

Trends in pediatric central nervous system cancers in Turkey

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Abstract

Aim: Paediatric central nervous system (CNS) cancers have a high incidence and mortality relative to other paediatric malignancies. The objective was to provide a brief, nonspecialist review of the incidence and outlook of paediatric CNS cancers in Turkey.

Materials and Methods: It is based on Turkish National Cancer Statistics and data from the International Incidence of Childhood Cancer (IICC) collaborative project. The pediatric CNS cancers data of Turkish children were analyzed and compared with the World statistics data.

Results: CNS cancers are the second most prevalent cancers in boys and girls in Turkey. About 21.7% of the cancers in boys and 25.5% in girls in Turkey from 2010 to 2015 were CNS tumours, which is consistent with the rates in other world regions. The Turkish National Cancer Centre reported that the ASRs/100 000 person years of pediatric CNS cancers were varying from 5 to 8.5 in boys and from 4.4 to 7.9 in girls between the years of 2010 and 2015. The group with the highest incidence of CNS cancers in childhood is observed as 0-4 years.

Conclusion: Cancer registries in Turkey and international agencies such as the IICC provide reliable incidence data, but surveillance data specific to paediatric CNS tumours may not always be easy to obtain. Dedicated paediatric cancer registries worldwide and broad surveillance worldwide will increase our understanding of epidemiology these tumours.

Keywords: Central nervous system; childhood; haematologic malignancies; paediatric cancers

INTRODUCTION

Cancer occurs less frequently in children than in adults, but when it does, it is very concerning. Pediatric cancers most often occur from birth to 14 years of age. Central nervous system (CNS) cancers are the second most frequent pediatric cancer after hematologic malignancies, the most common pediatric solid organ tumor and the leading cause of cancer death in children (1,2). Estimates of the worldwide incidence of pediatric CNS cancers were last collected by the International Incidence of Childhood Cancer (IICC-3) and published by the International Agency for Research on Cancer (IARC) (3). Cancer statistics are provided in Turkey by the National Cancer Statistics Unit of the Turkish Ministry of Health. The objective of this study was to summarize and evaluate the available data on CNS cancer incidence in childhood in Turkey and to share our findings.

MATERIALS and METHODS

Cancer incidence data were obtained from the National Cancer Statistics Report of the Cancer Control Department

of Turkish Ministry of Health (4). Population-based cancer incidence data has been collected and collated by investigators in the Ministry of Health since 1992 (5). Cancer registry centers have conducted active regional surveillance of the Turkish population beginning with nine regional centers in 2010 and expanding to 13 in 2012. Coverage has expanded from 23.4% in 2010 of the population in 2010 to 47.9% in 2015(4).

The World Health Organization (WHO) is active in cancer research and data collection. The IARC is the leading cancer research establishment operated by the WHO. IARC in cooperation with the International Association of Cancer Registries publishes the available data on the worldwide incidence of pediatric cancers as the International Incidence of Childhood Cancer (IICC). IICC-3, the latest volume, was published in 2017 and includes data on the incidence and age-standardized rates (ASR) of pediatric cancers collected from 153 high-quality cancer registry centers worldwide—including Turkey (3).

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(ICD-10) system codes include CNS cancers as C70 for meningeal malignant tumors, C71 for brain malignant tumors and C72 for spinal cord malignant tumours (6). The incidence and ASR of the pediatric CNS cancers represented by the C70, C71 and C72 codes in ICD-10 system were included in this analysis because those cancers are grouped together, not in both the Turkish National Cancer Data and the IICC-3.

Because of our study's not including data collection from the participants using questionnaire, interview, focus group study, observation, experiment, interview techniques, the use of humans and animals for experimental or other scientific purposes and personal data, it does not require any ethics committee approval; we acknowledge and declare that no breach of ethical rules has been made during the preparation and publication of the study.

