

## Profile and trend analysis of diseases of the genitourinary system in the Philippines

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### ABSTRACT

In the Philippines, kidney disease is acknowledged as a significant public health issue as it causes considerable suffering, negatively impacts health, and possibly death to people inflicted it, this is despite the available programs and efforts to combat these diseases. This study evaluated and analyzed six decades of data (1960-2019) from Philippine Health Statistics to provide precise and valid information regarding its mortality trend and to assess the country's improvement in effectively dealing with these diseases. Factors such as gender, geographical location, and lifestyle were found to affect kidney disease chances. We also found out that there are age and gender disparities in the vulnerability of the people of the Philippines to kidney diseases, with elderly ages 70 and up and males recorded to be at greater risk of dying due to it. Differences in the regional outcome were also observed with Region XII having the highest mortality rate, and Region ARMM having the lowest. Urgent need to expand treatment advancements and programs for the population is needed to decrease the burden of kidney disease in the country in the following years.

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## 1. INTRODUCTION

Infectious diseases have been known to be the leading causes of death for decades, causes uncontrolled epidemics worldwide, and frequently shorten people's lives. Due to improvements in health and medical research, advancements in immunizations and medication, age, sex, and cause-specific death rates caused by communicable diseases generally declined. However, because of improved living circumstances after World War II, there was a shift from the cause of death from communicable diseases it was replaced by noncommunicable diseases (NCD's), NCD's began posing substantial difficulties to children, adults, and the elderly worldwide especially in developing countries and has been one of the leading causes of mortality and morbidity [1]. The 7 out of 10 deaths worldwide are caused by NCD's, and each year, it kills 15 million individuals under the age of 79 [2]. By 2025, if not adequately managed, deaths caused by NCD's are expected to rise by more than 100 million, according to World Health Organization (WHO).

A genitourinary disease which is a disease of the urinary and genital organs is a global public health issue and is a significant contributor to the adverse health outcome associated with major NCD's such as cardiovascular disease, cancer, diabetes, and diseases of the respiratory system [3]. In the Philippines, overall morbidity and death rates have increased primarily due to NCDs, particularly chronic kidney disease (CKD). Every hour, one Filipino suffers from CKD; thus, this has become part of the top 10 leading causes of death

among Filipinos [4]. An escalating prevalence of kidney disease is also observed in the United States, with it being the 9th leading cause of death in the country [5].

Information from mortality data allows evaluation of a particular healthcare system's effectiveness or put-in-place intervention, researching trends, dissemination channels, or factors that influence a given health occurrence within a particular sex and age group [6]. The measurement of mortality death rates from a genitourinary disease from the population in the Philippines is important as the information that will be obtained will serve as the basis for improving theories about the causes of a particular disease, identifying the efficiency of efforts done by private and public healthcare officials, the Government, and Non-Government organizations. This will help assess the demand for certain clinical and preventive healthcare services [7]. This study would be of great help in assessing the country's improvement in effectively dealing with these diseases.

Although the Philippine Health Statistics provides available data for the number of deaths and infections due to diseases of the genitourinary system, there is still no nationwide study regarding the trends of mortality caused by these diseases in the Philippines. There is still a lack of precise and valid information about its trends when descriptive studies for the trends of morbidity and mortality over time can be useful in generating evidence to further develop control strategies, for prevention and or to eliminate certain diseases. This study will assess the Philippine Health Statistics' six decades of data (1960-2019) in order to determine the country's progress in effectively dealing with these diseases and to give accurate and reliable information regarding the death trend.

## **1. METHOD**

### **2.1. Collection of data**

Data regarding the annual numbers of deaths due to diseases of the genitourinary system were obtained from the Philippine Health Statistics (PHS), a yearly publication of the Department of Health (DOH). PHS is the result of the joint and coordinated efforts of the Philippine Statistics Authority (PSA), the Epidemiology Bureau of DOH, and local health units in the country. The PSA provided statistical data on births, deaths, and population, while the DOH's Field Health Service Information Program gathered the data on illnesses that required reporting. This provides a comprehensive summary of the country's current statistics on natality, morbidity, and mortality.

