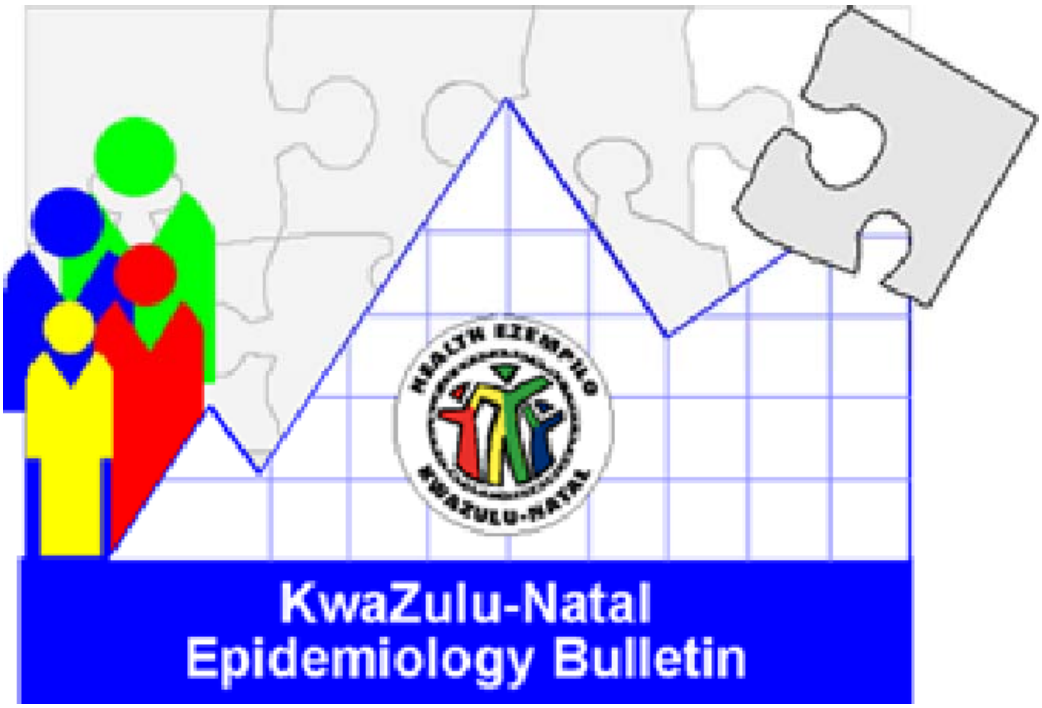

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Epidemiology of chronic degenerative diseases in KwaZulu-Natal

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Editorial

The answer of modern western medicine to the perennial question regarding **"What makes people ill?"** has evolved over time according to the technological advances available in each era. In the Pre-sanitation era, people who lived in areas where the air was dank and stale were more frequently ill. Hence, it was thought that evil spirits resided in the foul air and made people sick.

It was much later, when the Germ Theory emerged with Koch's postulate and bacterial organisms could be seen under a microscope or cultured in the laboratory, that the term "show them or grow them" was coined. This heralded the antibiotic era with the discovery of penicillin. The world of medical science began to believe that with the combination of vaccines and antibiotics we could rid the world of all infectious diseases with a so-called "Magic Bullet". Unfortunately this was not the case, bacteria mutated and became resistant.

As living conditions and human development improved, people started to live longer and the era of cancers and other chronic degenerative diseases began to manifest. It was at this time that it became evident that providing vaccines and antibiotics could not solve these new problems and no organisms could be identified under the microscope. Medical thinking had to evolve to tackle the new enemy by investigating the link between risk factors and diseases. The then young science of Epidemiology introduced the concept of the "*web of causality*" and *"causal pies"* to describe the interactions between risks factors, cancers and other diseases of lifestyle such as Hypertension and Diabetes. After decades of epidemiological investigations, the link between Tobacco and lung cancer became common knowledge. This is one of the many public health victories, which has resulted in concerted prevention attempts to control diseases by controlling the risk factors. As science, technology and analytical methods improved, the causal relationship between risk factors and diseases became clearer. This allowed health planners to direct health-promoting interventions at specific risk factors to obtain an impact on the target diseases.

This issue deals with the Chronic Degenerative Diseases of lifestyle. The information presented has been obtained by analysing mortality data from this province to identify trends according to age and gender. It also begins to sound the warning bell of the preventable causes of death in our society today. Hence, concerted efforts directed at these risk factors will have a positive impact in years to come if we act NOW!

I would also place on record my appreciation for the support of the Italian Co-operation and await the results of the hospital morbidity and mortality survey to verify the preliminary findings of this analysis.

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Acronyms & Definitions of Terms

ASSA — Actuarial Society of South Africa.

BMI — The Body Mass Index measures the nutritional status among adults and it is equal to: kgs/meters^2. The following cut offs are used: <18.5 for undernutrition, 18.5-24.9 for normal weight, 25-29.9 for overweight and 30+ for obesity.

BOD — Burden of Disease

DHS — 1998 Demographic and Health Survey.

Group I — This group is composed of communicable diseases, including HIV/AIDS; maternal and perinatal conditions; and nutritional deficiencies.

Group II — This group is composed of chronic degenerative diseases including: malignant neoplasms, diabetes mellitus, other endocrine disorders, neuropsychiatric conditions, cardiovascular diseases, chronic respiratory diseases, digestive diseases, congenital anomalies and other chronic degenerative diseases.

Group III — This group is divided into unintentional and intentional injuries.

ICD10 — International Classification of Diseases, Number 10.

IHD — Ischaemic Heart Diseases.

Abstract

This issue deals with the epidemiology of chronic degenerative diseases. The mortality estimates are based on the analysis of the data coming from Statistics SA, which consists of a 12% sample of the death notifications that occurred between 1997 and 2001. Diseases are divided into Group I, mainly HIV/AIDS and other communicable diseases; Group II, non-communicable diseases; and Group III, injuries. After adjusting for under-reporting, Group I, II and III cause respectively about 51%, 39% and 10% of mortality, with females dying more frequently than males from Group I and males dying more frequently than females from Group III.

Males and females have also different patterns of mortality within Group II. Males die more frequently from ischaemic heart diseases, from cancer of the lung and of the oesophagus, and from respiratory conditions. Females die more frequently from cerebrovascular diseases, diabetes and cancer of the reproductive system.

The burden of the diseases of Group II is expected to increase in the next few decades. This is due to the slow aging of the population and the cumulative effect of risk factors that will become more evidence in the future. This means that besides the burden of HIV/AIDS, the health system will have to face an increasing burden of chronic degenerative diseases.

The only strategy to decrease this burden is to act on the risk factors. High prevalence rates of obesity, smoking, alcohol consumption and other risk factors such as hypertension and obesity produce cumulative and long-term negative effects on the various target organs that will take a long time to manifest. Any attempt to decrease the prevalence of risk factors requires a creative social marketing strategy to produce an impact on ingrained cultural values that influence attitude and behavior. The success of the anti tobacco strategy in curbing down tobacco consumption through health education, limitation of smoking in public places, increase in taxation and other actions show that creative strategies pay off and could be expanded to other consumption patterns. However, as with tobacco, any action influencing consumption is bound to touch vested interests and to require a multisectoral approach.