RESULTS

Both the Turkish National Cancer Data and IICC-3 confirmed that the worldwide incidence of pediatric CNS tumors was second to that of pediatric hematologic malignancies (3,4). The IICC-3 recorded 284,649 new cases of cancer in children 0–14 years of age between 2001 and 2010; 57,955 were CNS cancers (ICD-10 codes C70, C71 and 72). The ASR for all cancers was 140.6/1,000,000 person years. Hematologic malignancies were the most frequent at 61.6 per 1,000,000 person years and CNS cancers were second in both sexes at 28.2 per 1,000,000 person years. The numbers and percentages of new CNS cases in each age group were 21 804/127 096 (17.2%) in children 0–4 years of age, 19 471/74 175 (26.3%) in those 5–9 years of age and 16 680/83 378 (20.0%) of those 10–14 years of age (3).

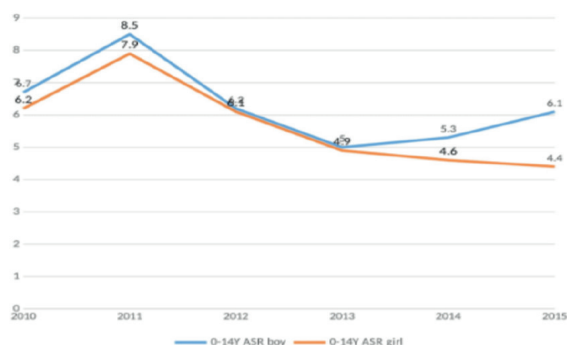


Figure 1. Age standardized incidence rates (0–14 years) per 100,000 person years (boys vs girls)

The Turkish National Cancer Centre reported that the ASRs/100 000 person years of CNS cancers were 6.1 in 2010, 5.3 in 2011, 5, in 2012, 6.2 in 2013, 8.5 in 2014 and 6.7 2015 in boys and 4.4, 4.6, 4.9, 6.1, 7.9, 6.2 in girls (Figure 1). The ASRs of CNS cancers were 2.4 at 0–4 years of age, 1.8 at 5–9 years of age, 1.9 at 10–14 years of age and 1.7 at 15–19 years of age in boys in 2015. The corresponding ASRs in girls were 1.6 at 0–4 years of age, 1.4 at 5–9 years of age, 1.4 at 10–14 years of age and 1.1 at 15–19 years of age (4,5). The Turkish trends in the incidence of pediatric CNS cancers between 2010 and 2015 are summarized in

Figure 2A, B. The incidence of CNS cancer in both boys and girls from 0 to 14 years of age in Turkey is shown in Figure 3.

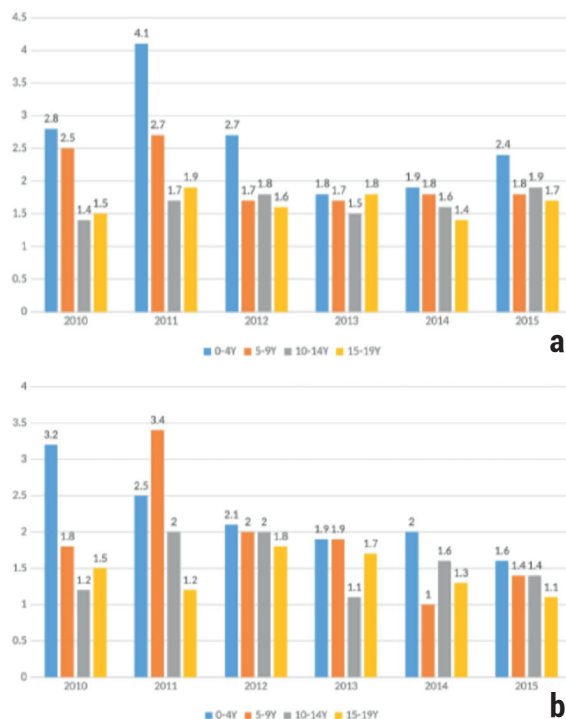


Figure 2. A: Distribution of incidence according to years and age groups in boys (2010–2015). B: Distribution of incidence according to years and age groups in girls (2010–2015)

