Trends in Melanoma Mortality in the Population Groups of South Africa

Wright C.Y.[a,b,*], Kapwata T.[c], Singh E.[d,e], Green A.C.[f,g], Baade P.[h], Kellett P.[d], Norval M.[i]

[a]Environment and Health Research Unit, South African Medical Research Council, Pretoria, South Africa

[b]Department of Geography, Geoinformatics and Meteorology, University of Pretoria, Pretoria, South Africa

[c]Environment and Health Research Unit, South African Medical Research Council, Johannesburg, South Africa

[d]National Cancer Registry, National Health Laboratory Service, Johannesburg, South Africa

[e]School of Public Health, University of Witwatersrand, Johannesburg, South Africa

[f]QIMR Berghofer Medical Research Institute, Royal Brisbane Hospital, Brisbane, QLD, Australia

[g]Cancer Research UK, Manchester Institute and Faculty of Biology, Medicine and Health, University of Manchester, Manchester, United Kingdom

[h]Cancer Council Queensland, Brisbane, QLD, Australia

[i]Biomedical Sciences, University of Edinburgh Medical School, Edinburgh, United Kingdom

*Correspondence to: Caradee Yael Wright

South African Medical Research Council

1 Soutpansberg Road, Private Bag x385

Pretoria 0001 (South Africa)

E-Mail cwright@mrc.ac.za

Abstract

The incidence of cutaneous melanoma (CM) is increasing in countries around the world. However, little is known about melanoma trends in African countries by population group. We studied CM mortality in South Africa from 1997 to 2014 to partly address this knowledge gap. Unit record mortality data for all South Africans who died from CM (*n* = 8,537) were obtained from Statistics South Africa. Join-point regression models were used to assess whether there

was a statistically significant change in the direction and/or magnitude of the annual trends in CM mortality. A significant increasing trend of 11% per year was observed in age-adjusted mortality rates in men between 2000 and 2005 ($p < 0.01$), rising from 2 to 3 per 100,000. There was also a statistically significant increase of 180% per year among White South Africans from 1997 to 1999 ($p < 0.05$) and of 3% from 1999 to 2014 ($p < 0.01$). These results may be used to inform CM awareness campaigns and will motivate efforts to improve the collection and analysis of relevant statistics regarding the present burden of CM in South Africa.

Keywords: Cutaneous melanoma; Skin cancer; Environmental health; Skin colour

Introduction

Although robust data regarding the mortality burden due to cutaneous melanoma (CM) are available for most countries in the developed world, less is known for low- and middle-income countries, such as South Africa. South Africa has a multi-ethnic population with four official population groups. These are Black African, Coloured (mixed European [white] and African [black] or Asian ancestry, with skin colour ranging from pale to dark brown), Asian/Indian and White. The population of South Africa in 2017 was 56.7 million (48% male), with approximately 81% Black African, 9% Coloured, 3% Indian/Asian and 8% White [1].

Data on the incidence of CM in South Africa are available through the pathology-based National Cancer Registry which was instituted in 1986. These statistics are likely to underestimate the true incidence since the proportion of CMs diagnosed clinically without histological confirmation is omitted. Furthermore, classification by population group is unspecified in 93% of cases. These 93% are assigned to a population group by comparing their surnames with a reference database of surnames of known ethnicity [2]. In contrast, CM mortality data are available for a majority (approx. 80%) of the South African population for the four population groups. To date, studies of CM mortality in South Africa have mostly been

restricted to certain regions or population groups [3–5]. Some reports have grouped incidence-derived estimates of mortality with other sub-Saharan countries [6]. Given the above-mentioned challenges with CM incidence data, we therefore studied CM mortality in the period 1997–2014 to partly address the existing large knowledge gap about the trends and burden of CM in South Africa over time and by population group.

Methods

Unit record mortality data for South Africans who died from all types of CM (ICD 10 codes C43–C44) between 1997 and 2014 (inclusive) were obtained with permission from Statistics South Africa. Variables included in the data set were individual's age at death, sex and population group. Ethics approval for the study was granted by the South African Medical Research Council (EC003-2/2017).

Age-standardized mortality rates by sex, age at death and population group were calculated using age-specific mortality counts and World Health Organization standard population (2000–2025) [7]. Join-point regression models (Join-point 4.2.0, National Cancer Institute) were used to assess whether there was a statistically significant change in the direction and/or magnitude of the annual trends in CM mortality during the study period.

Trends were measured by the Annual Percentage Change (APC) estimated by fitting a regression line to the logarithm of the age-standardized mortality rates with a linear term for year of death. To reduce the likelihood of reporting spurious changes in the linear trends, conservative parameters for the maximum number of join points (n = 3) and the minimum number of years between each join point (n = 5) were employed [8]. Monte Carlo permutation tests were used to examine the trend lines associated with each combination and number of join points, and the trend line combination was selected that provided the best fit to the observed data [9].

Results

The data set comprised 8,537 deaths with 3,496 (41%) females and 5,033 (59%) males (sex missing for $n = 8$). Table 1 lists the proportion of CM deaths by population group. Trends in CM mortality were different for males and females. A statistically significant increasing trend of 11% per year was observed in age-adjusted mortality rates in men from 2 to 3 per 100,000 between 2000 and 2005 (APC 10.8%; $p < 0.01$), after which mortality rates plateaued (Fig. 1a). In women, there was a slight but statistically significant increase in mortality rates of 2% per year between 1997 and 2014 (from 0.9 to 1.2 per 100,000) (APC 1.68%; $p < 0.05$) (Fig. 1a).