Acknowledgement

Although the main author is Dr. Venanzio Vella, Italian Cooperation, this issue is the result of a concerted effort of the Epidemiological Bulletin Committee composed of the following Drs: Thilo Govender, Epidemiology Unit of the DOH; Pablo Rodriguez and Medina Morales Mercedes Benicia, Cuban Cooperation; Farshid Meidani, Medical Care Development Intl; and Dario Mariani and Antonio Silvestri, Italian Cooperation. The Italian Cooperation contributed through the author, the printing costs and the secretarial support from Imam Rogany and Bisnath Reshma.

Introduction

As mentioned in the previous issues, the Epidemiology Bulletins deal with the estimation of the Burden of Disease (BOD). According to the BOD methodology, introduced by Murray and Lopez in the early 1990s, the diseases are categorized into three main groups. Group I is composed of communicable diseases, including HIV/AIDS; maternal and perinatal conditions; and nutritional deficiencies. Group II is composed of chronic degenerative diseases of the various organ systems. Group III is divided into unintentional and intentional injuries.

This issue deals with the diseases of Group II. After the description of the methodology, the mortality statistics is presented in the following order: (a) the proportion of the total mortality due to Group I, II and III; (b) the proportion of the mortality within Group II that is due to each disease category (i.e. malignant neoplasms); and (c) the proportion of the mortality within each category, that is due to each subcategory (i.e. cancer of the cervix). The incidence and the prevalence of the diseases of Group II are from the literature.

Methods

In South Africa there are several data sources on mortality and morbidity. The approach of the BOD is to estimate the potential years of healthy life lost because of mortality and disability. This allows to take into account the burden of some chronic degenerative diseases, such as the psychiatric diseases, which would be grossly under-estimated if only mortality were considered. However, as this description of the different data sources shows, mortality data continue to be the most used epidemiological data, while morbidity information is scarce. The different sources of mortality and morbidity are described below.

Mortality

As shown in Box I, the most recent data on mortality for KZN covers the period between 1997 and 2001. According to law, a doctor or a nurse, in case a doctor is not available, must certify each death, except for remote areas, where a traditional leader can certify a death through a specific form. Each death certificate should be filled with the most immediate cause of death first, followed by the intermediate causes and the underline cause. The underline cause is the most used in mortality statistics because it is the cause which started the train of events leading to death. The death notifications are sent to the Department of Home Affairs, which give them a barcode and store them in microfilms. Because processing all the death notifications will require a long time, Statistics SA has decided to produce a preliminary release of the mortality statistics on the basis of a sample of 12% of the death notifications that occurred between 1997 and 2001. The 12% sample produced a total of 49,191 deaths for KZN, which are representative of about 410,000 deaths for the period 1997/01.

Some ICD10 codes were "ill defined" and they have been reassigned. There were about 15% of male deaths and 17% of female deaths with "ill defined codes" such as senility (R54) and sudden death (R96) that are not specific in terms of underline cause of death. In accordance with the BOD methodology, the "ill defined codes" have been reallocated to Group I and II[1] according to age and sex specific distributions of such groups.

Although death recording has improved considerably, there are deaths that are not certified. The expected number of deaths can be estimated through statistical models, such as that produced by the Actuarial Society of South Africa (ASSA). The ASSA model is calibrated to match real data coming from surveys, the census and vital statistics, and it is one of the best sources providing an estimation of the expected deaths. According to the ASSA, the number of deaths expected for the period 1997/01 for KZN is in the order of 581,000; which compared with the 410,000 recorded deaths translates in an under-reporting of about 30%.

After presenting the statistics on the three Groups of diseases, the analysis focuses on the main categories within Group II. The ICD 10 codes belonging to Group II have been clustered in the categories used by Murray and Lopez in the Global BOD. The categories are the followings: cardiovascular, malignant neoplasms, respiratory diseases, diabetes, endocrine disorders, digestive diseases, neuro-psychiatric conditions and other chronic degenerative diseases. Each of these categories has been subdivided into more specific subcategories; for example, the category 'cardiovascular diseases' is subdivided into ischaemic heart diseases, cerebrovascular diseases and other subcategories of the circulatory system.

In each category, there are some ICD codes that are not very specific of the underline cause of death and are defined by the BOD methodology as "garbage codes". An example of such code for the category "cardiovascular diseases" includes heart failure, dysrhythmias and atherosclerosis. These codes are better defined than the "ill defined codes" because at least they are part of the cardiovascular category. However, they are considered "garbage codes" because they are not related to any specific cardiovascular disease (i.e. ischaemic heart disease).

The "garbage codes" have been reallocated according to the BOD methodology. According to Murray and Lopez, the most important causes of cardiovascular mortality are cerebovascular accidents (stroke) and ischaemic heart diseases. Because the diagnosis of stroke is always clearer than the diagnosis of ischaemic heart diseases, stroke is unlikely to be miscoded. Therefore, the cardiovascular "garbage codes" are reassigned to the other "well defined" cardiovascular subcategories (i.e. ischaemic heart diseases) but not to stroke. In this analysis, the "garbage codes" were reassigned according to the algorithm suggested by Bradshaw et al in the SA BOD.

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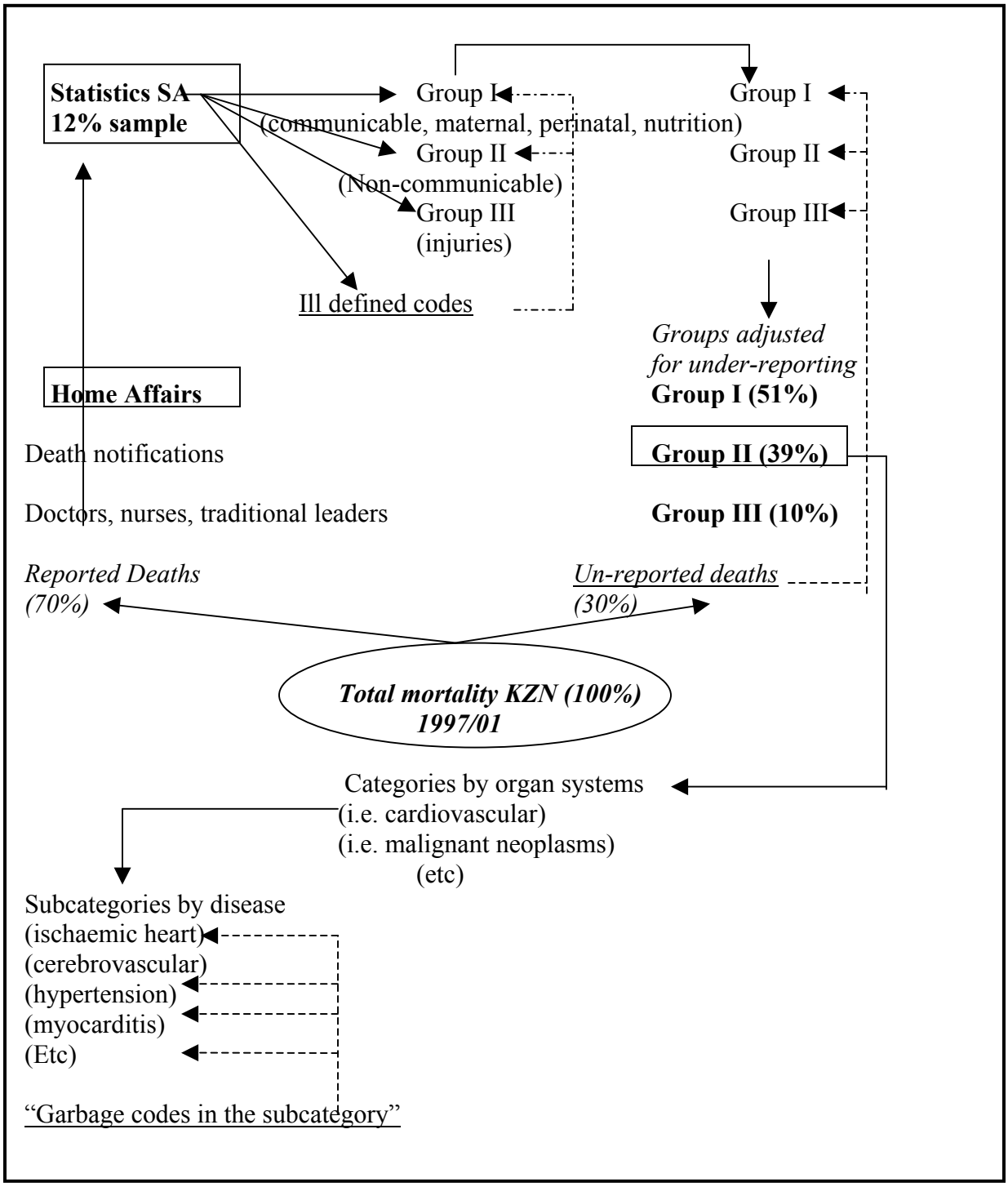
[1] This reallocation is based on the assumption that it is unlikely that a death from injuries is assigned an "ill defined" code

