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Geriatric cancer trends in the Middle-East: Findings from Lebanese cancer projections until 2025

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ABSTRACT

Objective: By 2020, 70% of all cancers will occur in patients aged 65 years and older, causing an increase in related morbidity, mortality, and cost. This study projects cancer trends in the elderly population in Lebanon, a country experiencing accelerating aging trends. Findings will guide future policy decisions regarding geriatric oncology in Lebanon and the surrounding Arab world.

Materials and Methods: Cancer incidence rates were derived for men and women 65 years and above, divided into three age groups: 65–69 years, 70–74 years, and 75 years and above. Raw data were obtained from the National Cancer Registry reports 2003–2010. The eight consecutive year data were used to project the incidence until 2025 using a logarithmic model. The Average Annual Percent Change in incidence rates was calculated to determine whether it would significantly increase, decrease, or remain stable over time.

Results: Incidence rates are projected to increase significantly in all age groups of both genders until 2025. In men, the fastest rise is expected in prostate cancer, followed by bladder, lung, colorectal, and NHL. In women, the rise will be fastest in breast, followed by colorectal, lung, NHL, and ovary. Projected rates increase faster in the “younger” age group 65–69 compared to the “oldest” ≥ 75 , both in men and women. Only kidney and liver cancers continue to rise significantly after 75.

Conclusions: Cancer incidence is projected to increase in individuals between 65 and 74 years of age. Lebanese and Middle Eastern physicians must implement adapted therapeutic strategies in the management of the increasing caseload among frail, elderly patients.

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1. Introduction

Population aging is a recent and rapidly evolving phenomenon. Today, 12.3% of the world's population is aged 60 years and older, and this number is expected to rise to almost 22% in 2050. Life expectancy has increased during the last two decades by 5.2 years around the world, to reach 70 years. This development is due to better nutrition, improved healthcare and education, and economic well-being. However, age is a major non-preventable risk factor for cancer as a result of immune-senescence and enhanced cytokine production. Other important factors accountable for the age-related rise in cancer incidence are the duration of carcinogenesis, the increased susceptibility of older tissues to late-stage exposure, and unhealthy lifestyle during adolescence especially with regard to four major components: smoking, poor nutrition, inactivity, and alcohol abuse. Consequently, as the world population ages, the burden of cancer in the elderly population is likely to increase [1–4]. Worldwide, 70% of all cancers will occur in patients aged 65 years and older by 2020, causing an increase in cancer

related-morbidity, cost, and mortality in this population. Moreover, 70% of mortality in people older than 65 years will be attributed to cancer in the US within the next two decades [5,6].

In Lebanon, detailed population-based cancer-incidence data has been provided by the Lebanese National Cancer Registry (NCR) for eight consecutive years (2003–2010) [7]. Figures indicate a consistent year-to-year increase in incidence rates at the national level. Cancer incidence in Lebanon is currently at the highest level among Arab nations, but still short of reaching levels found in Western Europe or North America. The latest reported rate of incidence (2010) was 2273/100,000 men and 1396/100,000 women [7]. Projections to 2018 based on trends from 2003 to 2008 have been published, suggesting that overall incidence will increase by 50% over the 15-year interval [8]. There was no attempt to project trends specifically in the elderly population, despite accelerating trends towards aging in the Lebanese population.

Recently, health and social problems associated with aging have started to slowly attract the attention of public health experts in Lebanon. Among the 4.5 million Lebanese citizens, the proportion of those aged ≥ 65 was estimated at 7%, or about 450,000 persons, in 2005 [7]. The relative size of the elderly subgroup is increasing faster than that of the general population. By 2016, almost 10% of the

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population was already above the age of 65 years. By 2030, this number is expected to increase to 12% [9]. This fast increase is largely due to a continued drop in the fertility rate, coupled with a major wave of emigration that has affected mostly adults in active ages since the early 1990s, with a proportion of young adults leaving the country in the search for job opportunities abroad; thus creating a relative increase in the proportion of the elderly population. At the same time, life expectancy has been increasing steadily in Lebanon like in almost every other country in the world. Women's life expectancy was estimated in 2014 at about 81 years, and that of men 78 [10]. However, specialized care for the unique health needs of the elderly is almost non-existent, and geriatric services and geriatricians are rare as well. We believe that our study can be used to guide future policy decisions regarding geriatric care in general and geriatric oncology in particular in Lebanon and in the surrounding Arab world.