There was a statistically significant increase of 180% per year among White South Africans from 1997 to 1999 ($p < 0.05$) and of 3% from 1999 to 2014 ($p < 0.01$) (Fig. 1b). In contrast, mortality rates for Black Africans fluctuated over the study period. For Black Africans, there were statistically significant increases of 16 and 12% per year from 1997 to 2005 (APC 15.61%, $p < 0.001$) and 2010 to 2014 (APC 11.96%, $p < 0.05$), respectively (Fig. 1b). A non-statistically significant decreasing trend in mortality rates for Black Africans was observed from 2005 to 2010. The age-adjusted CM mortality rates in the Indian/Asian and Coloured populations were too low for trend analyses.

Table 1. Frequency and percentage of cutaneous melanoma deaths by population group for 1997–2004 (inclusive)

Population group	*n*	%
Black African	2,666	31
Coloured	306	3
Indian/Asian	60	1
White	3,614	42
Other	19	1
Unknown	1,872	22

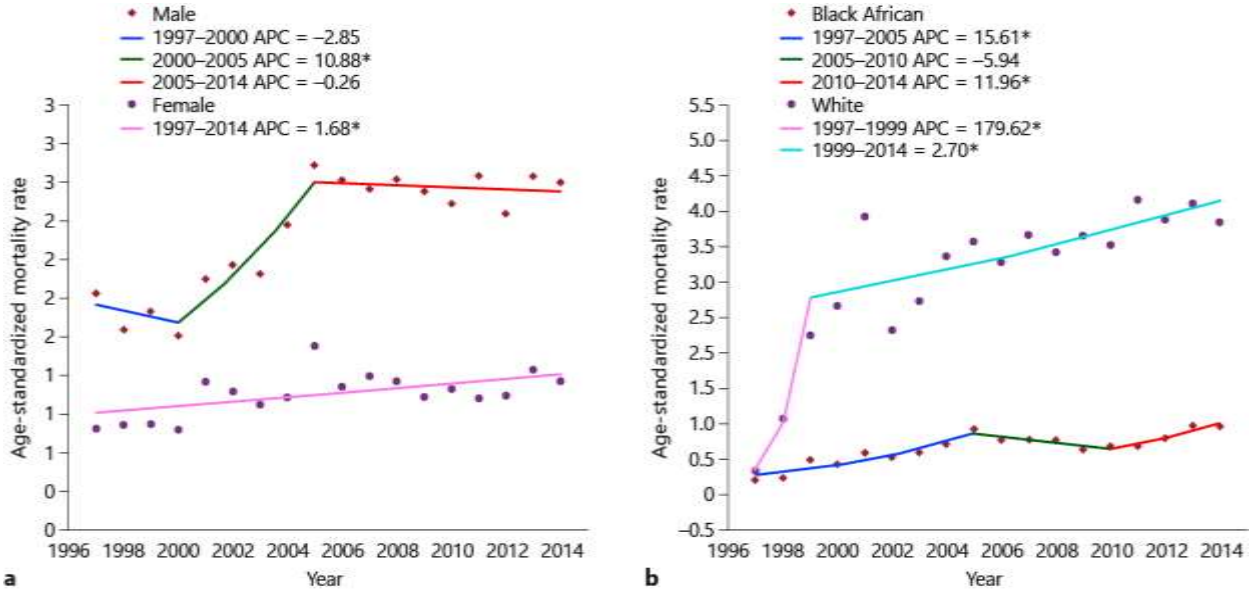

Fig. 1. Trends in age-standardized cutaneous melanoma mortality rates per 100,000 standard population (WHO standard) by males and females (**a**) and population group (**b**) in South Africa for the period 1997–2014 (inclusive). APC, annual percentage change. * $p < 0.05$: the APC is significantly different from zero.

Discussion

The increasing trend observed in age-adjusted CM mortality rates in South African men may be due to men having a poorer prognosis than women overall since they are less likely than women to check their skin for abnormalities [10, 11]. Even when diagnosed with melanoma at the same stage, women tend to survive longer than men as they may respond more effectively to treatment [12].

Among the Black South African population group, the lower rate of CM mortality compared with the other population groups increases the variability in year-on-year estimates and suggests greater uncertainty about the true underlying trends. Further research with additional data is required to better understand CM mortality in Black Africans including anatomical site and CM thickness at diagnosis.

Due to the lack of comprehensive population-based death registration in South Africa, the interpretation of these data is limited by their incompleteness to an unknown degree, and thus their representativeness. However, melanoma underreporting is a recognized challenge even in countries with well-established cancer registration, as indicated in studies of melanoma incidence [13, 14]. In addition, we were unable to validate the cause of death against original medical records. Also, it was not possible to ascertain the population group category in 21% of cases. The extent to which this proportion was split between the different groups, and how it varied by year, is not known.

Despite these limitations, these estimates represent information about CM mortality by sex and population group in South Africa that has not been available or published previously. The findings suggest that CM awareness campaigns should tailor messages to target men (while still including messaging for women) and individuals from the White population group, though factors associated with mortality in Black Africans also remain to be investigated. The lack of complete information about the current burden of melanoma in South Africa limits the ability to act and to target the groups at greatest risk. As such, it is hoped that this report will motivate efforts to improve the collection of relevant statistics regarding the present burden of CM mortality in South Africa.

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Disclosure Statement

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