

Epidemiology of multiple myeloma in Taiwan, a population based study

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ABSTRACT

Background: Although the incidence of multiple myeloma (MM) in Asia is lower than in Western countries, it is steadily increasing. However, limited data are available that describe the epidemiology of MM in Asia.

Methods: We conducted a retrospective cohort study using the Taiwan National Healthcare Insurance Research database to estimate the disease burden and clinical characteristics of patients with MM in Taiwan. All newly diagnosed confirmed MM patients during 2007–2012 were enrolled. Patients were followed up until death or end of the observation period (December 31, 2013), whichever occurred first.

Results: A total of 2723 newly diagnosed MM patients were included in the cohort analysis, of whom 58.0% (1578/2723) were men. The average age of MM patients was 67.6 years. At the time of diagnosis, the mean Charlson Comorbidity Index was 1.8, 35.3% of patients had anemia, 18.0% had bone fracture, 16.4% had renal disease and 17.3% had pneumonia. The crude annual incidence of newly diagnosed MM increased from 1.74 per 100 000 population in 2007 to 2.27 per 100 000 population in 2012 ($p < 0.0001$), and the age-adjusted incidence from 1.41 to 1.59 per 100 000 population ($p = 0.01$). The use of novel treatments expanded over the study period. The crude and age-adjusted annual MM mortality rate did not change significantly over time. Case fatality decreased from 25.5% in 2007 to 19.4% in 2012 ($p < 0.0001$).

Conclusion: The age-adjusted incidence of MM in Taiwan increased by 13% between 2007 and 2012. Despite the introduction of new treatments, MM remains largely incurable with 19.4% mortality.

1. Introduction

Multiple myeloma (MM) is one of the most frequently diagnosed hematological malignancies, and has a global annual incidence of approximately 114,500 and an annual mortality of approximately 80 000 [1]. Men are affected more than women and the incidence increases with age [1]. MM occurs less frequently in Asian countries than in Western countries [1]. However, marked increases in MM incidence have been documented in Asia over recent decades. In Korea, MM incidence increased up to 30-fold between 1981 and 2007 and then by 5% annually from 1999 to 2010 [2–4]. MM incidence in Japan increased by 5–6-fold between 1975 and 2010 [5]. Factors responsible for the increase are not known, but could include improved rates of detection, aging populations across Asia, and/or increased exposure to pollutants and radiation as an effect of industrialization [3].

As observed in other Asian countries, the incidence of MM in Taiwan has also increased over recent decades. A study using data from the Taiwan National Cancer Registry estimated that the incidence of MM increased by 4-fold in Taiwan between 1979 and 2003 [6]. The age-adjusted incidence was estimated to be 1.21 per 100 000 population between 1999 and 2003, and 1.83 per 100 000 between 1997 and 2013 [6,7]. MM mortality from 1997 to 2013 was 0.44 per 100 000 population [7]. In a large, retrospective database cohort study utilizing the National Health Insurance Research Database (NHIRD) in Taiwan, Chen et al described the epidemiological characteristics among patients with newly diagnosed MM in Taiwan who survived or died between 1997 and 2013 [7]. In this population, survivors were more likely to be young, female, and to reside in the south of Taiwan and in less-urbanized areas. We used the same database in a retrospective cohort study to facilitate understanding of the disease burden and to describe clinical

Abbreviations: CCI, Charlson Comorbidity Index; MM, multiple myeloma; NHIRD, National Health Insurance Research Database; RCI, Registry of Catastrophic Illness

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Table 1
Demographic and clinical characteristics of newly diagnosed patients with multiple myeloma (MM): 2007–2012, Taiwan (N = 2723).