#### **2.1.1. Computation and analysis of mortality rates**

The overall mortality rates concerning cause, sex, and region (National Capital Region, Cordillera Administrative Region, Region I, Region II, Region III, Region IV-A, MIMAROPA, Region V, Region VI, Region VII, Region VIII, Region IX, Region X, Region XI, Region XII, Region XIII, and BARMM), and age (for babies aging under 1, 1-4 years old, 5-9 years old, 10-14 years old, 15-19 years old, 20-24 years old, 25-29 years old, 30-34 years old, 35-39 years old, 40-44 years old, 45-49 years old, 50-54 years old, 55-59 years old, 60-64 years old, 65-69 years old, and 70 and over)-specific death rate were calculated using the provided formulas (Formula of Vital Health Indicators) of the PHS. Data gathered from the PHS were analyzed using Microsoft Excel. Two-independent sample t-test was used to determine whether there was a statistically significant difference between the male and female mortality rates. Bar graphs were used for the data that involves the rate of deaths concerning age groups and regions. A line graph was used to show the overall mortality trend during the 59 years and to compare male and female mortality trends.

#### **2.1.2. Missing data**

Following the accepted data mining technique, certain missing data from the PHS were filled in with the average values from the year before and the year after. Only data from 1999 to 2019 were also analyzed for the region-specific death rates analysis since regional data for Genitourinary system disorder from 1960 to 1998 were missing. For homogeneity, the current study combined more recent data from Region IV. Since Region IV was split into two separate regions, Region IV-A (Calabarzon) and Region IV-B (MIMAROPA), in 2002.

## **2. RESULTS AND DISCUSSION**

### **3.1. Overall mortality rates for the diseases of the genitourinary system in the Philippines from 1962-2019**

A total of 58 years was analyzed in this study. Included in the data collection of this study are the number of deaths and infected from different sex (male and female), age-group (under 1, 1-4 years old, 5-9 years old, 10-14 years old, 15-19 years old, 20-24 years old, 25-29 years old, 30-34 years old, 35-39 years old, 40-44 years old, 45-49 years old, 50-54 years old, 55-59 years old, 60-64 years old, 65-69 years old, and 70 and over), and all Regions in Luzon, Visayas, and Mindanao in the Philippines. The age groupings, which

is a five-year age group used in this study, are the same as those recommended by the World Health Organization. The Diseases of the Genitourinary System were classified using the International Classification of Diseases, Version 10 (ICD-10).

In Figure 1, we can see an increase in the overall mortality rate caused by diseases of the genitourinary system. From a 13.60 mortality rate in 1960, it increased to 19.28 in 2019. The highest number of recorded deaths was observed in 2016, with a 22.68 mortality rate with a total of 23,524 deaths during that year. The lowest number of deaths was observed in 1991, with a total of 6,487 deaths and a 10.2 mortality rate. The increasing overall mortality trend caused by diseases of the genitourinary system can be attributed to the lethargic and unhealthy lifestyles like lack of physical activity and smoking. Excessive alcohol consumption by Filipinos, is a consequence of fast and unplanned urbanization [8], which could lead to obesity, diabetes [9], and hypertension [10], [11] and is the two leading risk that can cause kidney failure. High chances of benign prostatic hyperplasia and lower urinary tract symptoms are also associated with lifestyle factors [12].

