
Orna Baron–Epel1,2, Helen Andreev1,3, Micha Barhana3 & Manfred S. Green1,4
1Israel Center for Disease Control, Ministry of Health, Tel Hashomer; 2The Cheryl Spencer Department of Nursing, Faculty of Social Welfare and Health Studies, University of Haifa; 3Cancer Registry, Ministry of Health, Jerusalem; 4Department of Epidemiology and Preventative Medicine, Faculty of Medicine, Tel-Aviv University, Israel

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Abstract. Between 1981 and 1995 the national cancer register in Israel received reports on 13,600 new cases of lung cancer. We evaluated the trends in total lung cancer and the histologic subtypes, in Jewish and Arab Israelis. During this period, the age-adjusted incidence of lung cancer increased in the male Arab population, while for male Jews there was a non-significant decrease, for women in both population groups the rates were stable. When analyzed by age group, there was a significant decrease in incidence rates in Jewish males aged 75 years and older. An analysis by histologic subtypes showed two different trends. In the Jewish population, the age adjusted incidence rates of squamous cell carcinoma (SQCC) decreased and the incidence rates of adenocarcinoma (AC) increased, whereas in the Arab population the incidence rates of both subtypes increased, although statistically significantly only for SQCC. The changes found in the Jewish population are similar to those found in other western countries, where the rates of AC are increasing and the rates of SQCC are decreasing. The trends in the Arab population in Israel are different. This may be due to different trends in the prevalence of smoking in the two populations.

Key words: Arabs, Histologic-subtypes, Israel, Jews, Lung-cancer, Trends

Abbreviations: AC = adenocarcinoma; OR = odds ratio; RR = relative risk; SMCC = small cell carcinoma; SQCC = squamous cell carcinoma

Introduction

Lung cancer consists of different histologic subtypes, all associated with cigarette smoking. Squamous cell carcinoma (SQCC) and small cell carcinoma (SMCC) are believed to have a stronger association with smoking compared to adenocarcinoma (AC). In 1984, the relative risk (RR) [1] for men smoking 20–29 cigarettes per day was estimated at 17 for SQCC and only 3.5 for AC. In women the RR was lower (14.8 and 1.1 respectively) [1]. Recently, cigarette smoking was found to be more strongly associated with death from AC [2, 3]. Although SQCC has a higher association with smoking than AC, the difference may not be as large as in the past. The changes in the degree of risk could be associated with the changes made in the composition and design of the cigarettes. In one study, the odds ratio (OR) for SQCC in people who have smoked only filter cigarettes was reduced relative to lifetime non-filter cigarette smokers, no reduction in risk was observed for AC [4].

General changes in the lung cancer epidemic have been taking place over the last decade, but to different degrees around the world. In the past, the most frequent histological type in the United States and Europe was SQCC. However, during the mid-eighties, in the United States, the incidence rate of AC surpassed that of SQCC. In parts of Europe SQCC remains the most frequent subtype [5–7]. In Israel, in 1991 it was reported that SQCC was the most frequent subtype [8]. Consistent upward trends in the incidence of AC were reported in the United States about 20 years ago, making AC the most frequent subtype of lung cancer in North America [5]. The same trend was observed in The Netherlands, Switzerland [9] and in Asia, China [10] and Israel [11].

Differences in morbidity rates between countries can be attributed to many factors including lifestyle (mainly smoking), genetics, environment and others. Israel consists of two sub-populations, comprising about 80% Jews and 20% Arabs, who differ in aspects such as genetics, culture and lifestyle. In the past it was reported that the rates and trends of lung cancer and its subtypes differed in Arabs and Jews [12]. The aim of this study was to analyze the trends of the subtypes of lung cancer in Israel from the national cancer registry, in the different age groups, in Jews and Arabs during 1981–1995.
Methods

The current analysis is based on the data files of the Israeli national cancer register, which was established in 1960, and is located in the ministry of health. Information on diagnosed cancer cases in Israel is collected from all medical institutions in Israel: hospitals, laboratories, pathology and oncology departments, and death certificates submitted to the Central Bureau of Statistics. Since 1981 all new cases of cancer must be reported by law. The coverage of solid tumors in the register is above 90% nation-wide [13]. The register contains information on sex, age, place of birth, country of origin and other variables such as histologic type and the data are classified according to the International Classification of Diseases, 9th revision. The analysis of the histological types was performed for the period 1981–1995, during which time 13,600 cases of lung cancer were reported. Lung cancers are grouped into histologic types based on the morphologic characteristics of the tumor. The three major types are SQCC, AC and SMCC. In 20% of the cases reported to the register, the subtype of the lung cancer was not available, in about 30% of the cases the subtype was something other than the three subtypes mentioned, this includes about 8% of non-SMCC, 6% of alveolar carcinoma, 4% large cell carcinoma and less than 4% of each of the other types of lung cancer. This pattern was stable during the period 1981–1995.

Age-adjusted incidence rates using the European standard population, were calculated for total lung cancer, for SQCC and AC by population group. Age-specific rates for ages 45–64, 65–74 and 75+ were calculated for total lung cancer and the histologic subtypes SQCC and AC. The data for Arab women is not presented, as the number of cases was low.

The graphs presented are smoothed curves, using moving averages calculated by the mean of 3 years (one year before the specific year and the year after). Trends were estimated using linear regression and the significance of the trend determined by using the Student’s t-test to test if the regression coefficient differed significantly from zero.

Results

Trends in the incidence of total lung cancer

Since 1970, age-adjusted incidence rates of morbidity from all types of lung cancer in Israeli Jewish men have declined from 40.2 per 100,000 in 1970 to 33.9 in 1995 (not smoothed). The decline is apparent through 1986–1992 where during these 6 years the decline is statistically significant (Figure 1).

There has been a significant rise in morbidity among Israeli Arab men, from 30.6 per 100,000 in 1970 to 41.5 in 1995. Since 1986 the incidence rate of lung cancer in the male Arab population has been higher than in the male Jewish population.

Trends in age-specific rates differ by age (Figure 2). During 1981–1995 the incidence rate at age group 65–74, in Jewish men was constant, but above 75 years old there was a significant decline in the trend of incidence rates ($p < 0.05$). There was a decline of 49% in the incidence rate from 1981 to 1995 (non-smoothed). In the younger age group a small non-significant decline was observed in the last 5 years, but it is too early to indicate an obvious trend.

In the Arab male population a significant rise in the trend of age-specific incidence rates was observed only in the young age group 45–64 ($p < 0.05$) (Figure 2). The increase in age-specific incidence rates is observed

Figure 1. Morbidity from lung cancer by sex and population group, 1970–1995 (smooth age-adjusted rate per 100,000).