Variables	All MM patients		2007–2008		2009–2010		2011–2012		Chi-square p-value
	n	%	n	%	n	%	n	%	
Total number	2723		786		914		1023		
Gender									0.8712
Male	1578	58.0	452	57.5	536	58.6	590	57.7	
Female	1145	42.0	334	42.5	378	41.4	433	42.3	
Age, mean (SD)	67.6 (12.2)		67.3 (12.3)		67.7 (12.1)		67.7 (12.3)		0.0838
18–30	2	0.1	1	0.1	1	0.1	0	0.0	
30–39	40	1.5	10	1.3	17	1.9	13	1.3	
40–49	199	7.3	66	8.4	60	6.6	73	7.1	
50–59	521	19.1	150	19.1	165	18.1	206	20.1	
60–69	686	25.2	195	24.8	236	25.8	255	24.9	
70–79	823	30.2	242	30.8	289	31.6	292	28.5	
≥ 80	452	16.6	122	15.5	146	16.0	184	18.0	
Geographical area									0.0651
Taipei	940	34.5	261	33.2	351	38.4	328	32.1	
Northern	385	14.1	118	15.0	129	14.1	138	13.5	
Central	542	19.9	158	20.1	154	16.8	230	22.5	
Southern	396	14.5	115	14.6	126	13.8	155	15.2	
Kaohsiung & Pingtung	370	13.6	107	13.6	119	13.0	144	14.1	
Eastern	90	3.3	27	3.4	35	3.8	28	2.7	
Index year									
2007	383	14.1	383	48.7	–	–	–	–	
2008	403	14.8	403	51.3	–	–	–	–	
2009	435	16.0	–	–	435	47.6	–	–	
2010	479	17.6	–	–	479	52.4	–	–	
2011	497	18.3	–	–	–	–	497	48.6	
2012	526	19.3	–	–	–	–	526	51.4	
Comorbidities associated with MM									
Renal impairment	447	16.4	113	14.4	147	16.1	187	18.3	0.0802
Anemia	960	35.3	287	36.5	319	34.9	354	34.6	0.6751
Bone fracture	490	18.0	138	17.6	169	18.5	183	17.9	0.8773
Pneumonia	471	17.3	136	17.3	143	15.6	192	18.8	0.1929
Frequency of Transplant									
0	2430	89.2	724	92.1	819	89.6	887	86.7	
1	267	9.8	55	7.0	85	9.3	127	12.4	
≥ 2	26	1.0	7	0.9	10	1.1	9	0.9	
CCI Deyo, mean (SD)	1.8 (2.0)		1.7 (1.9)		1.9 (2.0)		1.8 (2.0)		0.2452
0	834	30.6	263	33.5	267	29.2	304	29.7	
1	614	22.5	161	20.5	205	22.4	248	24.2	
2	535	19.6	161	20.5	178	19.5	196	19.2	
≥ 3	740	27.2	201	25.6	264	28.9	275	26.9	

n, % = number and percentage of patients with the indicated characteristic, SD = standard deviation, CCI = Charlson comorbidity index.

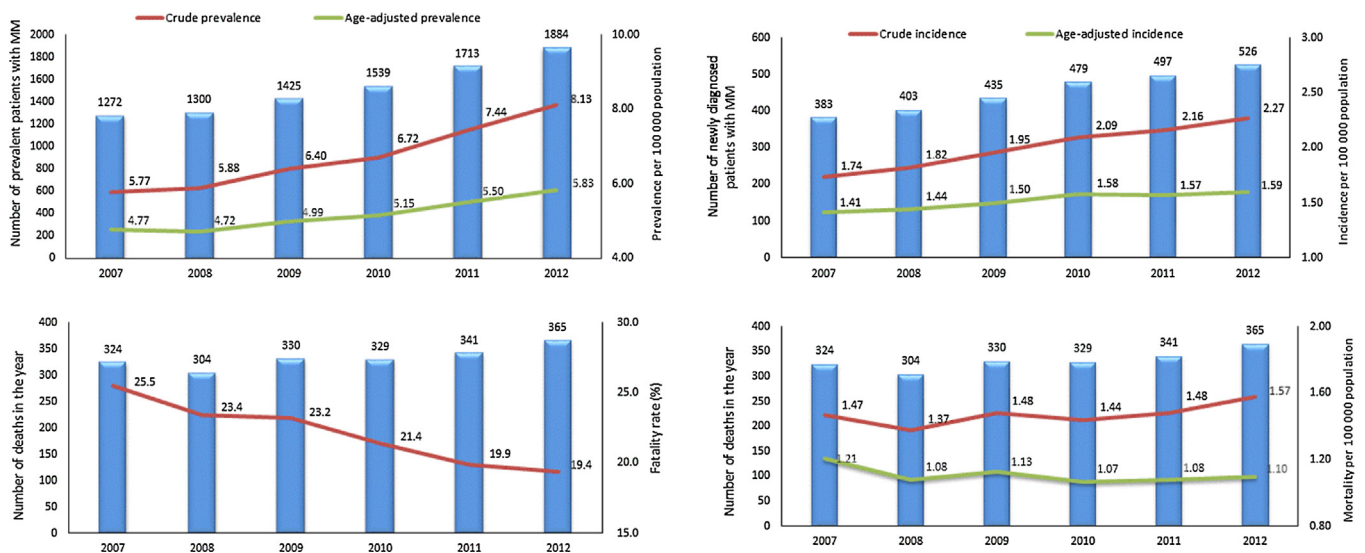


Fig. 1. Prevalence, incidence and fatality rates, and mortality of patients with multiple myeloma, 2007–2012, Taiwan. There is an increase in the crude and age-adjusted prevalence of MM over time, which is reflected in an increase in the incidence of newly diagnosed cases. The annual number of deaths increased slightly over time, but the case fatality rate decreased over the same period and overall mortality per 100,000 population remained unchanged.

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