Retrospective Mortality Survey in The Gambia: A rapid assessment of mortality trend and excess deaths during the COVID-19 pandemic in 2020/21

Study Report

Directorate of Health Research
Ministry of Health
The Gambia

September, 2021

This report summarizes the findings of the 2016 – 2021 rapid mortality study carried out by the Directorate of Health Research (DHR). The study was funded by the UK Public Health through the UK Public Health Rapid Support Team (UK-RST), The Gambia.

Additional information about The Gambia Rapid Mortality Study, 2021 can be obtained from the Directorate of Health Research (DHR), FIB Building, Kairaba Avenue; Phone: 2122669/ 3247910; Email: sainey_sanneh@ymail.com

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List of Acronyms/Abbreviations

CHN	Community Health Nurse
CIOMR	Council of International Organizations of Medical Research
COVID-19	Corona Virus Disease 2019
CRR	Central River Region
CVD	Cardiac Vascular Disease
DHIS 2	District Health Information System 2
DHR	Directorate of Health Research
DPI	Directorate of Planning & Information
HDSS	Health and Demographic Surveillance System
HIV/AIDs	Human Immune-deficiency Virus/Acquired Immunodeficiency Syndrome
HMIS	Health Management & Information System
ICD-10	International Classification of Diseases 10th Revision
IT	Information & Technology
IUFD	Intra-Uterine Fetal Death
LRR	Lower River Region
MOH	Ministry of health
MRC	Medical Research Council
NBER	North Bank East Region
NBWR	North Bank West Region
PHC	Primary Health Care
SARS-CoV 2	Severe Acute Respiratory Syndrome Corona Virus 2
SPSS	Statistical Package for the Social Sciences
TB	Tuberculosis
UKPHRST	United Kingdom Public Health Rapid Support Team
UNICEF	United Nations International Children's Emergency Fund
URR	Upper River Region
WHO	World Health Organization

Executive Summary

Introduction

The scale of impact of COVID-19 in most of the low and middle-income countries including The Gambia remains unclear. Most countries in the Sub-Saharan Africa including The Gambia lack Civil Registration and Vital Statistics (CRVS) system to monitor the effects of the COVID-19 on mortality. Disruption to provision of essential healthcare services and change in the health-seeking behaviour of people may have resulted in increasing the number of people dying from preventable diseases. In The Gambia, Covid-19 testing capacity and access to testing are been limited, meaning a large number of undiagnosed cases and deaths are likely to occur in the country. Registration and monitoring of deaths in the country are very weak or absent in many facilities and communities. Use of routine data to assess excess mortality is therefore unlikely to estimate the impacts of the Covid-19 pandemic. Evidence suggests that infection increases mortality risk from a number of other conditions due to diversion of vital health care resources and interventions. All-cause mortality assessment provides a more complete and comprehensive measure of the impact of the Covid-19, as it captures the net effect of all factors that may increase or decrease mortality. Thus, this rapid assessment aims to generate accurate and credible baseline information on mortality as well as estimate the impact of Covid-19 pandemic in The Gambia.

Methods

A retrospective cross-sectional study design was used to assess mortality in The Gambia from 2016 to June, 2021 using routine data from health facilities and village health services. The data was collected electronically using tablets (device) and automatically synced and stored on daily basis at the District Health Information System 2 (DHIS2), a central database developed and protected by the Ministry of Health. During the process, all data entry personnel were given user account and password to access the database for data entry which was monitored by the server administrator. Data was analyzed and reported using descriptive, inferential statistics and time series analysis methods. Data analysis was performed in Stata and SPSS software packages. Data analysis was performed by experienced epidemiologists and statisticians and all the analyses have undergo peer-review before being accepted as final.

Ethical approval was obtained both from The Gambia/MRC Joint Research Ethics Committee and the London School of Hygiene and Tropical Medicine Ethics Committee. With favorable opinions being granted from both ethics' committees, the study was eventually implemented.

Results

Overall, there has been a consistent and steady trend of all-cause mortality in the Gambia over the past 5.5-year period. A total of 26,622 deaths were reported with male deaths accounted for 53% of total deaths. Public health facilities constituted 80% of all-cause mortalities during the period. An average mortality rate of 192.0 per 100,000 population was observed over the past five-year period in the Gambia. The rate of mortality among males was 206.5 per 100,000 as opposed to females with 178.0 per 100,000. The age group 65 years & above has the highest mortality rate of 1625.4 per 100,000, followed by 45 – 64 with 446.0 per 100,000, with the least rate of mortality observed among the age group 5 – 14 years (29.7 per 100,000). Under-five mortality rate accounted for 343.0 per 100,000. The rate of mortality was highest in Western Region 1 with 293.0 per 100,000, followed by LRR (268.6 per 100,000), with Upper River Region which accounted for the least mortality rate of 95.1 per 100,000.