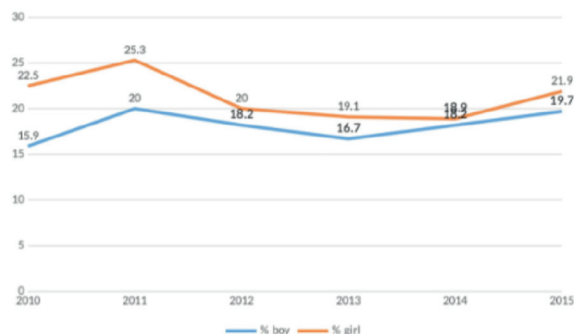


Figure 3. Central nervous system cancer incidence rates between 2010 and 2015 (0–14 years)

DISCUSSION

We believe that this is the first summary report of recent pediatric CNS cancer trends in Turkey between 2010 and 2015. The incidence data were extracted from the IICC-3 and Turkish National Cancer Statistics Report. Pediatric Hematologic cancers are prominent worldwide and are the most frequently diagnosed of all childhood cancers. CNS cancers are the second most diagnosed pediatric cancers and the most prevalent pediatric solid tumor. Turkish National Cancer Statistics Reports are being published annually, and also they are consistent with other reports of the incidence of childhood cancers (3,4). IARC's last trial and publication is about international incidence of childhood cancers. IICC-3 reported that CNS cancers accounted for 17.2% of all pediatric cancers at 0–4 years of age, 26.3% at 5–9 years of age and 20% at 10–14 years of

age worldwide. Differences in the reported incidence and frequency rankings of pediatric CNS cancer in IICC-3 and IICC-2, which was published in 1998, are not significant (3,7). The incidences of pediatric CNS and hematologic cancers reported in children in some national studies from USA and in Japan are similar to those included in the IICC-3, but the study from the USA did not find any difference in the incidences of CNS tumors in boys and girls (8,9).

IICC-3, reported that CNS cancers are most frequent throughout Europe in children between 0 and 14 years of age. Europe is followed by the USA and Canada. The lowest incidence was seen in Sub-Saharan Africa. The pattern is similar at 15–19 years of age (3). The IICC-3 reports that the incidence of pediatric CNS tumors in Turkey was 13.7/million person years in 2009–2011. The reported ASR of CNS cancers in boys was 14.2/million person years and 13.1/million person years in girls. The incidence in Turkey is similar to that reported for Asia and lower than that for Europe.

In the Turkish National Cancer Report, the ASR's per 100.000 of pediatric CNS cancers were higher at 0–14 years of age than at 15–19 years of age, but that except for a small increase in children 0–14 years of age in 2011, the incidence within each age group changed little between 2010 and 2015. The ASRs/100 000 person years were 10.5 at 0–14 and 2.8 at 15–19 years of age in 2015, 9.9 at 0–14 and 2.7 at 15–19 years of age in 2014, 9.9 at 0–14 and 3.5 at 15–19 years of age in 2013, 12.3 at 0–14 and 3.4 at 15–19 years of age in 2012, 16.4 at 0–14 and 3.1 at 15–19 years of age in 2011 and 12.9 at 0–14 and 3 at 15–19 years of age in 2010. Differences in the ASRs in boys and girls were not significant (4).

CONCLUSION

This study is the first report of childhood CNS cancer trends in Turkey. Pediatric CNS cancers are important because of their relatively high incidence and high mortality. Cancer registries, and studies investigating the incidence of disease, the most affected age groups and mortality help to determine optimal treatment periods and follow-up plans. In Turkey, cancer registry centers provide reliable and continuing incidence data, Turkish and international registries may not always give information specific to pediatric cancers and the childhood-specific approach of the IICC is very helpful. Additional pediatric-specific worldwide surveillance and incidence studies will provide even more data on pediatric cancers.

Competing Interests: The authors declare that they have no competing interest.

Financial Disclosure: There are no financial supports.

Ethical Approval: No ethics committee application was made due to the type of the study.

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