Box I Mortality Statistics of KZN



Morbidity

Data on the prevalence and the incidence of Group II diseases are scarce. The 1998 Demographic & Health Survey (DHS) is one of the few data sources with province-representative prevalence rates for a few health conditions. This was based on interviews and diagnostic techniques such as the measurement of the blood pressure.

Other potential sources of information can be used to provide hypothesis or to strengthen circumstantial epidemiological evidence. For example, the last publication from the cancer registry is from 1995, it is based only on the data coming from histological laboratories and it is not disaggregated by province. This means that the number of cases reported by the registry is influenced by the access to services and therefore the rates for malignant neoplasms should be considered the minimum rates for South Africa.

Some scientific articles provide estimates for specific diseases for limited areas and for different years and although they are not representative of the whole province and are outdated, their estimates are presented to give hints on the likely rates for these diseases. A full set of incidence rates will be worked out at a later stage, when the data from the hospital survey on discharges, presently carried out in KZN, will be available.

The rates for congenital anomalies are from the South Africa BOD study (Bradshaw et al.) that estimated them on the basis of the South Africa Birth Defect Surveillance System.

Other rates are from Murray and Lopez. The Global BOD tried to estimate incidence, prevalence and mortality rates by cause for geographic regions, such as Sub-Saharan Africa.

The population estimates are based on the census of 2001.

Results

Population

The population of South Africa has grown at an average rate of about 10% between 1996 and 2001 with a variation across provinces. The lowest increase has been in Northern Cape (-2%) and the highest in Gauteng (+20%), while the population of KZN has grown by 12% between 1996 and 2001, which is 2% above the national average.

This variation in population growth is the result of the migration across provinces. The net balance between those leaving and entering each province between 1996 and 2001 has varied between –292,000 in Eastern Cape to +403,000 in Gauteng, with KZN experiencing a balance of –38,000. The migration affects more the male than the female population producing a ratio that varies from 49.7 females over 100 population in Gauteng to 54.6 in Limpopo. In KZN, where males are 4.4 million and females are 5

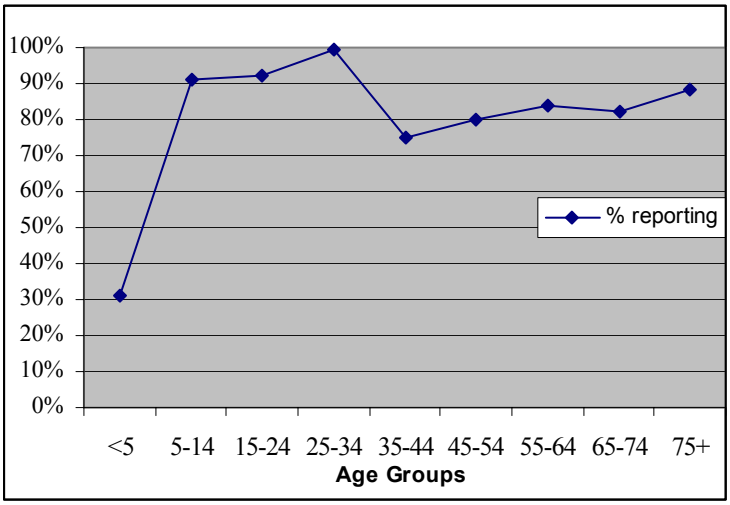
million, the higher proportion of females (53.1%) is about 1% above the national average (52.1%). The lower proportion of males, besides having socioeconomic consequences, may affect the estimation of the mortality rates. This may happen in case males moving outside the province die more frequently from certain causes of death and the deaths are recorded in the province of death and not in KZN. The mobility of people across provinces can therefore create problems in the estimation of the province specific rates for certain causes of mortality.

When dealing with chronic degenerative diseases, the aging process of the population is an important aspect to be taken into account. The population of KZN is aging, albeit slowly and the extent of aging varies across ethnic groups. The proportion of inhabitants 50 years and over has increased from 10.5% to 11% among men and from 13.8% to 14.8% among women between 1996 and 2001. Africans have a population pyramid resembling other developing countries, with a wide base typical of young populations. Other ethnic groups show population pyramids resembling the population structure of developed countries, with a higher proportion of older people. This aging process creates an increase in morbidity and mortality for chronic degenerative diseases, which will become more evident in the coming decades.

General pattern of mortality

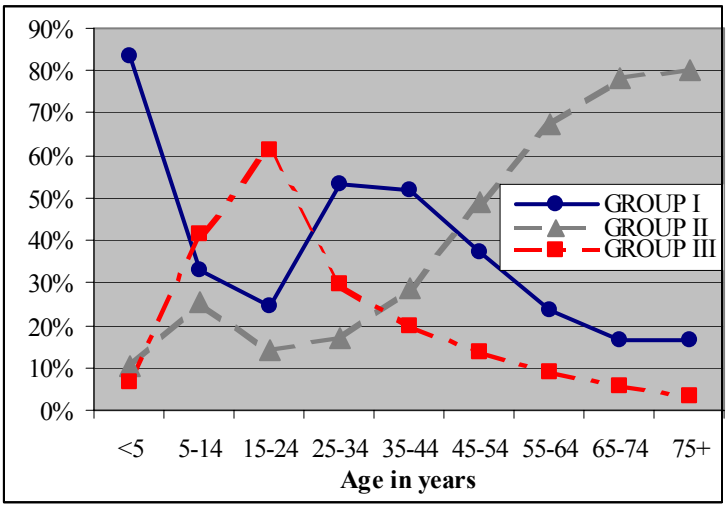
Under-reporting is more frequent in the age groups affected by a high mortality from the diseases of Group I, which are mainly composed of HIV/AIDS and other communicable diseases. Several hypotheses can be formulated to foresee how the under-reported deaths can affect statistics. If under-reporting is more frequent in certain age groups that are more characterized by certain causes of death, these causes of deaths are more likely to be under-reported. Figure 1a shows the proportion of total expected deaths, according to ASSA, that are reported in each age group. Figure 1b, shows the proportion of recorded deaths that are due to Group I, II and III, in each age group. It is clear that the death reporting was very low for the deaths that occurred under 5 years of age, it improved to more than 90% if the death occurred between 5 and 34 years of age, it declined to about 75% if the death occurred between 35 and 44 years of age, and it improved again afterwards. These same age groups were also characterized by a higher proportional mortality due to Group I, which is therefore likely to be under-reported.