Generally, the rate of mortality has declined by 10.3 per 100,000 population during the Covid-19 pandemic in the Gambia. However, there was a rise in mortality in the second wave, with an excess mortality of 22.6 per 100,000 population. Under-five mortality has declined by 100.7 per 100,000 during the pandemic. Though, an excess number of deaths was observed among the age group 5 – 14, 45 – 64 and 65 years and above with 10.1, 40.7 and 118.0 per 100,000 respectively. Amazingly, the rate of mortality among the age category 65 years & above has declined by 320.7 per 100,000 during wave 1, contrary to the excess mortality of 619.0 per 100,000 during the second wave. The rate of mortality has declined in Western Region 1 and Lower River Region during both waves of the pandemic. Nevertheless, Central River, North Bank East & North Bank West Regions has experienced excess deaths during the pandemic with 55.6, 54.0 & 41.6 per 100,000 population respectively. Among the leading causes of deaths, fetal complications (Intra-Uterine Fetal Deaths) constituted the highest proportion of deaths during wave 1 of the pandemic, followed by Sepsis and Covid-19 respectively. Similarly, IUFD, Sepsis and Stroke has accounted for the majority of the deaths during the second wave.

Conclusion & Recommendation

Despite the daily statistics on COVID-19 confirmed cases and its related deaths, the actual death toll from COVID-19 remains unknown. This uncertainty could be attributed to several factors, such as limited testing capacity, inadequate trained human resources, and a lack of well-established vital statistics registry, to name just a few. In the absence of adequate testing services, a substantial number of undiagnosed cases and deaths were likely to occur unreported. In the light of this, reliance on public health facilities routine data alone considered inadequate to estimate excess mortality during the pandemic. This explains the need for the inclusion of private health facilities and all communities served by Community Health Nurses in this rapid mortality assessment. The study sought to estimate excess mortality from COVID-19, and describe trends in mortalities over time. The study findings were achieved through a secondary data collection in the seven health regions countrywide for the period under review.

Overall, the results suggest a consistent and steady trend of all-cause mortalities in the Gambia over the past five-year period. More than three-quarter of the mortalities occurred in public health facilities. Male deaths accounted for the slight majority of the total deaths. The rate of mortality is more rapid among males as compared to their counterpart. Generally, an average mortality rate of 192.0 per 100,000 population was observed over the past five-year period in the Gambia. The rate of mortality was highest among the age group 65 years & above, followed by 45 – 64, with the least rate observed among the age group 5 – 14 years. Under-five mortality accounted for 343.0 per 100,000. The rate of mortality was highest in Western Region 1, followed by LRR, with URR which accounted for the least mortality rate.

Imperatively, there was a declined in mortality during the Covid-19 pandemic in the Gambia. However, there was a rise in mortality in the second wave, with an excess mortality of 22.6 per 100,000. The mortality rate for both male and female during the pandemic has declined. Yet, an excess number of deaths was noted among both gender during the second wave. Under-five mortality has declined during the pandemic including both wave 1 & 2. Though, an excess number of deaths was observed among the age group 5 – 14, 45 – 64 and 65 years and above. Amazingly, the rate of mortality among the age category 65 years & above has declined during wave 1, contrary to the excess mortalities noted during the second wave. The rate of mortality has declined in Western Region 1 and Lower River Region during both waves of the pandemic.

Yet, Central River, North Bank East & North Bank West Regions of the country has experienced excess deaths during the pandemic. Among the leading causes of deaths, fetal complications (Intra-Uterine Fetal Deaths) constituted the highest proportion of deaths during wave 1 of the pandemic, followed by Sepsis and Covid-19 respectively. Similarly, IUFD, Sepsis and Stroke has accounted for the majority of the deaths during the second wave.

Therefore, we strongly recommend the establishment of an electronic Civil Registration and Vital Statistics (CRVS) and mortality surveillance system in the Gambia to ensure a reliable and complete mortality database for subsequent similar studies. There is a need to conduct further studies on factors contributing to the high mortality due to fetal complications (IUFDs), Sepsis and NCDs (Stroke). Sensitization of the general public about COVID-19 and its consequences should be intensified across the country in order to reduce its associated morbidities and mortalities. Health care services should be decentralized to reduce the mortality burden in the West Coast Region

Chapter One: Introduction

Background & Justification

On 31 December 2019, the first case of a novel coronavirus, SARS-CoV-2, was reported in Wuhan, China. By 30 January 2020, the World Health Organization (WHO) had declared a Public Health Emergency of International Concern, and on 11 March, declared a pandemic (1). The coronavirus disease caused by SARS-CoV-2 has spread to almost every country in the world (2). Globally, as of 3rd September 2021, over 221 million confirmed cases of Covid-19, including 4,581,062 deaths have been reported (3). Whilst the disease spread rapidly through Asia, Europe and the Americas in the beginning, the first cases began to appear in Africa from Mid-February to March 2020.

In the Gambia, the first laboratory confirmed case of COVID-19 was reported on the 17th March 2020. From this date through to 3rd September 2021, the country has reported 9,789 confirmed cases with 328 deaths, a case fatality rate of 3.4% (3). The initial set of reported cases were mostly imported and sporadic and had resulted in the appearance of many secondary cases. From mid-July to mid-September, an unprecedented increase in the number of cases was observed with local transmission and a corresponding increase in COVID-19-related deaths. A second wave of infections has occurred in early 2021. During both waves many deaths, both from COVID-19 and other causes, had been registered across The Gambia. Deaths that were attributable to COVID-19 were mainly confirmed after the occurrence of death at health facility level. A policy stipulated that the corpses of all those who died during the COVID-19 pandemic required a sample to be collected for COVID-19 testing prior to burial. Corpses were kept in the mortuary until the results were available. If the sample test positive, the Red Cross are consulted to perform the burial, but a negative result meant the family could proceed with the burial. Whilst the process was thought to work well, it later emerged that some deaths in the communities were not reported and thus were not tested for COVID-19. Some religious denominations believed that once someone dies there shouldn't be any delay for burial rituals, and as the COVID-19 test could take up to three days before results were available, this policy was not always accepted or followed. As there is no mechanism for cemeteries to register/record burials, this has biased the

reported mortality data from COVID-19, with death tolls likely to be highly underestimated. Additionally, there were no established post-mortem investigations to ascertain causes of death. At present, only deaths associated with confirmed COVID-19 are reported to the Ministry of Health.