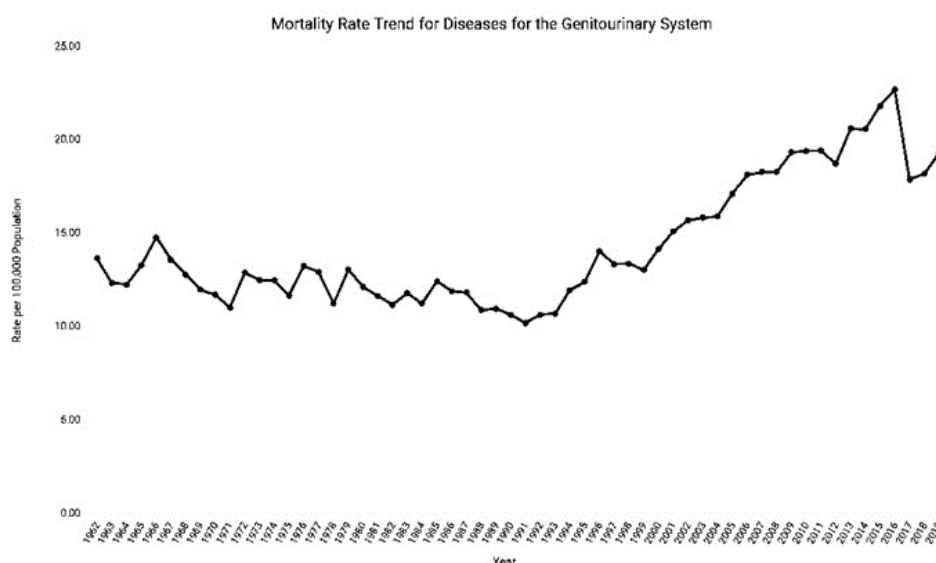


Figure 1. Diseases of the genitourinary system mortality trend from 1962-2019

Filipinos are also fond of drinking sugar-sweetened beverages; this is proven by the data provided by the Philippine Statistics Authority- Family income expenditure survey (FIES), wherein it is recorded that in 2003, 29.5 billion pesos were spent by Filipino Households on nonalcoholic beverages including carbonated drinks and other sugar-sweetened beverages (SSB's) and this has steadily increased until 2012. Intake of these SSB's has been associated with weight gain, the risk of type 2 diabetes (T2D), cardiovascular disease [13], and increased risk of chronic kidney disease (CKD) [14]. Sugar consumption may increase uric acid levels and cause a person to develop gout [15]. These are all linked to various phases of CKD [16], [17]. However, lifestyle and environmental factors are not the only factors that cause the rise in the number of deaths due to diseases of the genitourinary system. These diseases can also be acquired genetically.

Filipinos' unhealthy dietary behavior could be one of the factors why there is an increase in the mortality rate. Filipino foods usually contain a lot of salt and fat, and this behavior is linked to many health problems [18], [19]. Loss in the kidneys' capacity to eliminate salt loads specifically in older people could cause high blood pressure [20] and may lead to genitourinary problems. Other social determinants of health or factors like poor health care and poverty should be looked into. Here in the Philippines, poor access to health care services has always been an issue, especially in far-flung or geographically disadvantaged areas where transportation is a problem and people travel long distances just to reach the health care facilities. The lack of health professionals in Rural areas of the country is also a dilemma [21] since health experts are more clustered in the cities, and some choose to migrate to other countries [22], [23]. Some Filipinos, especially those who belong to the poor sector, also believe in alternative medicinal methods for care, which is why instead of going to doctors for a check-up, some would instead go to religious healers and rely on herbal medicines. For example, in Batan Island, one of the most isolated Provinces found in the northernmost of the Philippines, they used *Cocos nucifera* as a treatment for diseases of the genitourinary system, particularly for urinary, chronic cystitis, and kidney [24]. The overall health spending to cure diseases of the genitourinary system is also costly.

The average cost of a hemodialysis session in the Philippines is around PHP4,500, or PHP40,000 a month since dialysis should be performed a week thrice. This is a significant expenditure that low-income Filipinos cannot afford, and even the middle class could be burdened by it, hence the increasing trend. Glomerular illnesses are also more common and severe in tropical and low-income countries [25].

The Philippines' Government has made public health programs to address these issues. It includes establishing the National Kidney and Transplant Institute (NKTi), which provides services, training, and Research, principally for the benefit of Filipinos suffering from kidney and related disorders. The renal disease and control program (REDCOP) was also created to carry out public health programs and projects of NKTi for preventing and controlling illnesses of kidney and other allied diseases. Administrative Order No. 2011-0003 or the national policy on strengthening the prevention and control of chronic lifestyle related non-communicable disease was also made to lessen the morbidity and mortality due to these diseases. The Philippine health insurance corporation (PhilHealth) launched the Z benefits for package to make kidney transplant services affordable. Although there are some programs for these diseases, there is still an increasing trend due to the reason that there are only several health care policies for genitourinary diseases in the Philippines. Despite the significant rise in mortality rates, it continues to be a low priority in the country.

### 3.2. Sex and age-specific mortality rates

The genitourinary disease sex-specific mortality rate trend from 1962 to 2019 as shown in Figure 2 shows that males account for the higher proportion of genitourinary disease deaths in the Philippines since 1962. The Philippines' male and female genitourinary disease mortality rates were compared using a two-independent sample t-test to determine whether there was a statistically significant difference. Results show that the p-value is 0.003 as shown in Table 1, which is less than 0.05. Hence, there is a considerable difference in the genitourinary disease mortality rate between males and females in the Philippines. For the sex-specific mortality rate trend from 1962 to 2019 as shown in Figure 2, it shows that since 1962, males have died from genitourinary diseases at a higher rate than females in the Philippines. More medical specialties are becoming aware of the differences in how conditions present themselves differently in men and women [26]. Although many studies have shown that females have a higher risk of getting genitourinary disease, males are more likely to die. Men may live generally unhealthier lifestyles, such as overconsumption of alcohol and smoking, which increases their chance of kidney failure. This is despite the Government's move to raise taxes on alcohol and tobacco to lessen purchases. According to DOH, 41.9% of men and 5.8% of women were reported to use tobacco in 2015 [27]. In 2019, in comparison to females, roughly 1 in 10 adult men, or 13.4%, smoked tobacco every day, while females only had 4.4%.