2. Methodology

2.1. Sources of Data

Cancer incidence rates for the major cancer types were derived for men and women 65 years and above, divided into three age groups: 65–69 years, 70–74 years, and 75 years and above. Raw data were obtained from the National Cancer Registry (NCR) reports 2003–2010. More recent data were not yet available at the time of writing.

2.2. Plan of Analysis

Data from the eight consecutive years were used to create projections onto 2025. Linear and logarithmic models were found equivalent in terms of projections estimation, and the logarithmic model was adopted to visually magnify small changes. The software used in generating the projections was SPSS Statistics version 20. To determine whether a specific incidence was significantly increasing, decreasing, or remaining stable over time, an Average Annual Percent Change (AAPC) in incidence rates was calculated for each cancer type in every age group in both male and female populations. The AAPC is a summary measure of the trend over a specific interval that describes the average of numerous annual percent changes over a period of multiple years in which cancer rates are assumed to change at a constant percentage of the rate of the previous year [11]. Characterizing the observed trends is based on the value of the AAPC and the corresponding 95% confidence interval (95% CI) as follows: if the AAPC is positive (>0) with a significant CI not containing the "0" value, then the trend was judged to be rising; if the AAPC is negative (<0) with a significant CI not containing the "0" value, then the trend was judged to be falling; and if the CI contained the "0" value, irrespective of the AAPC value, then the trend was judged to be non-significant and was therefore considered stable. AAPC values were calculated using the Joinpoint Regression Program.

3. Results

In the subgroup of men aged 65–69 years, cancer incidence increased from 647.2 per 100,000 in 2003 to 1315.1 in 2010, and is predicted to reach 2977.7 in 2025. This rise was statistically significant with an AAPC of 6.3 (95% CI; 5.3–7.3). Prostate cancer is the most frequently diagnosed cancer in Lebanese men, rising from 158.4 per 100,000 in 2003 to 284.4 in 2010, to 618.2 in 2025, according to the projections, with an AAPC of 4.9 (95% CI; 4.1–5.6). Bladder cancer comes in second place with an incidence of 116.3 and 194.6 in 2003 and 2010, respectively, and is estimated to reach 440 per 100,000 in 2025, a significant increase with an AAPC of 5.1 (95% CI; 4.5–5.6). The third most diagnosed cancer is lung cancer, with an increasing incidence from 105.4 in 2003 to 220.3 in 2010, and an estimated rate of 467.4 in 2025, with an AAPC of 6.2 (95% CI; 5.2–7.2). Colorectal cancer and

non-Hodgkin lymphoma (NHL), the fourth and fifth diagnosed cancers in men, respectively, are also expected to rise in this age group (Fig. 1).

In elderly men aged between 70 and 74 years, cancer incidence is estimated to increase from 431.5 per 100,000 in 2003 to 4813.5 in 2025, with a significant AAPC value of 12.6 (95% CI; 8–17.4). Prostate cancer ranks first, with an incidence of 105.6 per 100,000 in 2003, 385.4 in 2010 and a projected incidence of 1079.5 in 2025, with an AAPC of 12.1 (95% CI; 5.6–19). Following in the ranking is bladder cancer, with a rising incidence from 77.5 in 2003 to 272.5 in 2010 and an estimated incidence of 807.9 in 2025 associated with an AAPC value of 8.4 (95% CI; 7–9.8). Lung cancer is the third most diagnosed cancer in this age group, with an incidence that increased from 70.3 to 282.3 per 100,000 between 2003 and 2010, and is expected to rise to 703.9 per 100,000 according to 2025 projections, with an AAPC of 11.3 (95% CI; 8.5–14.2). Colorectal cancer and NHL are also expected to rise in this age group (Fig. 2).