Moreover, Covid-19 testing capacity, coverage and access are been limited, meaning a large number of undiagnosed cases and deaths are likely to occur in the country. There is also inequality in access to testing, which is only primarily available in the greater Banjul area, meaning substantial geographical variation in mortality, with deaths outside the capital are likely to be vastly underestimated. Registration and monitoring of deaths in the country are very weak or absent in many facilities and communities. Use of routine data to assess excess mortality is therefore unlikely to estimate the impacts of the Covid-19 pandemic on mortality. Evidence suggests that infection increases mortality risk from a number of other conditions due to diversion of vital health care resources and interventions. All-cause mortality assessment provides a more complete and comprehensive measure of the impact of the Covid-19, as it captures the net effect of all factors that may increase or decrease mortality (4).

It was evident across the country that deaths were on the increase during the first wave of COVID-19 infections (summer 2020), but it was also not certain whether it was COVID-19 related due to the limitations with testing for COVID-19 described above. Also, the summer period traditionally sees higher death registration rates due to the high prevalence of malaria during this period of the year. However, in the past four to five years, the Gambia has achieved significant steps in reducing the prevalence of malaria in the country, suggesting that any significant increase in mortality during this period could in fact be related to COVID-19. Whilst the previous smaller study undertaken in 2020 collected data on mortality in public health facilities between 2018-2020, the present study expanded collection of mortality data from 2016 to June, 2021. It also included mortality data from private facilities across the country. This expansion of mortality data collection will undoubtedly enable The Gambia to quantify mortality during the second wave on the COVID-19 pandemic (early 2021) in addition to the first wave and has also improved the precision of mortality estimates.

Furthermore, it is widely known that the death registration process (from all causes) in the Gambia does not capture a large proportion of deaths which occur in the country. Assessment of

health facility mortality may reveal increases or decreases in mortality during the COVID-19 pandemic. Changes observed in health facility mortality could be due to a change is health seeking behavior, health facility capacity, or choice of place of death during the COVID-19 pandemic and therefore may not be a true estimate of change in the number of deaths.

Thus, this study will enable The Gambia to evaluate the impact of COVID-19 in the country by comparing mortality during the COVID-19 pandemic to the pre-pandemic period. In addition, the investigation has helped in revealing variances in excess mortality by region, gender and age which is expected to evidently inform future decisions, policies and strategies for the management of COVID-19. The study has also established a baseline data for both health facility and community mortalities in the country and enable future comparisons to be made. It also provided the basis in establishing a nationwide death surveillance system.

Study Aim

To establish an estimate of excess mortality from all-causes during the Covid-19 pandemic as well as changes in mortality from January 2016 – June 2021 to generate baseline information in supporting the ongoing mortality surveillance in the Gambia.

Study Objectives:

1. To estimate all-cause mortality for both health facility and community deaths in the Gambia
2. To calculate excess mortality during the COVID-19 pandemic by comparing before and during Covid-19 period.
3. To describe the differences in all-cause mortality between regions and demographics (Age and Gender)
4. To describe the changes in mortality (trend) from January 2016 – June 2021 in the country
5. To determine the proportion of deaths observed by broad categorization of cause of death overtime and during the COVID-19 pandemic

Chapter Two: Methodology

Study Population

This census mortality study has captured both health facility and community deaths in The Gambia from 2016 to June, 2021. The population of interest was the population of the Gambia.

Study Design

The study used an observational retrospective study design to assess mortality in The Gambia. It utilized routine data on death registrations in the country as well as a bespoke data collection from health services, both public and private including large facilities and village health services. Data collected was analyzed using descriptive statistics and time series analysis methods.

Study Restrictions

Inclusion of study data was restricted to deaths which occurred between January 2016 and June 2021. Only deaths with the year of death recorded were included.

Sampling Procedure

Mortality data was collected from all public and private health facilities across The Gambia, including 39 private health facilities, 56 public health facilities and 106 community health nurses (village health services providers).

In collaboration with the statistics unit of the MRC, The Gambia, a representative sample of geographic areas included in the data collection was calculated and a range of sampling approaches were considered. There are numerous justifications for collection of mortality data from all the facilities. Firstly, when sampling at facility level, it is difficult to account for patients travelling between regions to seek care and for referrals between facilities. In addition, it is important to include facilities across all seven health zones, and if data collection staff visit one facility in a region, there is limited additional time or cost to collect data from the other facilities in the region. Recent experiences from the previous similar study demonstrated that a data collection exercise involving all health facilities is feasible in a short timescale, with modest resources, and ultimately offered better value in terms of precision than a sampling approach. As the same data collection tool was used and the data collection team in The Gambia having adequate experience in the approach, data collection from all sources was straightforward. In

addition, by collecting data from all health facilities across the country, the study will help to establish routine mortality surveillance.