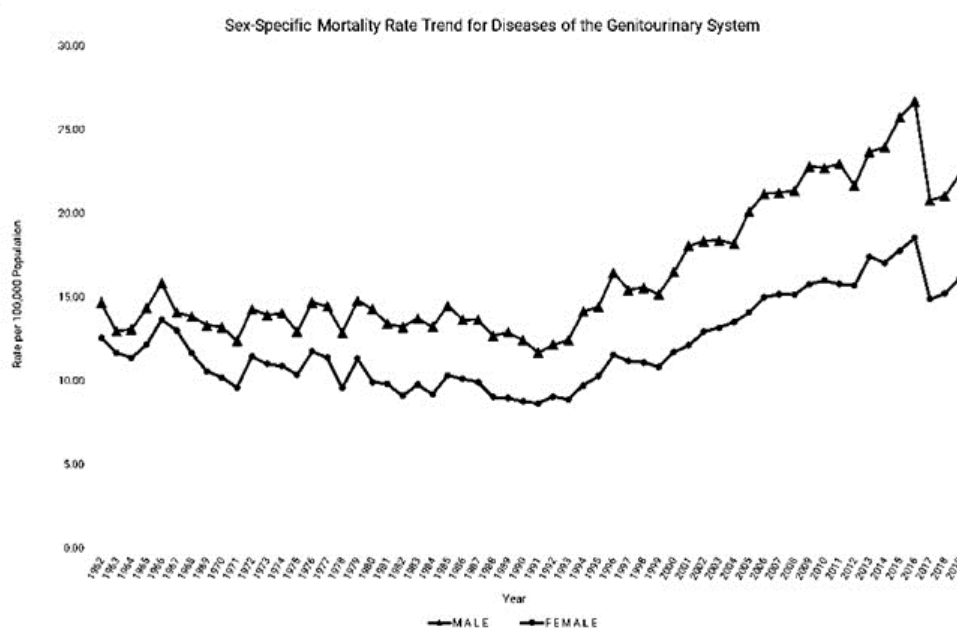


Figure 2. Sex-specific mortality rate trend from 1962 to 2019

Table 1. T-test results of sex-specific genitourinary diseases mortality rate

| t     | df  | Sig.  |
|-------|-----|-------|
| 2.984 | 112 | 0.003 |

Aside from lifestyle consequences, some physiological factors could also affect the differences in the mortality trend between males and females. Compared to women, men experience a faster deterioration in renal function [28]. The sex hormones estrogen and its receptors were found to have renoprotective effects and critical roles in healthy kidney function, as proven both in clinical and experimental studies [29]–[31]. On the other hand, testosterone was seen to have detrimental effects by escalating the formation of internal scar tissue and oxidative stress within the damaged kidney [32], [33].

Figure 3 shows that people ages 70 and over have the highest occurrence of genitourinary disease, followed by age groups 65 to 69 and 60 to 64 with 205.76, 82.45, and 57.02 mortality rates, respectively. On the other hand, people aged 10 to 14 years old have the lowest with a 1.86 mortality rate. The age-specific data also shows that the elderly have the highest mortality rate among all age groups. Since the global population of people over the age of 65 is expected to grow globally from 2000–2030 [34] due to improvement of life expectancy, problems for medical and social services for the elderly may also arise. Though the Philippines' demographic change has been slow because of the continuing high fertility rate [35]. Age is not the only independent risk factor of mortality. The high mortality rate of kidney disease in the elderly is primarily due to increased incidence of kidney risk factors like diabetes, hypertension, and cardiovascular diseases [36]. Kidney disease is particularly common in the elderly; as people age, there will also be changes in the structure of the organ including decline in their glomerular filtration rate, renal blood flow, and changes in the immune system that can later affect the kidney [37]–[39]. Kidney and bladder issues are more likely to develop in many older adults due to insufficient fluid intake [18].

