

Hospital oncology costs in an aging South-Eastern European nation

Mihajlo Jakovljevic¹, Marko Folic^{2,3}, Aleksandar Dagovic⁴

¹ Department of Pharmacology and Toxicology, The Faculty of Medical Sciences University of Kragujevac, Serbia

² Department of Pharmacy, The Faculty of Medical Sciences University of Kragujevac, Serbia

³ Clinical Pharmacology Service, Clinical Center Kragujevac Serbia

⁴ Oncology and Radiotherapy Centre, Clinical Center Kragujevac, Serbia

Population aging will likely remain one of the key public health challenges in broader European region for many upcoming decades [1]. Its growing economic burden remains closely related to the blossoming of prosperity diseases such as cancer [2]. Oncology related medical care bears particular weight for the emerging Central & Eastern European markets (CEE). Financial sustainability of massive hospital leaning, national health systems across CEE region has been particularly heavily affected by the accelerated population aging [3]. Regional diversity in pace of transitional healthcare reforms, equity of access, quality and affordability of health services is particularly obvious in the case of Balkan economies [4]. Therefore we decided to observe dynamics of cancer attributed expenditure in the largest Western Balkan market of Serbia during key years of world economic crisis.

Serbia could be regarded as an example of rapidly aging CEE nation [5]. Its long term demographic trends provide evidence of decreasing female fertility rates almost for decades [6]. Official release of annual national public health reports shows plateau incidences of major non-communicable diseases to be reached only by some cardiovascular disorders. Unfortunately malignant tumours still contribute to the all-cause mortality by 21.2% (21 725 deceased in 2012). Few core malignant disorders such as thyroid, lung cancer and colorectal carcinoma continue to rise unlike in the most of the EU region [7].

Observed University Clinical Centre of Kragujevac with its 1.300 beds capacity is actually one of only seven major referral centres for tertiary specialist care of cancer in Serbia inclusive of radiotherapy, surgery and advanced targeted immunotherapies [8]. Although there are almost 2.5 million

inhabitants of Central Serbia region, some 600.000 residents will almost exclusively access public funded tertiary care in this facility. Conventional cost of illness estimate has been provided using retrospective bottom-up approach, one year time horizon and Payer's perspective. Sample consisted of 12.505 cases of patients suffering from cancer being diagnosed and treated due to any malignant disorder during 2010-2013.

Focus of observation was 5.103 large subpopulation of elderly aged 65 or more and the subset of 604 seniors aged over 80 (Table I). The landscape of cancer attributed costs of inpatient hospital care reveals quite stable upward trend of increasing both proportion of elderly among cancer patients (from 41% in 2010 to 43.5% in 2013) as well as their total budget share (from 32% in 2010 to 35.6% in 2013). The gap present indicates the fact that in our sample elderly patients were on average less frequently admitted thus incurring fewer costs comparing to younger age groups. This might be explained by prevalence-based pool of patients with many of them experiencing remissions or occurrence of metastatic disease. This means that most demanding clinical phase following initial diagnostics and treatment protocol administration was captured only in some of the cases described. Opposed finding of far more expensive last year of life was reported within the incidence-based study design [9]. Significant decrease in costs of care towards 2012 followed by mild recovery is a pattern mostly related to global recession related budget cuts and imposed reimbursement limitations [10]. According to some recently published pioneering estimates large portion of the aforementioned costs are related to imaging diagnostics [11] and radiation oncology procedures [12]. Another essential cost domain was antineoplastic pharmaceuti-

Corresponding author

Mihajlo Jakovljevic, MD, PhD
sidartagothama@gmail.com

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	2010	2011	2012	2013
Patients diagnosed with confirmed malignancy – all age groups (n.)	2,977	3,392	3,027	3,109
Elderly ≥ 65 years diagnosed with confirmed malignancy				
%	41.05	37.2	41.82	43.52
n.	1,222	1,262	1,266	1,353
Hospital admissions due to cancer (n.)	1,428	1,604	1,494	1,595
Mean total inpatient costs of care				
€/patient	1,997	1,795	1,507	1,590
€/hospital admission	1,710	1,414	1,279	1,350
Total cost of care for the elderly aged ≥ 65 (€)	2,439,985	2,265,736	1,907,728	2,151,123
Elderly ≥ 80 years diagnosed with confirmed malignancy				
%	4.77	4.6	4.82	5.15
n.	142	156	146	160
Hospital admissions due to cancer (n.)	169	199	171	186
Mean total inpatient costs of care				
€/patient	1,613	1,441	1,012	1,041
€/hospital admission	1,355	1,130	864	896
Total cost of care for the elderly aged ≥ 80 (€)	229,042	224,841	147,794	166,632
Percentage of resources spent for the care of aged ≥ 80 (%)				
	3.00	3.25	2.49	2.76
Percentage of resources spent for the care of aged ≥ 65 (%)				
	32.01	32.78	32.09	35.60
Total cost of cancer care – all age groups (€)	7,622,727	6,911,246	5,944,480	6,042,452

Table I. Total prevalence-based pool of patients with histology, laboratory and imaging diagnostics confirmed malignancies treated as inpatients in the largest university clinic of the Central Serbia region

cals whose budget impact was by far dominated with monoclonal antibodies and protein kinase inhibitors [13].

Regardless of cost drivers composition the key observation from this insight is visible upward trend of expanding contribution by senior citizens to the burden of cancer. Quite surprising finding are substantially lower cost of treatment for the elderly aged 80 or more and these might be attributable to the home provision of palliative [14] and terminal medical care [15]. Government owned hospitals, funded by obligatory tax contributions be the employed citizens experience frequent difficulties with work overload and financial losses [16]. Therefore there is straight forward tendency by hospital management in the country to avoid terminal care in clinical cases with poor prognosis where substitute of home care seems to be affordable to the citizen or his/her family [17]. General population aging in Serbia will further worsen shrinking domestic labour force and increase the portion of retired citizens in need of more expensive medical care [18]. Broader participation of senior citizens among those suffering from cancer under current health

policies might actually slightly release pressure on hospital budgets. Nevertheless this surprising fact will most likely present a hidden boomerang effect for the national health insurance fund and an overall economy. Opportunity cost of lost productivity by family members in charge of home cancer care for the elderly will certainly by far exceed hospital net savings. In the long run, transitional health systems of Western Balkans region will probably be forced to adapt to the unique needs of elderly citizens suffering from variety of malignancies. State-of-the-art in primary care prevention of cancer and embracement of healthy life style by the general population is still lagging behind most of the EU. An ambitious health strategy targeted to combat rising oncological morbidity within an aging population will be a pure necessity in years to come.

Ethical Committee Approval: The underlying study was conducted in line with The Declaration of Helsinki and has been approved by the regional Ethics Committee of the University Clinical Center Kragujevac, Serbia. Decision number 01-5978 issued on 28.05.2013.

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