Data Collection

Information Collected

Public health facilities mortality data (2018 – 2020) from the previous study was made available. This data was supplemented by collecting mortality data from public facilities from 2016-2017 and the first six months of 2021 (and the full 5.5-year period for private facilities). Data on all deaths recorded in both health facilities and communities across the country within the 5.5 years (January 2016 and June 2021) was then collated electronically. Mortality data collected included the region, name and type (hospital, health center, or clinic) of health facility. Where available, it also collected data on key demographics (name, age and gender), date of death and cause of death. Personal identifiable data was collected to enable de-duplication across facilities and datasets.

Data Collection Procedure

The study used an electronic data collection tool programmed in DHIS2 (surveillance system used in The Gambia) developed by the Ministry of Health, as previously utilized by the earlier mortality study. The tool was tweaked in response to lessons learned from the previous study. Data collection has involved the recruitment of field staff in The Gambia, who previously worked on a similar mortality study (smaller). The Ministry of Health has employed eight teams of staff to undertake the data collection. Each of these teams consisted of 1 supervisor, 3 data collectors and 1 driver. Staff were employed for the duration of data collection (10 days). Training was delivered to data collection staff on the purposes of the study, the data collection tool (DHIS2), the information to be collected, and how the information will be stored and used. Each of the health facilities and village health service communities (PHC circuits) have been visited by the data collectors. The required data were collected through an electronic form using tablets (device). Data were automatically synced and stored on daily basis at the central database (DHIS2) which is secured and protected by the Ministry of Health.

Data Completeness and Validity

The data collection was anticipated to encounter issues on data completeness and duplication. To address these anticipated challenges, the following steps were undertaken:

1. Duplication of data: It was recognized that different sections of various health facilities may record deaths but data are usually captured centrally in the facility records department in most major health centers and hospitals. To avoid duplication within and between facilities, the study has collected personal identifiable information on all deaths to enable deduplication within and between facilities. Two people from the study team were tasked to cross-checked for any duplication. Then, a third person does the confirmation if there is any disagreement.

2. Missing data: It was recognized that there could be both missing variables and missing records. The previous mortality study has indicated good data completeness, however, revealed that cause of death was missing for some individual records. This is acknowledged as a weakness. Data completeness was assessed prior to data analysis. To provide assurance in terms of missing records, a small sample of data from each month was checked to see what percentage are included and missing from central records. Missing deaths were acknowledged as a possible weakness in the study.

3. Mortality data from the previous smaller study: A sample of data collected from public health facilities for 2018-2020 was audited to check for the validity of the data before including it into the main analysis.

Data Storage and Information Governance

The data was digitally collected and stored in the DHIS2 (central server of the Ministry of Health) which is secured and protected with a password. During the process, all data entry personnel were given user account and password to access the database for data entry which was monitored by the server administrator. Once the deduplication process has been completed, individual deaths were given unique identification numbers that was used for anonymity. Only study staff have access to the data and privacy of participants as well as the confidentiality of the data was not compromised.

Data Analysis

Data was analyzed and reported using both descriptive and inferential statistics. Data analysis was performed in Stata and SPSS software packages. The overall mortality rates in The Gambia were described over time and broken into various time periods. The mortality rates were stratified by categorical variables, including geography, gender, age group.

For each of the stratum, mortality rates and excess number of deaths (from all causes) during the COVID-19 pandemic (2020/2021) and during both waves (1 & 2) were calculated using various specific population estimates from the national population databases.

In addition, The MRC Health and Demographic Surveillance System (HDSS) (2) conducts 4-monthly community surveys, which include mortality assessment, so this data provided a reference for comparison and an insight into the extent of missing deaths in the community. There appears to be a downward trend in mortality in The Gambia. The extent of this downward trend is difficult to quantify due to the rise in non-communicable diseases and the lack of studies on mortality in the adult population in The Gambia. Seasonality in mortality is expected based on previous studies in Gambian children under five. Time series analysis allows for seasonality to be accounted and controlled for and to assess any changes in the trends. Therefore, interrupted time series analysis was undertaken to assess both changes in mortality between 2016 and 2021 and excess mortality during the COVID-19 pandemic in 2020/21. Use of this method has allowed for the assessment and control of seasonality in mortality.

Where available, cause of death was described. However, classification of deaths was not performed as it would be too challenging due to lack of standardized cause of death recording in The Gambia (e.g., currently no use of ICD-10 classifications). Still, in order to highlight the potential secondary impacts of COVID-19 on non-COVID-19 morality in The Gambia, we have calculated the proportion of deaths by broad categorization of cause of death.

In addition, where available, we have examined the day of the week the death occurred and how patterns may have changed during the COVID-19 pandemic to shed some light on the impact on healthcare access and delivery.

Quality Assurance

Following rigorous peer-review, the study proposal has received favorable review from the UKPHRST Technical Steering Committee. The protocol has been developed and undergone peer reviews from all parties involved in the project. Data collection involved the use of field workers with previous experience in a similar project. A training session (3 days) was conducted for field workers so that data collection procedures are cleared and standardized. Whilst in the field, field data collectors were supervised by experience study staff from the Ministry of Health and MRC, The Gambia. As data collection was performed by teams, data were consistently cross-checked to ensure its accuracy and completeness. Data analysis was performed by experienced epidemiologists and statisticians and all the analyses have undergo peer-review before being accepted as final.

