Morocco. Davies indicated that there was a lag period of almost a decade before the morbidity from IHD (as reflected in hospitalizations) began rising in the North African born population in this country. This increase later became very rapid. It is possible that this population group initially had high blood pressure levels with raised morbidity from CVD, and began to suffer from IHD some years after "meeting" the Western culture of Israel, especially in relation to diet and physical activity. This resulted in the high rates of IHD found in this study.

It is further of interest to note that the greatest absolute fall in CVD mortality is in this African group, while the largest relative reduction was in persons born in Israel. In IHD the greatest relative reduction was in Israel born persons. The Asian group, who have the lowest rate of IHD mortality, have the lowest fall in the rate. Similarly the European/American population have the lowest reduction in CVD mortality linked with the lowest death rates.

It therefore seems that the major fall in mortality has occurred in those who have the highest mortality rates and that this has been the major contribution to the overall fall in the mortality for both conditions.

References

Mortality from ischemic heart disease and cerebrovascular disease in Israel 1969-1978.
L Epstein and M Zaaroor

Stroke. 1982;13:570-573
doi: 10.1161/01.STR.13.5.570

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://stroke.ahajournals.org/content/13/5/570

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Stroke can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Stroke is online at:
http://stroke.ahajournals.org//subscriptions/