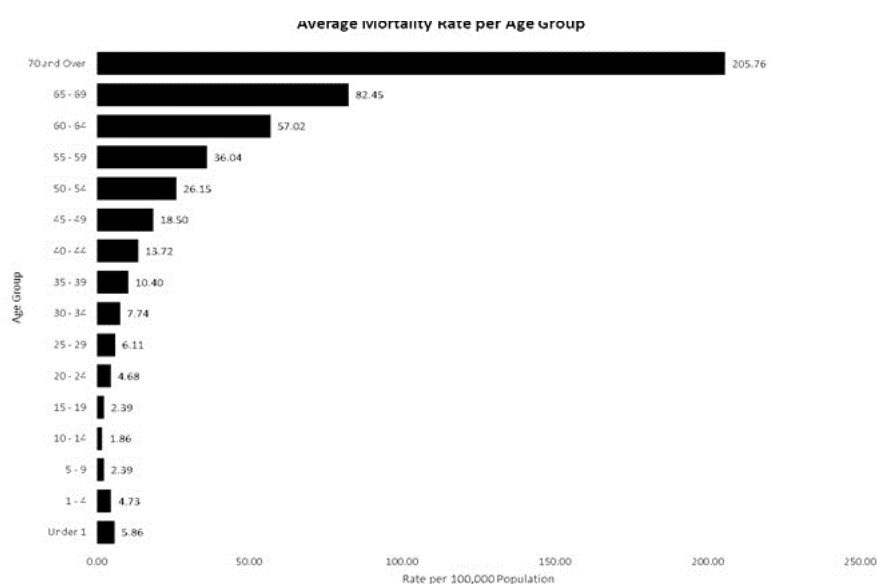


Figure 3. Age-specific mortality rate trend from 1962 to 2019

### 3.3. Region-specific morbidity and mortality rates

Figure 4 shows the average mortality rates per Region in the Philippines from 1999 to 2019. It can be observed that the highest mortality rate is found in Region XII followed by Regions VI, XI, VII, and III with 17.79, 16.99, 16.33, 16.21, and 14.97 mortality rates, respectively. The lowest mortality rate was found in the Autonomous Region of Muslim Mindanao (ARMM). The disparities in the regional mortality rate, as shown in Figure 4, could be attributed to health inequities that could be influenced by geographical location, income, education, and occupation of people. Although ARMM has the lowest mortality rate, it does not mean that the region has successfully addressed kidney-related health needs. ARMM region's input cause of death data is of poor quality. In the Philippines, region ARMM has the lowest vital statistics performance index quality (VSP IQ) of all the areas in the country, which means that the mortality data system is functioning poorly. The region's high percentage of recorded deaths is unusable and inadequately states the reasons for death. Thus, a very low mortality rate record.

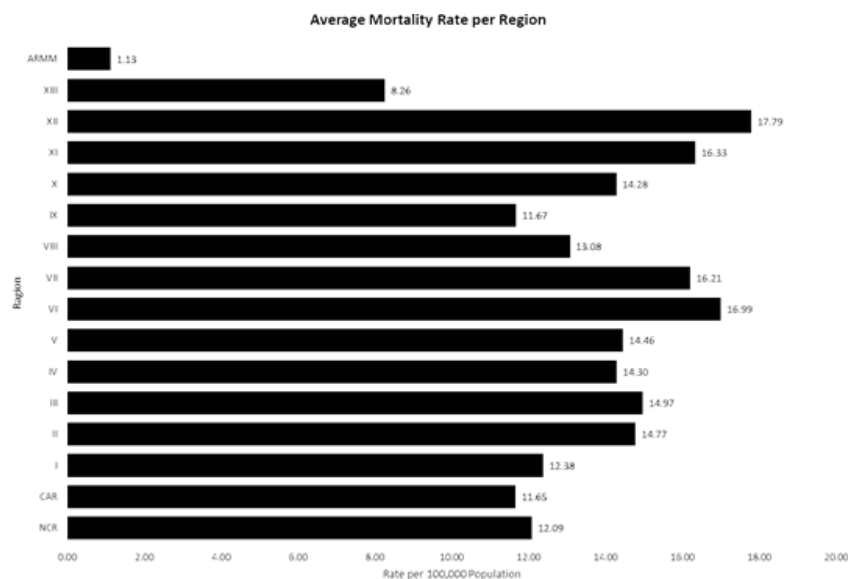


Figure 4. Average mortality rates per region for genitourinary disease, 1999-2019

### 3. CONCLUSION

The mortality rate trend for genitourinary system disease is increasing from the overall study period. It is still considered a health burden in the country, as expected since there is also an increase in the leading risks diseases causing kidney disease. In this study, we also found out that there are gender differences in the vulnerability of people to kidney diseases, with males recorded to be more vulnerable to it. Greater risk and increasing trends observed in older men and women highlight the urgent need to expand treatment advancements and programs for the population. Regional disparities were also observed, thus there should be a localized political will to solve this health issue for every population of the Philippines to achieve equal opportunity of having optimal level of health. Raising and enhancing awareness is important to improve the knowledge of the public regarding these diseases.

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