Bias and Limitations

The main limitation of this study is that community deaths that occurred in non-primary health care villages (non-PHC villages) were not captured due to lack of reliable routine mortality data in such communities/villages. Notwithstanding, collecting mortality data from all the PHC villages and health facilities (both public & private) in the country has potentially and reliably provided us an accurate estimate of deaths occurring in both communities and health facilities. However, this study has substantially increased information on excess mortality during the COVID-19 pandemic because it has included both public and private health facility data as it is known that private health facilities data are often not reported to the Ministry of Health. It has also addressed the issue of information gap on COVID-19 related mortality outside of Banjul.

In The Gambia, there is a lack of standardized cause of death recording (e.g. currently no use of ICD-10 classifications). This causes a limitation as we were unable to classify deaths as being attributable to COVID-19 or not. The Ministry of Health is currently aiming to establish a robust medical certification process for cause of death using ICD-10 classifications, as per WHO international standards. This work is ongoing but will not be in place during the time of this study. This study may highlight the need for adequate and standardized classification of deaths to be adopted in The Gambia so that disease-specific mortality can be calculated.

Ethical Considerations

Ethical Committee Clearance

Ethical approval was obtained both from The Gambia/MRC Joint Research Ethics Committee and the London School of Hygiene and Tropical Medicine Ethics Committee. This study has met established guidelines for conducting research involving humans. In addition, we have followed the Tri-Council Policy Statement on Research Ethics and the Council for International Organizations of Medical Research (CIOMS) principles on ethics and research on human subjects. With favorable opinions being granted from both ethics' committees, the study was eventually implemented.

Protection of human subjects (vulnerable populations)

This study has not exclusively collected data from vulnerable populations. However, as the study involved collecting mortality data from the entire population, members of vulnerable populations who have died have been included in the study.

Risks

This observational study was conducted with no risk to the participants as it does not require active involvement of participants, but rather involved secondary data collection method by reviewing health facility and community mortality records.

Confidentiality

All the participants' identifiable data collected are stored securely at the study coordination center (DHR) and their confidentiality is strongly assured in accordance with the Data Protection Act 1998. All study documents with personal identifiers are kept in locked filing cabinets. Filling cabinets can be access only by a limited number of study staff. The study staff were trained to understand their duties regarding the confidentiality of data. All the data were collected in electronic format using tablets and can only be accessed by the use of a protected password.

Study Benefits

The outcome of this study will allow the ministry of health of The Gambia to quantify the impact of COVID-19 on the mortality in the country by measuring excess mortality through epidemiological methods. In doing so, this will increase the knowledge and intelligence needed

to inform policies on how to appropriately response and manage COVID-19 and other epidemics in the long-term, yet will provide scientific-evidence on the impact of COVID-19 on the population. It will inform the national strategy for the ongoing response to the COVID-19 pandemic thus informing measures to reduce the impacts of COVID-19 on the population.

Capacity building for sustaining ongoing surveillance of excess deaths in The Gambia is an important secondary benefit of the study. The study will support capacity building within the ministry of health, both within the surveillance and research teams in the areas of epidemiology and operational research. This study may also pave the way to introducing a nationwide death surveillance system and training will be provided to health facility staff so that they are able to use the DHIS2 data collection tool on a longer-term basis, outside the life of the study. In addition, through discussions with health facility staff, the feasibility and acceptability of using this tool on a longer-term basis has been explored (known). This could help inform government recommendations on the establishment of a mortality surveillance system.

Collaboration with other key partners including the MRC, The Gambia is another essential benefit of this study. Thus, MRC The Gambia may support continued partnership on operational research activities in the future.

Informed Consent

The data collection sources (health facilities and village health service communities) were informed about the nature and purpose of the study. Appropriately trained study staff who speak the language of healthcare staff were used to deliver the information and were always available to answer any questions. Health facilities and communities that were involved in the study were given the option to either participate or not to do so.

Output Dissemination

The findings of this study will be presented in a manuscript which will be submitted to a peer reviewed journal. In addition, an abstract of the findings will be prepared and submitted to an international global health conference. Internal reports of the findings will be prepared and shared with regional health centers and the health facilities which participated in the study (upon request). In addition, the findings will be presented to colleagues internally in the Ministry of Health, MRC Gambia, UK Public Health Rapid Support Team, Public Health England and others.

Publication Policy

All publications and presentations relating to this study are authorized by the study team. The named authors will include at least the core study team. Members of the study team will be listed, and contributors will be cited by name if published in a journal where this does not conflict with the journal's policy. Authorship of parallel studies initiated outside of the study team will be according to the individuals involved in the project but must acknowledge the contribution of the study team.

Chapter Three: Results

Table 1: Deaths by places of occurrence, 2016 - 2021

Year	Public	Community	Private	Total	Percent
2016	3742	978	92	**4812**	18%

2017	3228	1076	136	**4440**	17%
2018	4092	762	114	**4968**	19%
2019	4061	619	135	**4815**	18%
2020	4019	877	121	**5017**	19%
2021(June)	2173	314	83	**2570**	10%
Total	**21315**	**4626**	**681**	**26622**	100%

Table 1 above shows the distribution of deaths by place of occurrence. The analysis reveals that there were 26,662 total deaths between 2016 to June 2021. The findings showed that in 2016, out of a total of 4812 deaths, 3742 occurred in public health facilities and 978 in the communities. Deaths in 2020 constitute 19% (n=5,017) of the total deaths between 2016 and 2021. The total number of deaths in public facilities in 2020 was 4,019, whilst 877 deaths occurred in the community and 121 in private health facilities.

