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Original Research

Central nervous system tumours among adolescents and young adults (15–39 years) in Southern and Eastern Europe: Registration improvements reveal higher incidence rates compared to the US

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KEYWORDS
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Abstract ***Aim:*** To present incidence of central nervous system (CNS) tumours among adolescents and young adults (AYAs; 15–39 years) derived from registries of Southern and Eastern Europe (SEE) in comparison to the Surveillance, Epidemiology and End Results (SEER), US and explore changes due to etiological parameters or registration improvement via evaluating time trends.
Methods: Diagnoses of 11,438 incident malignant CNS tumours in AYAs (1990–2014) were retrieved from 14 collaborating SEE cancer registries and 13,573 from the publicly available SEER database (1990–2012). Age-adjusted incidence rates (AIRs) were calculated; Poisson and joinpoint regression analyses were performed for temporal trends.
Results: The overall AIR of malignant CNS tumours among AYAs was higher in SEE (28.1/million) compared to SEER (24.7/million). Astrocytomas comprised almost half of the cases in both regions, albeit the higher proportion of unspecified cases in SEE registries (30% versus 2.5% in SEER). Similar were the age and gender distributions across SEE and SEER with a male-to-female ratio of 1.3 and an overall increase of incidence by age. Increasing temporal trends in incidence were documented in four SEE registries (Greater Poland, Portugal North, Turkey-Izmir and Ukraine) versus an annual decrease in Croatia (−2.5%) and a rather stable rate in SEER (−0.3%).
Conclusion: This first report on descriptive epidemiology of AYAs malignant CNS tumours in the SEE area shows higher incidence rates as compared to the United States of America and variable temporal trends that may be linked to registration improvements. Hence, it emphasises the need for optimisation of cancer registration processes, as to enable the in-depth evaluation of the observed patterns by disease subtype.

1. Introduction

Central nervous system (CNS) tumours comprise a heterogeneous group of malignancies of variable behaviour and histology arising from the cerebral parenchyma or the surrounding structures. Across the whole age spectrum, the global annual incidence rate of brain tumours (malignant and non-malignant) is 10.8 cases per 100,000 individuals, according to a recent meta-analysis [1], whereas the GLOBOCAN project using nationwide data from 184 countries estimated the annual incidence of malignant-only CNS tumours to be 3.4 per 100,000 individuals [2]. Increasing temporal trends have been reported especially in the previous decades, which have been explained by the diagnostic advances in neuroimaging technology and improvements in disease classification [3]. Although CNS tumours are traditionally considered a fatal malignancy and are included among the top 10 causes of death due to cancer worldwide, their prognosis has considerably improved over the last decades possibly because of the prompt detection, the optimisation of treatment protocols including the introduction of temozolomide and the advances in neurosurgical procedures [4–6].

CNS tumours are more common among males [1,2] and their age distribution markedly increases with age reaching its peak incidence in individuals >65 years [2], although variations are noted dependent on the histological subtype under study [7]. CNS tumours constitute the second most common cancer in childhood (0–14 years) and the third most common malignancy in the special age group of adolescents and young adults (AYAs; 15–39