Mortality Analysis of Registered Deaths in the FSM from 1990-2003

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Abstract

This paper discusses the result of a mortality analysis carried out in the Federated States of Micronesia in 2005. The result shows that the population crude mortality rate decreased slightly between the years 1990-1992. Disease-specific mortality was highest among the chronic, or non-communicable diseases (i.e., diabetes, stroke, cancer, heart disease combined) compared to communicable diseases and injury combined. In addition, the study suggests that mortality due to NCD is occurring among people as young as 40 years old. In order to curb this trend, the authors recommend drastic change to the current health care delivery system.

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Introduction

This paper discusses the results of an activity carried out in the Federated States of Micronesia (FSM) in 2005 on mortality review based on death certificates. The review focused on registered death records for years 1990-2003. The purpose of the study was to determine mortality trends for various age groups, with particular attention to diseases that have the greatest number or rate of increase.

Methods

Data for the mortality analysis came from the FSM National Department of Health and Social Affairs vital statistics registry, a national repository for births and deaths for the entire nation. Before conducting the analysis, a review of the existing database, which spanned back to the mid 1980s, took place to ensure uniformity in data structures and format, which further lead to cleaning, creating proxy variables, and importing other statistical information (i.e., life tables) so that the results could also be compared with other countries.

Population figures used as denominators for the mortality analysis were based on three censuses (1989, 1994 and 2000). The populations in other years during the period of 1990-2003 were projected based on these three censuses. The quality of the mortality database was checked, and some mistakes were corrected through original death certificates. Disease classification was based on WHO ICD-9 before 2001 and ICD-10 since 2001. Analysis was conducted for five different age groups (see Table 1). The overall crude mortality rate was computed using the total number of registered deaths for both males and females.

Results

1. Crude Mortality Rate

The overall crude mortality rate for the FSM from 1990-1994 was almost 458 per 100,000; 441 per 100,000 from 1995-1999, and about 467 per 100,000 from 2000-2003 (Table 2). The rates observed during these three different periods are not that different compared to other neighboring islands such as Marshall Islands, Palau, or the Philippines.[2] However, when compared to developed countries such as USA, Australia, or Germany, the rates for FSM were about four times higher.

Table 2 also shows that diseases of the circulatory system had the highest rate followed by diseases associated with respiratory system, endocrine and metabolic systems. The diseases that have the lower rates were eye, ear and mental health related conditions.

Table 1. Percent of death by age group and sex, 1990-2003

Age group	M	F	Total
<1	8.64	12.21	9.90
1-24	13.34	13.50	13.43
25-44	14.25	11.56	13.36
45-64	29.71	24.94	28.13
65+	33.65	37.79	35.18
Total	**100.00**	**100.00**	**100.00**

Although Table 1 shows differences in proportions of death among males and females, the differences were not significant. The mortality rates among males from 1990-2003 were consistently higher compared to female rates (Figure 1).

Source: Vital Statistics Unit, FSM Department of Health and Social Affairs

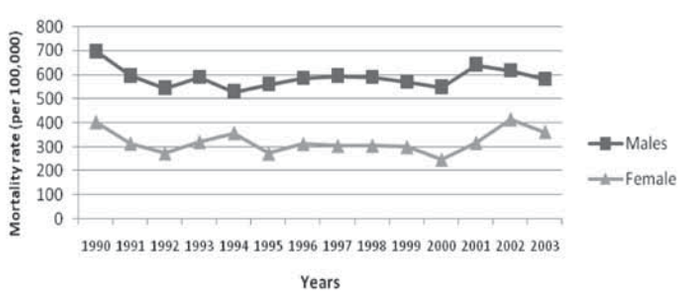
Table 2. Mortalities (1/100000) by systems (ICD-10) in three periods

Categories of disease (ICD-10)	1990-94	1995-99	2000-03
Circulatory system disease (I00-I99)	111.35	103.60	119.62
Respiratory system disease (J00-J99)	62.04	52.08	59.81
Endocrine, Nutritional & metabolic diseases (E00-E90)	34.83	59.20	57.24
Injury and poisoning (S00-Y98)	40.90	46.65	49.30
Malignant neoplasm (C00-C97)	54.99	39.53	48.13
Infectious & parasitic disease (A00-B99)	34.44	32.97	33.41
Ill-define, signs & symptoms (R00-R99)/Unknown	41.49	34.85	23.13
Certain conditions. Originating in prenatal period (P00-P96)	22.31	19.30	20.33
Digestive system disease (K00-K93)	16.83	15.55	18.46
Diseases of genitourinary system (N00-N99)	12.72	11.62	15.19
Disease of nervous system (G00-G99)	11.74	10.68	11.92
Pregnancy, childbirth & puerperium (O00-O99)	3.13	2.81	2.80
Skin & subcutaneous tissue disease (L00-L99)	0.98	3.00	2.10
Blood and blood forming organ disease (D50-D89)	1.37	1.12	1.40
Musculoskeletal system disease (M00-M99)	1.57	1.31	1.40
Congenital malformations, deformations and chromosomal abnormalities (Q00-Q99)	5.28	3.93	1.17
Mental and behavioral disorders (F00-F99)	0.78	0.75	0.47
Diseases of ear and mastoid process (H60-H95)	0.20	0.37	0
Disease of eye and adnexa (H00-H59)	0	0.19	0
Total	**457.93**	**441.00**	**467.26**