Figure 1: Proportion of Mortality by Places of Occurrence in The Gambia (2016-2021)

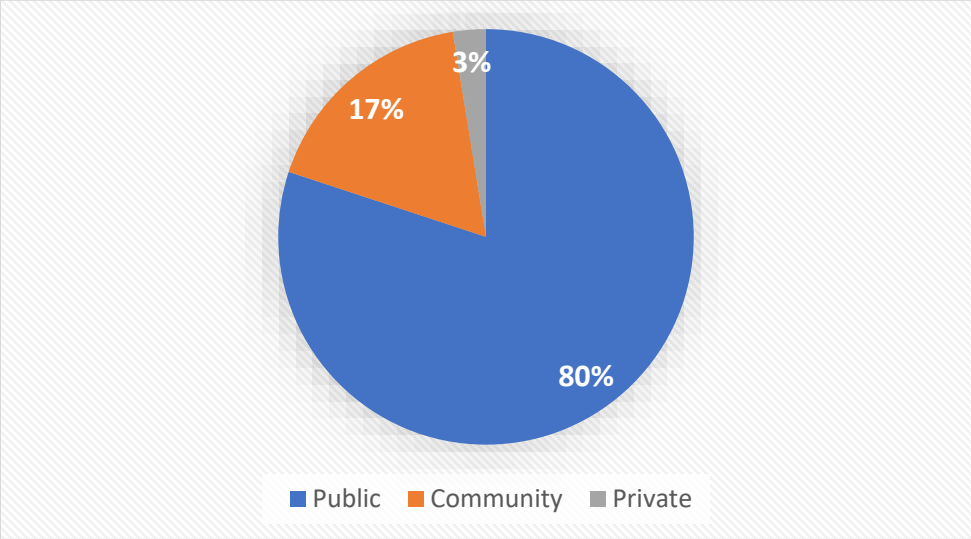

Figure 1 shows the proportion of mortality by place of occurrence between 2016 and 2021. The findings show that 80% of deaths occurred in public facilities and 17% occurred in the communities.

Table 2: Deaths by age category, 2016 - 2021

Age Cohort	2016	2017	2018	2019	2020	2021	Total	Percent
0-14	2042	1559	1735	1872	1696	849	9753	37%
15-24	247	235	248	202	239	107	1278	5%
25-39	527	547	512	442	493	259	2780	10%
40-59	681	744	743	688	772	470	4098	15%
60+	1315	1355	1441	1334	1506	885	7836	29%
Unknown	0	0	289	277	311	0	877	3%
Total	4812	4440	4968	4815	5017	2570	26622	100%

Table 2 shows deaths by age category between year 2016 and 2021. The analysis shows that 37% of the total deaths during this period happened to those between the ages of 0-14. Twenty-nine percent (29%) of those who died were aged 60 and above. In 2016, 2,042 people between the ages of 0 and 4 died. The age category with most deaths was the 60 and over, accounting for 1,315 deaths. In 2017, too, the age categories with most deaths are 0-14 and 60 and over, registering 1,559 and 1,355 deaths, respectively. A similar pattern can be seen in subsequent years, for instance in 2020, 1,696 people within the age category of 0-14 died as well as 1,506

people aged 60 and over. The year 2020 has the highest number of total deaths with 5,017 deaths, followed by 2018 with 4,968 deaths and 2019 with 4,815 total deaths. It was found that most deaths occurred in 2020, recording 5,017 (19%) deaths, followed by 4,968 (19%) deaths in 2018, and 4,815(18%) deaths in 2019.

Figure 2: Proportion of Mortality by Age group in The Gambia (2016-2021)