Figure 1a % reported deaths against expected* in each age group



* 100% corresponds to the total expected deaths according to ASSA

Figure 1b % of the reported deaths due to Group I, II and III in each age group

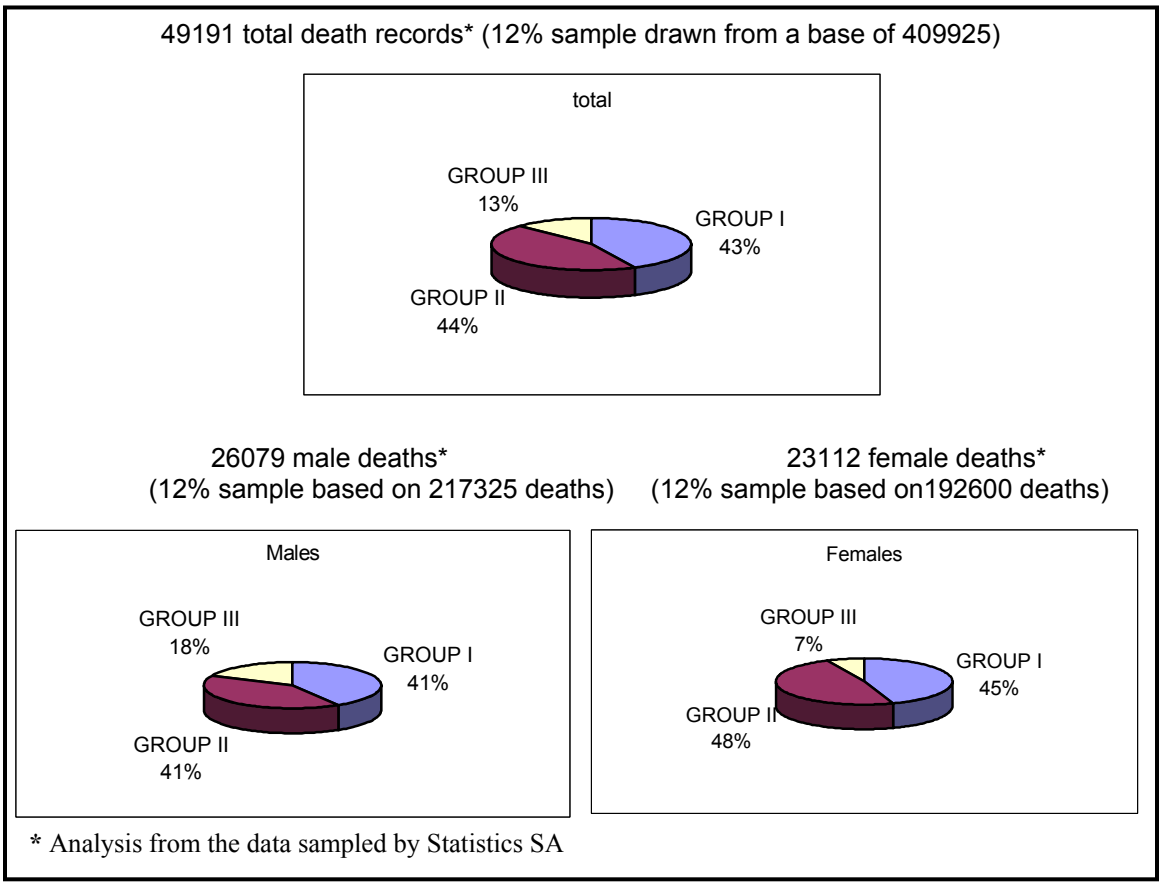


Two scenarios of mortality are represented in Box II and III. Box II represents the proportional mortality due to the three main Groups of diseases without adjustment for under-reporting. Box III is the proportional mortality due to the three groups of diseases adjusted for under-reporting. The under-reported deaths have been reassigned according to the age and sex specific proportional distribution of Group I, II and III. The two scenarios provide an idea of how the under-reporting is associated with an under-estimate of Group I mortality.

In Box I, where there is no adjustment for under-reporting, Group I and II contribute almost equally to the total mortality. The 12% sample of deaths drawn by Statistics SA for KZN for 1997/01 was composed of 49,191 deaths; of which 26,079 were males and

23,112 were females. These records were representative of a universe of about 410,000 recorded deaths; of which about 217,000 were males and about 193,000 were females.

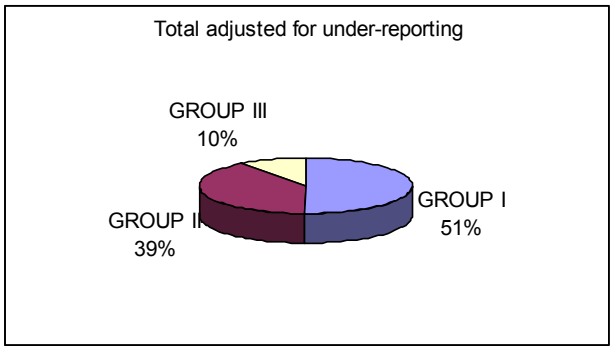
Box II Figures 2-4 on the recorded mortality, KZN, 1997/01, not adjusted for under-reporting



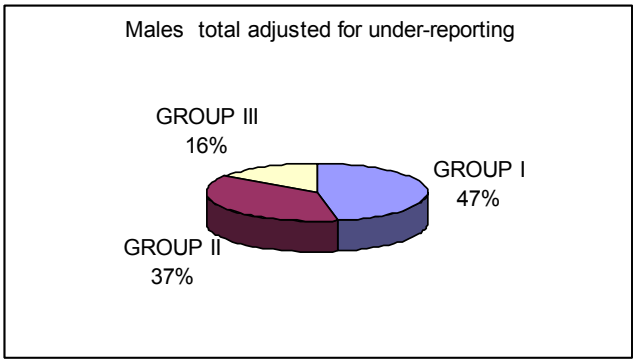
In the second scenario (Box III), where the mortality is adjusted for under-reporting, Group I contributes for more than half of the mortality. The deaths expected for 1997/01 are about 581,000, of which about 300,000 are males and about 281,000 are females. The difference between Box II and III is related to the fact that the recorded mortality in Box II takes into account only the deaths that are recorded, producing an under-representation of the mortality caused by the diseases of Group I. The adjustment for the under-reporting provides a more realistic proportional distribution of the three main Groups of diseases (Box III) and produces results that are very similar to the findings of the BOD for South Africa (Bradshaw et al.).