Source: Vital Statistics Unit, FSM Department of Health and Social Affairs

Figure 1. Trend of FSM population mortality by sex, 1990-2003
Rate (per 100,000)

Source: Vital Statistics Unit, FSM Department of Health and Social Affairs



2. Mortality in Different Age Groups

Table 1 shows that about 10% of the total deaths occurred among <1 year age group, 13% in the 1-24 year group, 13% in the 25-44 year group, 28% in the 45-64 year group, and 36% in the 65+ year group. In males, the percent was 9%, 13%, 14%, 30% and 34%, and in females was 12%, 14%, 12%, 25% and 38%, respectively.

The deaths in population aged 25-64 (more productive years) accounted for 42% of all deaths, 44% for males and 47% for females. In 2000-2003, the profiles of the percent of deaths was similar to the total mentioned above although a little increase of the percent in the age group of 65+ year. In contrast to the USA, where three-quarters of all deaths occurred among persons 65 years of age and over around two thirds of deaths in FSM occurred among persons <65 years of age.[3]

3. Leading Causes of Death by Age Groups

Table 3 shows the top five leading causes of death by age groups from 1990-2003. For less than 1 year old (<1 year old) age group, pneumonia was the top leading cause of death followed by septicemia, diarrhea, unintentional injury and congenital heart diseases.

For the 1-4 years old age group, unintentional injury, pneumonia infection, diarrhea, cancer and TB were the leading causes of death. For the older school age group (15-24 years old), unintentional injury is still the top followed by suicide which then became the top leading cause of death in the 15-24 age group.

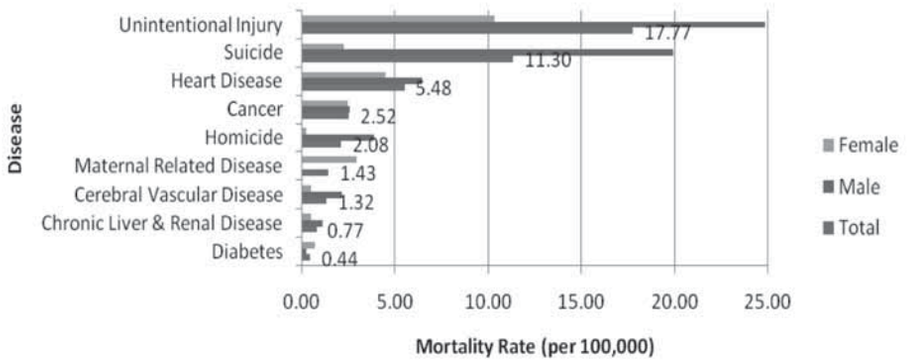
Table 3. Leading causes of death by age group, FSM, 1990-2003

<1 year	1-4 years old	5-14 years old	15-24 year old	25-44 years old	45-64 years old	65+ years old
PI	UI	UI	Suicide	CHD	CHD	CHD
Septicemia	PI	Suicide	UI	Cancer	Cancer	COPD
Diarrhea	Diarrhea	CHC	CHC	UI	Diabetes	Cancer
UI	Cancer	PI	Homicide	Suicide	CVD	CVD
CHC	TB	TB	Cancer	Homicide	COPD	Diabetes

Notes: CVD=Cerebral vascular disease, CHD=Coronary Heart Disease, COPD=Chronic Obstructive Pulmonary Disease, UI=Unintentional Injury, CHC=Congenital Heart Conditions; PI=Pneumonia Infection. Source: Vital Statistics Unit, FSM Department of Health and Social Affairs

From the most productive age group (25-44 years old) all the way to the elderly age groups (65+ years old), coronory heart disease became the leading cause of death. It appears that the chronic diseases are affecting the FSM population as early as 25 years old and most of these diseases are lifestyle related disease such as COPD, which are also associated with smoking, and diabetes and cancer which are associated with lifestlyes.