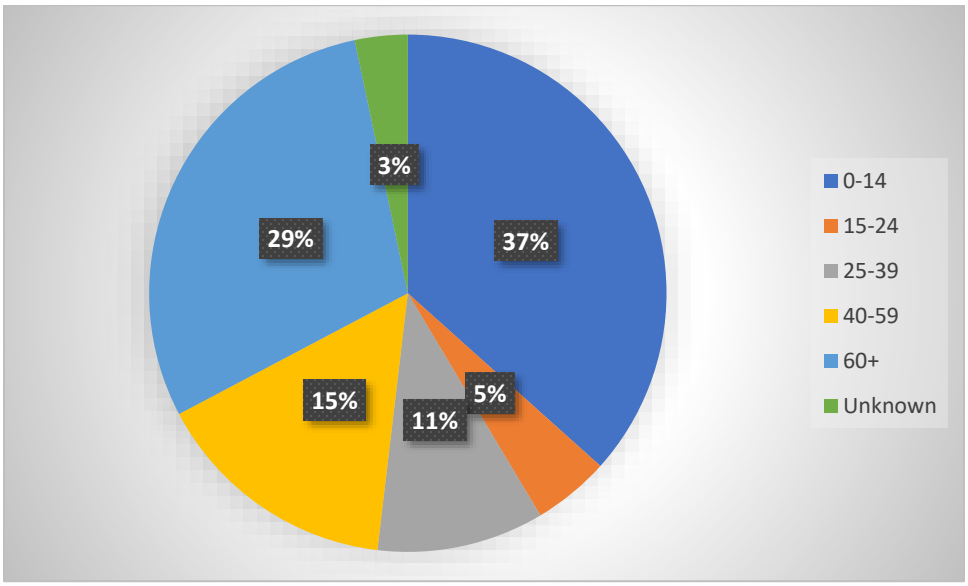

Table 3: Annual Distribution of Deaths by Regions, 2016 - 2021

Regions	2016	2017	2018	2019	2020	2021	Total	Percentage
WHR1	2918	2436	3531	2957	2632	1345	15819	59%
WHR2	497	482	430	703	802	356	3270	12%
LRR	238	312	214	232	197	109	1302	5%
CRR	614	494	381	418	608	339	2854	11%
URR	189	203	291	263	332	138	1416	5%
NBWR	181	209	30	87	125	131	763	3%

NBER	175	304	91	155	321	152	1198	5%
Total	4812	4440	4968	4815	5017	2570	26622	100%

Table 3 shows the distribution of deaths by regions from 2016 to 2021. The findings revealed that Western Region 1 had the highest number of deaths from 2016 to 2021, constituting 59% of the total deaths that occurred in the country over the period. The region with the second highest number of deaths was Western Region 2 representing 12%, then followed by CRR with 11%. of the total deaths. North-Bank West Region had the least number of deaths with 3%.

Figure 3: Annual Death Distribution by Regions, 2016- 2021

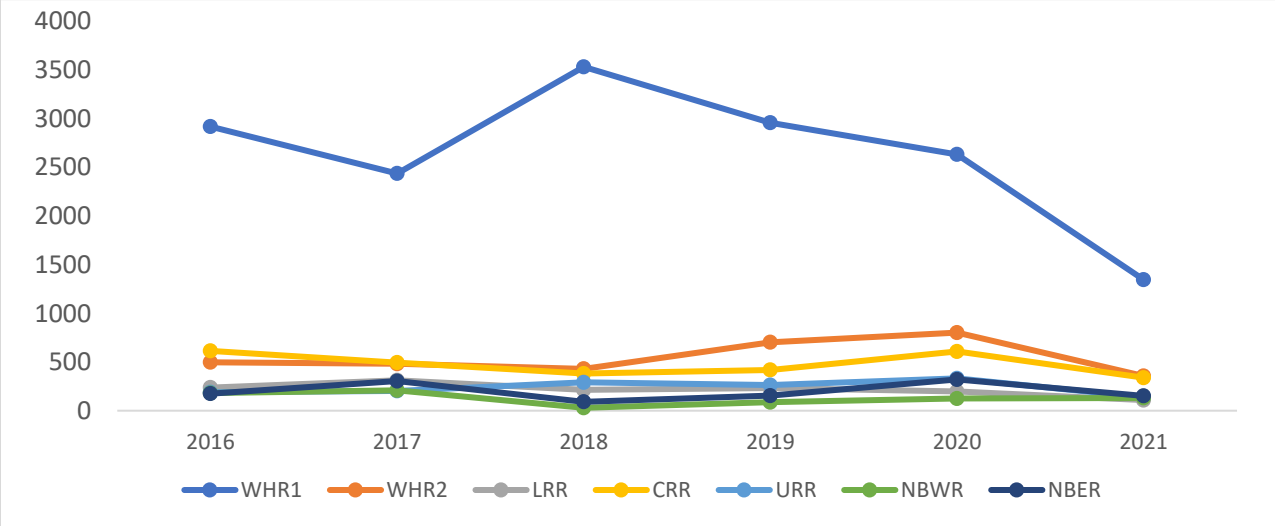

Table 4: Sex Distribution of Deaths by Year, 2016-2021

Year	Female	Male	Unknown	Total	Percent
2016	2307	2491	14	4812	18%
2017	2101	2329	10	4440	17%
2018	2326	2610	32	4968	19%
2019	2179	2612	24	4815	18%
2020	2356	2639	22	5017	19%
2021	1163	1394	13	2570	10%

Total	12432	14075	115	26622	100%

Table 4 shows the annual distribution of deaths by sex. The analysis reveals that in 2016, out of 4,812 deaths, 2491 were males. In 2017, there were 2,329 deaths among males and 2,101 deaths among females whilst in 2018, out of a total of 4,968 deaths, 2,610 were males and 2,326 were females whilst the sexes of the rest unknown. In 2019, 2020 and 2021, male deaths were 2,612, 2,639 and 1,394 respectively. The total number of deaths among males between 2016 and 2021 was 14,075, whilst that of females was 12,432.