Box III Figures 5-7 on the recorded mortality, KZN 1997/01, adjusted for under-reporting

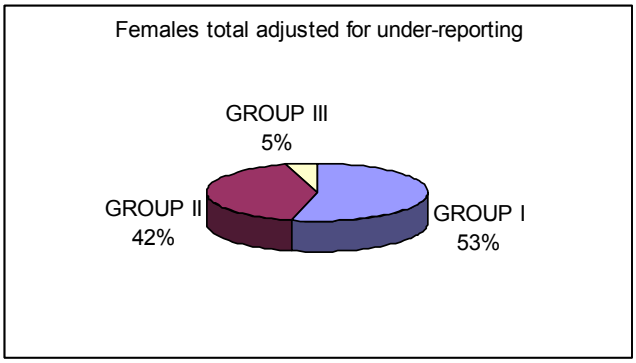
581,181 total deaths* expected for KZN between 1997/01



300,070 expected male deaths*



281,111 expected female deaths*

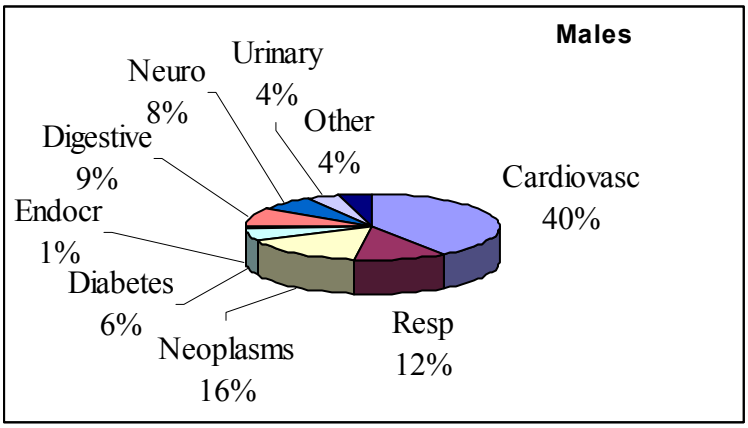


* Expected deaths estimated through ASSA

Box II and III show that males and females have a different pattern of mortality. Group I contributes to a higher mortality among females compared with males, who die more frequently from injuries (Group III) compared with females. These findings are in line with the South Africa BOD study (Bradshaw et al.), which showed the same differences in causes of mortality between males and females.

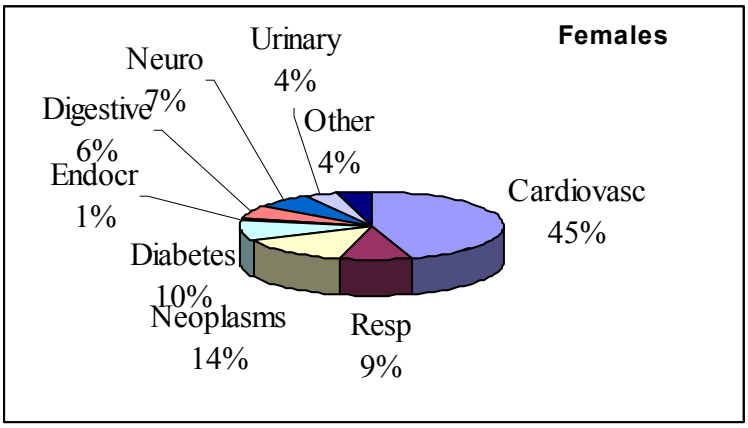
The rest of the results deals with the mortality by type of disease within Group II. Figures 8 and 9 show that among the deaths from chronic degenerative diseases (Group II), males die more frequently from malignant neoplasms, and from diseases of the respiratory and gastrointestinal systems; while females have a higher mortality from cardiovascular diseases and diabetes.

Figure 8 % mortality by diseases category within Group II*, KZN 1997/01, males



* i.e. for every 100 deaths due to Group II, 40% are due to cardiovascular diseases

Figure 9 % mortality by diseases category within Group II, KZN 1997/01, females



Cardiovascular

Within the cardiovascular category, males die more frequently from ischaemic heart diseases (IHD) and women die more frequently from cerebrovascular causes. Of 100 deaths from cardiovascular diseases among male, about 38 are from IHD, 34 are from cerebrovascular diseases and 14 are from hypertensive diseases. Of 100 deaths from cardiovascular diseases among females, about 39 are from cerebrovascular diseases, 25 are from IHD and 23 are from hypertension.

Figure 10 % mortality by cause in the cardiovascular category, KZN 1997/01, males

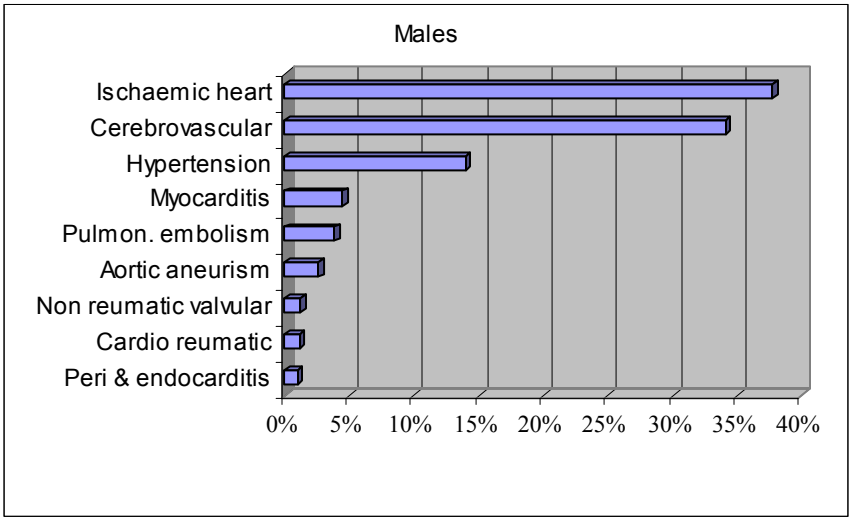
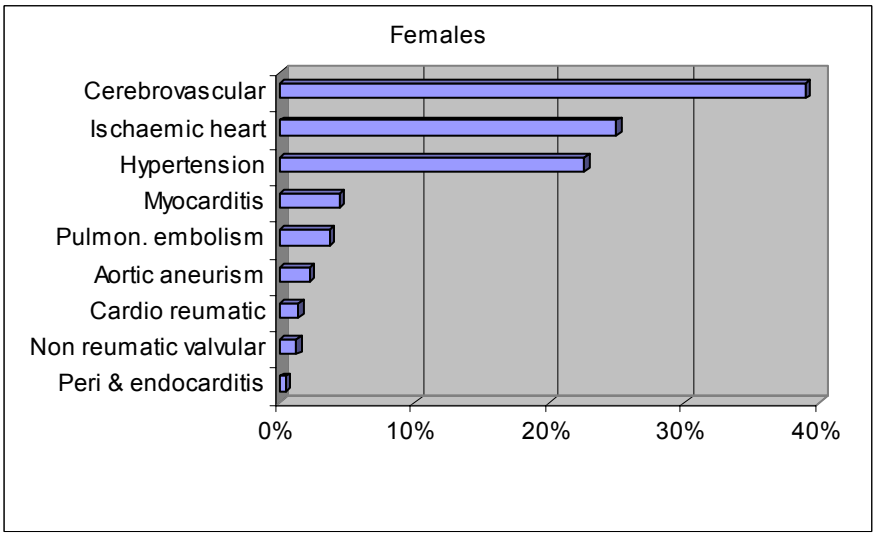