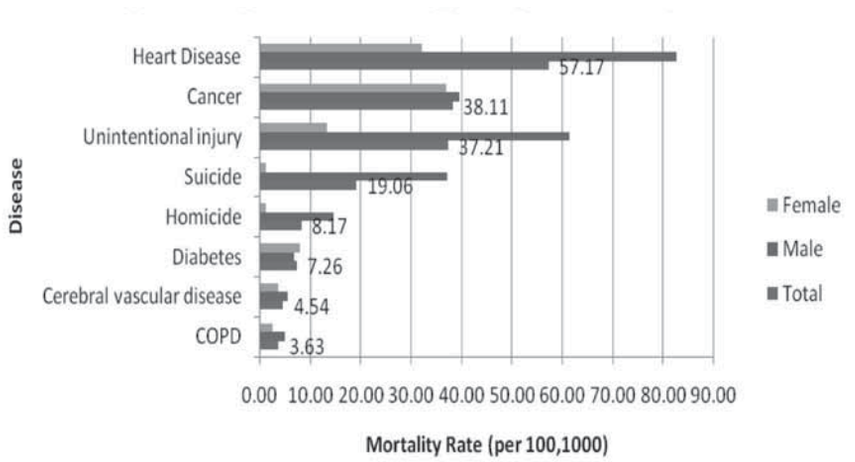
Figure 2. Leading causes of death among person age 1-24 in FSM By Sex, 1990-2003



Source: Vital Statistics Unit, FSM Department of Health and Social Affairs.

To better illustrate the differences among males and females, Figure 2 shows that among the 1-24 age group, males dominate females for all diseases except for diabetes where it appears that mortality rate due to diabetes among females was higher than that of among males.

Figure 3. Leading causes of death among person age 25-44 in FSM By Sex, 1990-2003

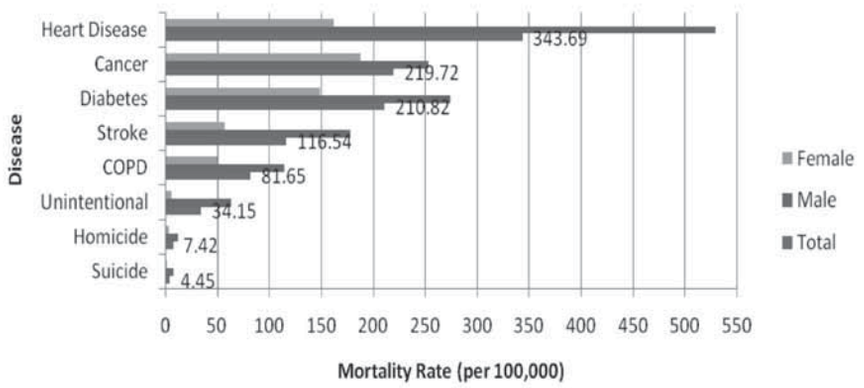


Source: Vital Statistics Unit, FSM Department of Health and Social Affairs

In the 25-44 years old population, heart disease was the first leading cause of death and was higher in males than in females. Cancer was the second leading cause of death; however, it appeared to affect both males and females equally. Unintentional injury was the third leading cause of death, followed by suicide, homicide, diabetes, cerebrovascular diseases, and COPD (Figure 3). Like cancer, diabetes affects both males and females equally in this population, but for homicide and suicide males outnumbered females disproportionately. An explanation to this disparity in rate could be that males are more likely to engage in behaviors (i.e., drinking and disorderly conduct) that predispose themselves for greater risk.

Similarly, COPD rate is higher in male than female. While it is beyond the scope of this study to assert any direct association, this could also point to similar findings in the past where smoking rate is higher in male than in females.[4]

Figure 4. Leading causes of death among person age 45-65 in FSM By Sex 1990-2003



Source: Vital Statistics Unit, FSM Department of Health and Social Affairs

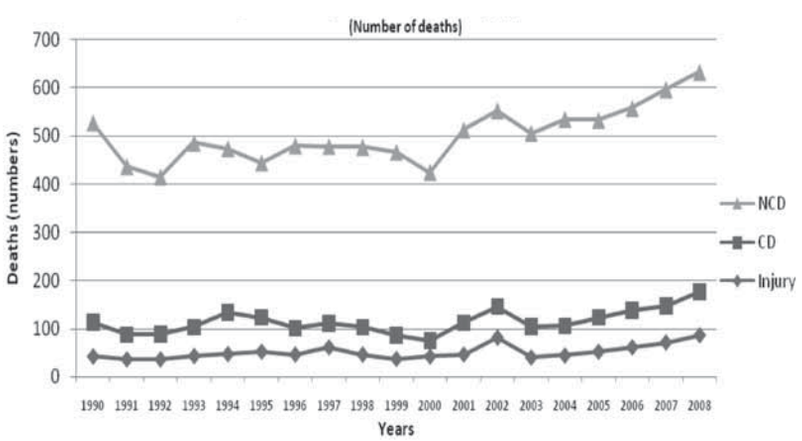
In the older age group (45-64 years old), heart disease, cancer (all forms), diabetes, stroke and COPD were the leading causes of death. While the rate is higher in males than females for all causes, the heart disease rate in male is almost 3 times higher than in females. Diabetes and stroke increased markedly in this age group, compared to any other age groups (Figure 4). Heart disease, cancer, diabetes, stroke, and COPD together accounted for more than 70% of all deaths in this age group during this period.

