Incidence of Cancer in Adolescent and Young Adults in Puerto Rico: A Descriptive and Comparative Study with the United States Population

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Background

• In Puerto Rico (PR), as in other parts of the world, cancer research focus mainly on children and adults but not on adolescents and young adults (AYAs:15-39 years). Despite cancer is uncommon in AYAs, an increase in incidence has been reported in Europe and United States.1
• The rise in incidence rates have been observed in men and women of all race/ethnicities.2
AYAs are four times more at risk to develop cancer when compared to children, and present different biological behavior than adults.3
• AYA face disparities based on age that can lead to a delay in diagnosis, an advanced stages of disease at presentation, suboptimal treatment location, lack of clinical trial availability, and an increased burden of quality survivorship through the loss of fertility or disruption in social, personal, or financial growth and stability.4
• A comparison of PR cancer incidence with those of racial/ethnic groups in USA is important to understand differences and similarities in AYAs and to understand different factors on disease occurrence in this population.

Aims

1. Describe the incidence of cancer in AYAs in Puerto Rico (PR).
2. Compare cancer incidence rates in AYAs in PR with United States Hispanics (USH), non-Hispanic Whites (NHW), and Non-Hispanic Blacks (NHB) groups in United States of America (USA) during the period 2011-2015.

Methods

Data sources and study population

• Data from cancer patients diagnosed from January 2000 to December 2015 was obtained from cancer data source based on the Puerto Rico Central Cancer Registry. AYA’s cancer incidence cases for each racial/ethnic group (USH, NHW and NHB) in the USA were obtained using SEER*Stat version 8.3.5. Cancer sites were analyzed using the adapted classification scheme for AYAs used by the SEER program.

Analysis

• Age-adjusted incidence rates (AAIR) were calculated by gender, age groups, racial/ethnic groups and cancer sites for the period 2011-2015.
• Racial/ethnic differences by sex were assessed using Standardized Rate Ratio (SRR) and its 95% confidence interval (CI).
• Average annual percent changes (AAPC) by cancer site and gender were estimated using the Joinpoint Regression Program, v.4.6.0.0 to determine incidence trends from 2000 to 2015 in PR and the USA.

Results

1. Proportion of cancer among AYAs and non-AYAs by gender in Puerto Rico, 2011-2015


3. Age-adjusted incidence rates and Average Annual Percent Change for cancer among AYAs by cancer site and gender in Puerto Rico and United States, 2000-2015

4. Average Annual Percent Change for all invasive cancers among AYAs by racial/ethnic groups and gender, 2000-2015

Table 1. Age-adjusted incidence rates and Average Annual Percent Change for cancer among AYAs by cancer site and gender in Puerto Rico and United States, 2000-2015

Table 2. Average Annual Percent Change for all invasive cancers among AYAs by racial/ethnic groups and gender, 2000-2015

Discussion and Conclusions

• The results of this study indicate that the incidence of all invasive cancers among AYAs in PR differ from those in other racial/ethnic groups in the USA.
• The incidence of cancer among AYAs is higher in PR and NHW than NHB and USH.
• Cancer incidence among children (<15 years) and adults (>40 years) is higher among males, but this study showed that among AYAs, females had the highest incidence. These differences could be explained by the high incidence rates in thyroid and cervical cancer among females.
• Young cancer survivors face numerous physical, social, and financial issues throughout their diagnosis and treatment.
• Observed differences between PR and other racial/ethnic groups in the USA may suggest the importance of genetic, environmental and social differences.
• Future studies should focus all identity causes of those disparities.

References


Acknowledgement

This work was supported by a federal grant from the National Program of Cancer Control Registries (NPCR Award Number NU58DP006318-01-02) to the Puerto Rico Central Cancer Registry at the UPR Comprehensive Cancer Center.

Epidemiological Characteristics

During 2011-2015, in PR, a total of 4,327 cancer cases (5.5% of all cancer patients) were newly diagnosed in AYAs. 1,401 (32.4%) were males and 2,926 (67.6%) were females.
• In PR, the most frequent type of cancers in AYAs were: testis (20.6%), thyroid (12.9%), and Non-Hodgkin lymphoma (10.7%) for males; and thyroid (33.2%), cervix and uterus (17.6%) and breast (16.7%) for females.
• The proportion of new cancer cases in AYAs by gender is higher for females (67.6%) than for males (32.4%) (Fig. 1).
• AYAs in PR had the second highest AAIR for cancer (Fig. 2). Females in PR and all racial/ethnic groups had higher AAIR than males.
• When AYAs are compared, it is observed that PRs females 25 years and older had highest AAIR than NHW, NHB and USH (Fig 3).

Standardized Rates Ratios

AYAs females in PR had higher incidence of cancer than USSH (SSR NHW=1.43, 95% CI = 1.37-1.49) (Table 4). For both sexes, AYAs in PR had higher incidences of cancer than USBSR (SSR NHW=1.36, 95% CI = 1.30-1.41, and SSR USH=1.18, 95% CI = 1.11-1.26).
• On the contrary, for AYAs males in PR had lower incidences of cancer than NHM (SSR NHW=0.79, 95% CI = 0.75-0.83). No differences on incidence were observed between AYAs women in PR and NHW (SSR USH=1.00, 95% CI = 0.96-1.03).

Joinpoint Regression Analysis

• A significant incidence increase for PR AYAs was observed from 2000-2015 (AAPC= 4.0%, p<0.05) (Fig. 5), specially among females (AAPC=4.9%, p<0.05).
• In PR, thyroid, kidney, cervical and testicular cancer showed the higher significant incidence increase over the period of 2000-2015; AAPC=13.8%, 9.9%, 5.4%, and 5.2%, respectively.

*Acknowledgments**

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