Figure 11 % mortality by cause in the cardiovascular category, KZN 1997/01, females



Besides having a higher mortality from cardiovascular diseases females have also a higher prevalence from these diseases. According to the 1998 DHS, about 3% of men and 7% of women 15 years and over were told by a doctor or a nurse that they had ischaemic heart diseases. The 1998 DHS has also reported a higher prevalence of cardiovascular risk factors among women. Blood pressure above 160/95 mm Hg was 12.6% and 17.7% respectively among men and women 15 years and over. Obesity[2], was

[2] Obesity was measured as BMI 30+

35% among women 15 years and over compared with 10% among men of the same age. Diabetes was also reported twice more frequently among women than among men.

Malignant neoplasms

Among those dying from cancer, the most frequent malignant neoplasms among males are those related to the respiratory tract and to the oesophagus; while females die more frequently from cancers of the reproductive system. The higher mortality from lung cancers and cancer of the oesophagus among men is in line with their higher prevalence of smoking and alcohol consumptions found by the 1998 DHS.

Figure 12 % mortality by cause among males dying from neoplasm, KZN 1997/01, males

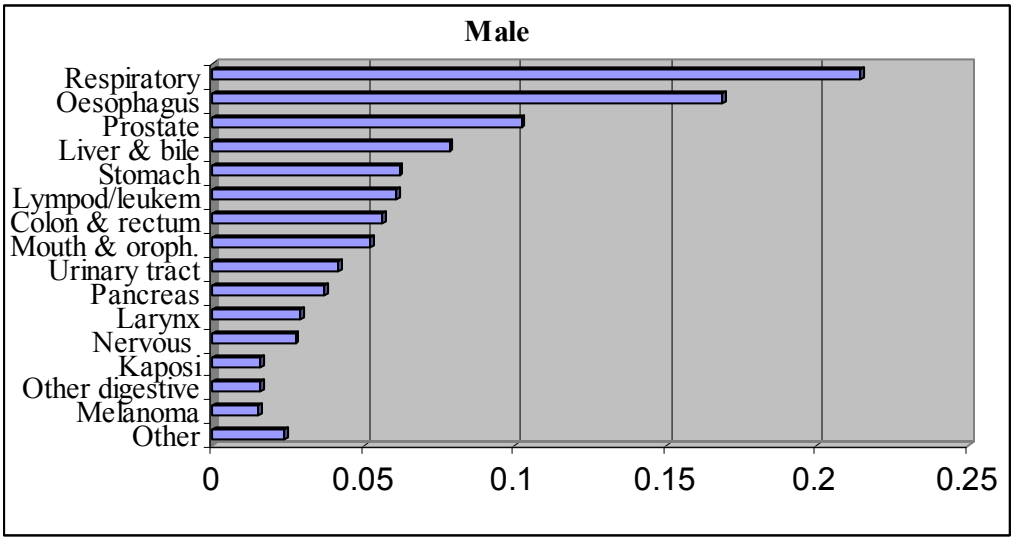
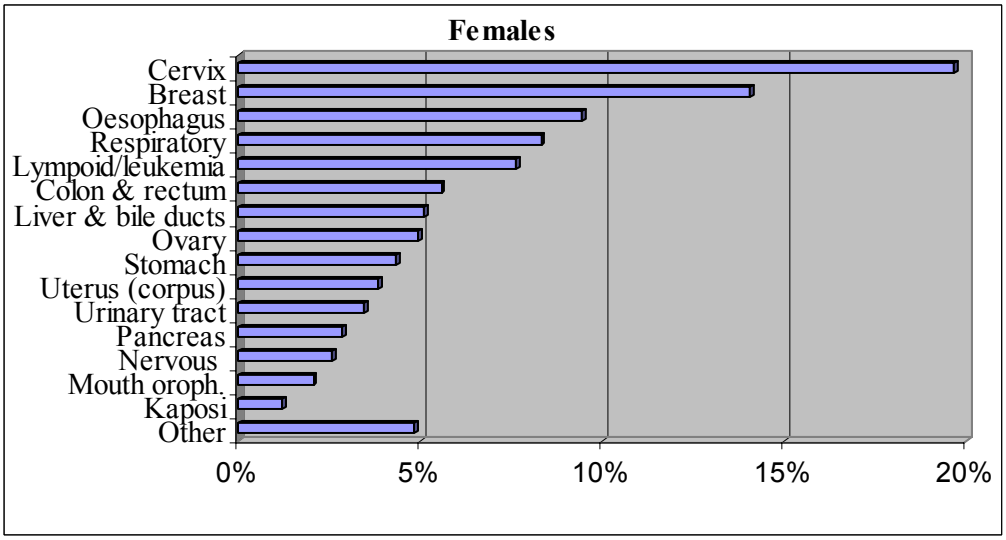


Figure 13 % mortality by cause among females dying from neoplasm, KZN 1997/01, females



Because the probability of early detection and survival varies across neoplasms, the ranking based on mortality differs from the ranking based on incidence. The rates provided by the National Cancer Registry are for the whole country, they are not disaggregated by province and the most recent year is 1995. Nonetheless, the information is presented to show how incidence rates provide a different ranking compared with mortality and how rates vary across races. Neoplasms of the skin have the highest incidence and the lowest mortality because most of them are benign and because they are detected earlier. The other most frequent malignant neoplasms in terms of incidence are those affecting the prostate, the lung and the oesophagus among males; and the breast and the cervix among females.

The ranking of cancer differs among races. As shown in Table 1, while prostate and lung cancers remain the most frequent malignant neoplasms among males of all races, there are some cancers that are more common in some groups. For example, cancer of the oesophagus is the most common cancer among males of African origin, while it ranks 4th among mixed races, 8th among males of European origin and 6th among males of Asian origin. Melanoma and non-Hodgkins lymphomas are very common among male of European origin, colorectal and bladder cancers are common among males of European and Asian origin. Among females, cancer of the cervix is the first cancer among females of Africans origin and mixed race, while breast cancer and colorectal cancer are more common among females of European and Asian origin.