Discussion

Seven out of ten deaths in the FSM are due to some form of NCD either heart disease, diabetes, cancer, or stroke. Translating this to numbers, five hundred (500) people in their 40s's die of these diseases every year. Not only do they die young in their productive years, but the diseases killing them are preventable if intervention is early .[5]

What also complicates the increasing trend in NCD morbidity and mortality is the fact that some of the old communicable diseases (i.e., TB and Leprosy) and poor sanitation related diseases (i.e., diarrhea and gastroenteritis) that one might think should have been controlled already are still occurring until today (Figure 5).[6] While it is unlikely that neither of these disease categories will disappear any time soon, FSM needs to prioritize which of these diseases should get more of its meager resources for intervention. Failure to undertake this important activity is like shooting a dart without looking at the target.

Figure 5. Mortality Trend in the FSM, by category, 1990-2008 (Number of Deaths)



Source: Vital Statistics Unit, FSM Department of Health and Social Affairs

We offer the following recommendations. First, the status quo health delivery system needs to be re-engineered toward a system that promotes and thrives on preventive care at all levels of entry points of receiving health care. Screening for heart debilitating

conditions, diabetes, and other life-threatening diseases should be routinely done at every clinic for high risk groups and if deemed necessary interventions provided. This simply means that early identification of diseases and intervention (management and control) need to be carried out early enough before the disease takes its course. The knowledge, skills and medicines needed for these top priority diseases are parts of the equation to provide better management and control of disease; therefore, should be available.

This also means that both the providers and the consumers have to take on a new way of approaching health care (paradigm shift). Posters telling the public about the danger of TB and the need to have your blood sugar level checked without linking or availing the specific care or services that actually improve health outcome will not be that effective. This kind of misguided practice that have become expected outputs of most public health programs in the FSM, needs to be rethought and revisited. Program managers as well as funding agencies should demand more than just the process outputs.

A second recommendation is creating a conducive and supportive environment for health promotion. It appears that people nowadays will visit the track and field only after they have been told by their doctors that they are obese or overweight and if nothing is done they will develop a heart attack, diabetes or stroke. While this may be a common human behavior, the fact of the matter is that there are not that many facilities, events, organizations, and places throughout the FSM that promote opportunities for meaningful activities for health promotions, which can also contribute to the notion of paradigm shift toward something more beneficial. These opportunities could be in form of organized sports for all ages, sponsored events, school-based nutrition and physical activities, availability of affordable food, particularly fruit and vegetables.

The above ideas for recommendations are predicated on the need to *empower* the individual, and the public to take more responsibility for their own health. One should expect that if the medicine he needs for his cholesterol is not available at the public hospitals at a subsidized cost, he should find ways to obtain it from the private clinics otherwise he faces an increased risk of non-compliance or even heart attack. In other words, the patient should become a proactive consumer for his own health benefit.

Change will not happen overnight, but the recommendations need to be introduced in order to build on the opportunities they will bring about. The current trend of disease and mortality in the FSM is a result of the macro-system in which the health system functions. Even if the trend is a byproduct of economic or epidemiologic transition, the fact that 70% of all deaths in the FSM are due to lifestyle diseases that are preventable calls for a new way of delivering health care. In order for public health to be improved for the coming generations, the current health delivery system needs to be re-engineered and strengthened in a substantial way.

Acknowledgement

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References and Notes:

1. Compared to country data in *Western Pacific Country Health Information Profiles (CHIPS),* 2004 Revision, WHO Western Pacific Regional Office.

2. Compared to country data in *Western Pacific Country Health Information Profiles (CHIPS),* 2004 Revision, WHO Western Pacific Regional Office.

3. *Health, United States,* 2003, pp 148-149, Table 32.

4. Hezel, F 1997, Alcohol and Drug Use in the FSM. Located on Micronesian Seminar website: http://www.micsem.org/pubs/articles/alcodrug/alcfsm/frames/chapter2fr.htm

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* Data for 2004-2008 are estimates only.

"Forgiveness does not change the past,
but it does enlarge the future."

Paul Boese