In the age group 75 years and above, cancer incidence in men varied from 1682.6 per 100,000 in 2003 to 2273 in 2010, with projections showing a rise to 3305.2 in 2025, and a significant AAPC value of 3.2 (95% CI; 2.8–3.7). Prostate cancer incidence increased from 424.9 in 2003 to 547.6 in 2010, and is estimated to increase to 799.1 in 2025, with an AAPC of 3 (95% CI; 2.4–3.6). Similarly, the incidence of bladder cancer rose from 311.6 to 351.7 per 100,000 between 2003 and 2010, and expected to reach 448.3 in 2025, and is associated with a significant AAPC of 1.9 (95% CI; 1.5–2.4). However, for lung cancer, incidence rates are expected to decrease over time, going from 280.4 per 100,000 in 2003 to 234.4 in 2010, and 139.5 in 2025, with a significant AAPC of -2.4 (95% CI; -3.2 to -1.6). In this most elderly age group, colorectal cancer and NHL are also rising (Fig. 3).

Cancer incidence is expected to also increase in women. Overall cancer incidence in women aged 65–69 years rose from 434.3 and 951.8 per 100,000 in 2003 and 2010, respectively, to 2278 per 100,000 in 2025 with an AAPC of 7.1 (95% CI; 6.2–8.1). Breast cancer is the most frequently diagnosed cancer, with incidence rising from 157.2 per 100,000 to 324.4 between 2003 and 2010, and growing to 695 in 2025, with a corresponding AAPC of 6.9 (95% CI; 6–7.8). Colorectal cancer ranks second, with an estimated increase in incidence from 48.9 to 102.2 per 100,000 between 2003 and 2025 with an AAPC of 6.7 (95% CI = 5.6–7.8). Following in the ranking is lung cancer, whose incidence was estimated to increase from 72.8 to 115.4 per 100,000 from 2003 to 2025, with an AAPC equal to 3 (95% CI; 2.2–3.8). NHL and ovarian cancer, the fourth and fifth diagnosed cancers in women, respectively, are expected to rise in this age group (Fig. 4).

Among those aged 70–74 years, cancer incidence is estimated to grow from 289.5 and 879.7 per 100,000 in 2003 and 2010 respectively, to 3141.3 in 2025, with a significant AAPC of 12.4 (95% CI; 8.1–17). The incidence of breast cancer rose from 104.8 per 100,000 to 223.6 between 2003 and 2010, and is estimated to reach 773.8 in 2025. This rise is significant as shown by the AAPC value of 10 (95% CI; 5.7–14.4).

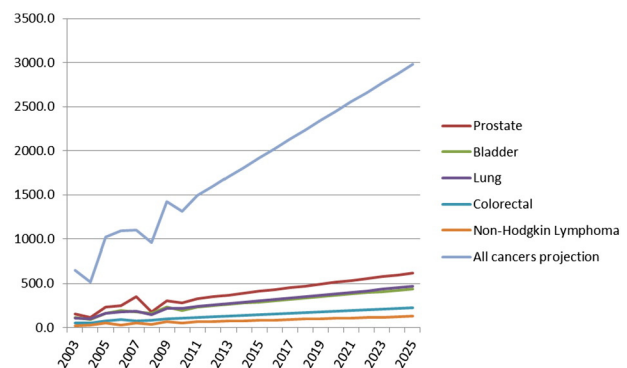


Fig. 1. Trend variation in incidence rates of the five most common cancers and "all cancers" in Lebanese men aged 65–69 (2003–2025).

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