Table 1 Age standardized incidence rates for malignant neoplasms per 100,000, South Africa, 1993-95

Type of cancer	Males				Type of cancer	Females			
	African origin	Mixed origin	European origin	Asians origin		African origin	Mixed origin	White origin	Asians origin
Oesophagus	13.61	7.74	5.34	4.78	Cervix	26.47	17.66	10.78	14.96
Prostate	12.96	15.75	57.79	17.6	Breast	11.3	14.66	70.23	42.1
Lung	11.72	11.79	22.25	13.42	Oesophagus	5.82	2.25	1.92	3.9
Liver/bile ducts	3.88	1.91	4	2.53	Uterus	3.29	3.74	7.3	10.33
Larynx	3.8	5.26	5.25	4.77	Lung	2.56	4.47	12.32	6
Mouth	3.36	5.01	3.72	2.79	Liver/bile ducts	1.66	1.03	2.5	1.56
Stomach	2.89	8.78	11.11	13.51	Colorectal	1.64	2.95	19.31	10.51
Naso-oropharynx	2.5	3.49	4.48	3.16	Stomach	1.52	3.32	4.97	6.33
Tongue	2.43	3.47	3.13	1.7	Ovary	1.5	2.63	7.09	4.82
Colorectal	2.11	4.15	24.68	16.49	Bladder	1.49	1.32	7.11	3.2
Bladder	1.91	5.98	28.36	13.06	Genitals	1.43	1.94	2.06	2.22
Non Hodgkin	1.88	2.65	10.35	4	Melanoma	1	0.68	17.81	1.48
Melanoma	0.88	0.79	21.48	1.65	Non Hodgkin	0.93	1.75	7.32	5.77

Source: Sitas F. et al.

Respiratory diseases

Morbidity and mortality from chronic respiratory diseases is more common among males. Chronic respiratory diseases cause about 12% and 9% of total mortality from Group II respectively among males and females. The most frequent causes of deaths affecting the respiratory tract include chronic obstructive pulmonary diseases (COPD) and asthma. While COPD include chronic bronchitis and emphysema, which permanently damage bronchi and lung tissue; asthma is an acute constriction of the bronchi, which is reversible. The 1998 DHS found that peak expiratory rate or the maximum rate of flow of air expelled during forced ventilation was abnormal in 4.2% of men and 3.2% of women. According to the 1998 DHS, those suffering from COPD and asthma had a higher prevalence of smoking, exposure to indoor air pollution from cooking fuels and occupational exposure to pollutants. About 2% of men and women were taking medication for asthma and chronic bronchitis.

Diabetes

Women have a higher mortality and morbidity from diabetes. Of 100 males dying from Group II, about 6 die because of diabetes; while of 100 females dying from Group II, 10 die because of diabetes. Although the self reported prevalence of diabetes does not have the same validity of that based on blood tests, the prevalence reported by the 1998 DHS is unlikely to be very far from the real values. According to the 1998 DHS, about 6% of women 15 years and over in KZN were told by a doctor or a nurse that they had diabetes, compared with about 3% of men. There are very few population-based surveys which have used blood tests to diagnose diabetes and in one of these surveys, carried out in Umlazi near Durban in the early 1990s, Omar et al found a prevalence of diabetes mellitus of about 2% and 5% respectively among men and women 15 years and over. According to Murray and Lopez the prevalence of diabetes in the population 15 years and over in Sub-Saharan Africa is about 1.4%. Considering the more affluent living conditions in KZN, the estimates in KZN are likely to be twice or three times the prevalence estimated for Sub-Saharan Africa. Therefore, the prevalence found by the 1998 DHS is likely to be not very far from the reality. No estimates are available for the complications of diabetes that include retinopathy, neuropathy, sepsis, renal failure and hypertension.

Congenital malformations

A sizable proportion of chronic disabilities among children is due to congenital malformations. The total incidence of congenital malformations is estimate to be around 20 per 1000 live births. This is based on the South African Birth Defect Surveillance System for the period 1995-2000. Applying these rates to the number of live births, Bradshaw et al. estimated an incidence of about 470 per 100,000 in the age group 0-4 in the BOD for South Africa. The most frequent anomalies include congenital heart diseases, neural tube defects and Down's syndrome.

Neuropsychiatric disorders

Very little is known on the prevalence of neuro-psychiatric diseases. The methodological problems in measuring psychiatric symptoms cause a wide variation in the prevalence estimated through surveys. Parry C.D.H. found a high variation in the prevalence measured in surveys carried out in South Africa. The prevalence of psychiatric morbidity in children/adolescents varied between 19% and 71%, while adults had a prevalence varying between 8% and 45%. This high variation is related to the poor validity of psychiatric epidemiological instruments and their lack of standardization. The estimates of neuropsychiatric disorders for Sub-Saharan Africa derived from Murray and Lopez are shown in Table 3 to provide some hints on what the prevalence and incidence for these diseases could be in KZN.

Table 2 All-ages incidence and prevalence per 100,000 for neuropsychiatric disorders, Sub-Saharan Africa

DISEASE	**Males**		**Females**		**Total**	
	Incidence	Prevalence	Incidence	Prevalence	Incidence	Prevalence
Unipolar depression	1190	752	2,265	1,432	1,734	1,096
Bipolar disorders	217	305	219	309	218	307
Schizophrenia	4.9	146	4.8	132	4.8	139
Epilepsy	267	503	203	504	234	504
Alcohol dependency	1286	2069	290	471	783	1261
Dementia	8.9	63.8	22.1	97.3	15.6	80.8
Parkinson	2.7	27	2.4	26	2.5	27
Multiple sclerosis	1.5	29	2	40	1.7	34
Post traumatic stress disorders	92	217	155	363	124	291
Obsessive compulsive disorders	560	858	758	1159	660	1010
Panic attacks	336	248	644	477	492	364

Source: Murray C.J.L. and Lopez A.D.,

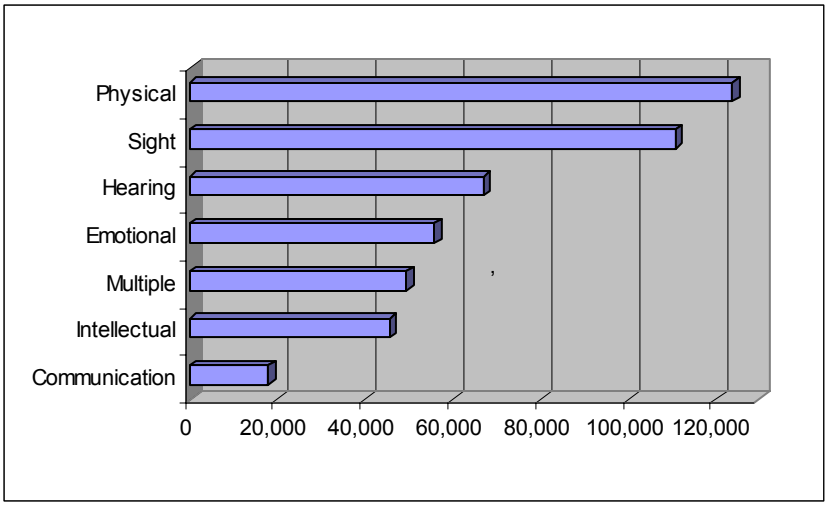
Mental health is also affected by substance abuse. The DHS estimated that alcohol dependence, measured through screening questions, was 22% among men and 7% among women 15 years and over. The highest rates were in the age between 35-54 and among coloured. Besides producing mental health problems, over-consumption of alcohol is associated with several cancers, cirrhosis, violence and accidents. The successful implementation of the tobacco policy suggests that similar efforts could be used to curb alcohol consumption.

Disabilities

An important contribution to the BOD that is not captured by mortality statistics is that related to the disabilities. According to a survey conducted in 1999, about 7% of the population in KZN suffered from moderate or severe disabilities. The prevalence was higher among Africans and increased with age, being highest among the elderly. The

most common disabilities were related to a limitation in movements and daily living activities, followed by blindness, learning/emotional/intellectual functions and hearing loss. The most common causes of disability were mental illness, hypertension, epilepsy, ear infections, hereditary diseases, diabetes, arthritis and polio. These findings were similar to what found by the 2001 census, according to which about 5% of the population in KZN is affected by a disability. The numbers of people affected by specific disabilities estimated by the census of 2001 for KZN are shown in Figure 14.

Figure 14 Number of people affected by disabilities in KZN, 2001



Source: Census 2001

One of the mot frequent disabilities is blindness. Surveys carried out in the late 1990s and early 2000s in KZN found that blindness, measured as visual acuity <3/60, increases with age, from 3% in the population above 40 years of age to 10% in the population above 60 years of age. Every 10 cases of blindness, about 7 are due to cataract, 2 are caused by glaucoma, and 1 is caused by trauma and other factors.

Discussion

There are several limitations in the mortality data, including a high proportion of "ill-defined codes", "garbage codes" and under-reporting. The general "ill defined codes", such as sudden death and senility, cannot be clearly assigned to any specific cause of death. The rationale for reassigning the "ill-defined codes" to Group I and II, according to the age and sex specific rates for these diseases, is based on the fact that somebody dying from injuries (Group III) is less likely to be "ill defined" compared with somebody dying from infectious or chronic degenerative diseases. The "garbage codes" such as heart failure and atherosclerosis are better than the "ill defined codes" because they are part of a category (i.e. cardiovascular), but they are not specific enough to suggest the underline cause of death (i.e. ischaemic heart disease). Although the utilization of the

BOD methodology to reassign these deaths is not perfect, it is nonetheless a better alternative than leaving the codes as "ill defined" and as "garbage".

Another problem is the under-reporting of mortality. The fact that 3 out of 10 deaths are not recorded, produces an under-estimate of some causes of death. The adjustment is based on the rationale that the under-reporting is more frequent in certain age groups and therefore it is likely that the profile of under-reported deaths follows the mortality profile of these groups.

Another limitation is the lack of disaggregation of the causes of mortality by ethnic group. Almost 40% of the recorded deaths did not have the population group and therefore the analysis by race would have been biased.

Morbidity data are scarce. Surveys are limited to small areas and they are carried out in different time periods. Some literature sources such as the Global BOD provides estimates for Sub-Saharan Africa, but even these estimates are based more on hypothesis and expert opinion than on real estimates. Nonetheless, these and other sources could be used in epidemiological modeling to arrive at consistent estimates of mortality, prevalence and incidence. However, even modeling has its own limitations because its estimates depend on the robustness of the assumptions on which the models are based.

The epidemiological profile of KZN is characterized by a combined burden of communicable and non-communicable diseases. The analysis of this issue has been mainly limited to the proportional mortality of chronic degenerative diseases, while the estimation of population rates will be carried out at a later stage. If the under-reporting is taken into account, the proportional mortality due to Group I accounts for more than half of total mortality. Although HIV/AIDS remains the most important cause of morbidity and mortality, chronic degenerative diseases are beginning to produce a considerable burden, which is likely to increase in the next few decades.

Cardiovascular diseases are the major contributors to the mortality from Group II and their burden is likely to increase. In the early 1900s, cardiovascular diseases were a rare cause of hospitalization and mortality in the US and Europe, but after the 1920s their frequency gradually increased. In the 1970s, cardiovascular diseases caused almost a third of mortality in the developed countries. In African Americans, cardiovascular diseases were low till the 1970s, when their rates started to increase and reached the rates of the white population.

Several factors suggest that South Africans may experience the same trends occurred in African Americans in the last two decades. According to studies carried out between the 1950s and the 1980s, cardiovascular disease among black South Africans were rare, but the latest mortality data suggest that they are picking up. Mortality data show that cardiovascular diseases are now the third cause of death in KZN, stroke being the major contributor of female cardiovascular mortality and ischaemic heart diseases being more common among males. There is a high prevalence of cardiovascular risk factors such as hypertension, obesity, diabetes, smoking and alcohol consumption. These risk factors are

caused by an improvement in socio-economic conditions and by changes in lifestyle conditions, which characterize the epidemiological transition. If this situation does not change, the incidence and mortality rates from cardiovascular diseases are likely to increase in the next few decades as it has happened among African Americans.

Acting on risk factors is the only choice to avoid the impending epidemic of cardiovascular diseases. Treating hypertension could reduce the morbidity and mortality from stroke and other cardiovascular diseases. However, the DHS found that only a minority of those affected by hypertension was adequately treated, indicating the need to increase coverage with cost-effective strategies to treat hypertension. More efforts to improve poor dietary habits could reduce the consumption of sugar, salt and alcohol that are related to hypertension, obesity and diabetes. However, because most obese people consider their weight as normal and obesity has a positive connotation, any change would require a very aggressive public health campaign to raise awareness about the consequences of obesity.

Poor dietary habits are particularly difficult to tackle because they are influenced by strong cultural factors. Because of such difficulty in changing dietary patterns and in influencing the attitude towards obesity, the campaign needs to start in primary schools when it is easier to influence changes. Other actions that could be adopted include the labeling of processed foods that at the moment do not show the caloric content and the nutritive values, not allowing consumers to make informed choices.

Smoking is another risk factor for cardiovascular diseases, cancer and diseases of the respiratory tract. According to WHO, tobacco related deaths are rapidly increasing and by 2030, tobacco is likely to be the primary cause of premature death worldwide, with most of the increase in tobacco-related mortality occurring in low and middle income countries. According to several reports, smoking is on the decline as a consequence of the legislation that was introduced in the early 1990s and that was strengthened in 2000. This has included the prohibition of advertisement and promotion of tobacco products, the restriction of smoking in public places, the taxation and the labeling of tobacco products with health warnings. More efforts are required to reinforce these trends and to decrease the proportion of youngsters who start smoking. The above policies and strategies show that similar efforts could be expanded to other risk factors besides tobacco.

It is also critical to understand that any attempt to influence behaviour is complex and the health sector is only one of the many actors involved in influencing it. Although promoting a healthy lifestyle is key to the reduction of risk factors, knowledge per se is insufficient to change attitude and behaviour. Many factors associated with lifestyles are deeply rooted in society and there are limitations to what the health sector can do to influence social norms and values. Identifying such limitations would help to clarify the role of the health sectors in promoting behavioural changes.

Policies and programmes to decrease the prevalence of risk factors are urgently needed, to prevent a costly epidemic of chronic degenerative diseases in the next few decades.

Any attempt to influence risk factors requires the followings: (a) building a comprehensive BOD where each disease is ranked in order of importance; (b) estimating the contribution of the risk factors to the BOD; (c) prioritizing the preventive strategies according to the BOD and the scientific evidence we have on their cost-effectiveness; and (d) assessing the feasibility of implementing priority interventions according to available human and financial resources. The feasibility of intervention strategies to reduce risk factors should take into account the complexity of changing ingrained behavioural and cultural causes, the inter-sectoral implications and the potential resistance to change coming from several actors with vested interests in maintaining present patterns of consumption.

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