Figure 4: Distribution of Mortality by Sex, 2016 - 2021

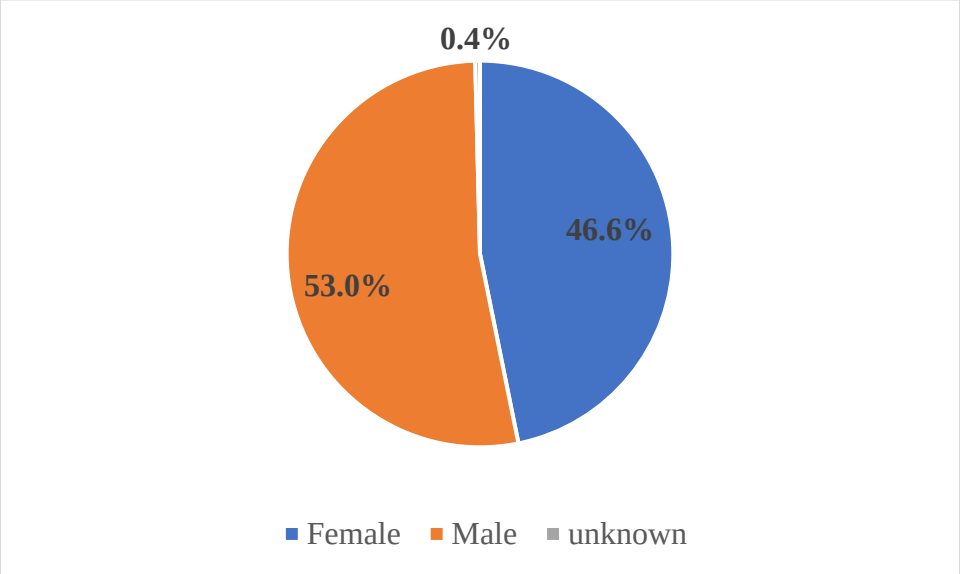

Figure 4 shows the distribution of deaths by sex between 2016 and June 2021. The findings show that 53% of those who died were males

Table 5: All-cause Mortality Rate per 100,000 Population by Person, Place & Time, 2016 - 2021

Key Study Variables	Sub-Variables	All-Cause Mortality Rate/100,000 Population						
		Time Period						
		2016	2017	2018	2019	2020	2021 (Jan - Jun)	Average Mortality Rate (2016 - 2020)
Overall		198.9	186.4	202.5	183.0	188.9	177.5	191.9
Gender	Males	210.6	198.8	217.2	202.7	203.0	198.2	206.5
	Females	187.4	174.2	188.1	163.7	174.9	155.5	177.7
Age Group	0 -4	407.9	334.3	350.9	337.0	284.9	416.3	343.0
	5 - 14	34.8	23.7	31.8	27.0	31.4	15.9	29.7
	15 - 24	55.4	51.0	52.0	41.3	47.2	40.4	49.4
	25 - 34	104.2	116.3	98.9	83.3	85.2	83.6	97.6
	35 - 44	211.9	196.9	186.7	173.7	185.1	198.1	190.9
	45 - 64	456.6	459.3	473.7	393.4	446.8	540.5	446.0
	65 & above	1607.9	1639.1	1652.8	1555	1672	1827.3	1625.4
Geography	West Coast Region 1	320.4	251.4	374.8	294.5	228.5	209.9	293.9
	West Coast Region 2	117.1	107.5	68.3	96.9	124.5	55.5	102.9
	Central River Region	164.1	177.7	151.2	163.9	243.3	161.3	180.0
	Lower River Region	257.2	347.0	248.8	266.5	223.6	161.5	268.6
	Upper River Region	73.8	76.8	107.9	91.4	125.4	83.1	95.1
	North Bank East Region	146.7	309.0	73.6	120.1	261.5	171.8	182.2
	North Bank West Region	152.9	172.4	24.2	68.4	92.2	178.5	102.0

Table 5 shows all-cause mortality rate per 100, 000. The findings showed that in 2016, all-cause mortality rate was 198.9. The mortality rate was 202.5 in 2018 and the six-month mortality rate

in 2021 is 177.5 per 100, 000. The average mortality rate for the entire 5-year period was 191.9 per 100, 000.

With regards to the mortality rates among genders, the mortality rates among males have been found to be higher than those of females between 2016 and 2021. In 2016, the mortality rate among males was 210.6 per 100, 000, whist that of females was 187.4 per 100,000. In 2019, males' mortality rate was 202.7, whilst that of females was 163.7 per 100,000. In 2021, between January to June, all-cause mortality rate among males was 198.2, whilst that of females was 155.5 per 100,000. The average all-cause mortality rate for the entire period in terms of gender was 206.6 for the males and that of females was 177.7 per 100,000.

The mortality rates were further stratified according to age categories. The analysis reveals that the mortality rate among those between the ages of 0-4 was 407.9 per 100,000 in 2016, and that of those between the ages of 25-34 was 104.2 per 100,000. The age category of 65 and above had an all-cause mortality of 1607.9 per 100,000 in 2016. In 2020, all-cause mortality rate among those between the ages of 5-14 was 31.4, and that of people within the age bracket of 15 to 24 was 85.2 per 100,000.

The findings show that the all-cause mortality rate in the West Coast Region1 in 2016 was 320.4 per100,000. The mortality rate in the Upper River Region in the same year was 73.8 per 100,000. In 2018, all-cause mortality rate in the West Coast Region 1 and West Coast Region 2 were 374.8 and 68.3 per 100,000, respectively. In 2021, between January and June, all-cause mortality rate in the West Coast Region 1 was 209.9 per 100, 000, whilst it was 55.5 and 161.3 per 100,000 in the West Coast Region 2 and the Lower River Region, respectively.

Table 6: **Observed and Excess Mortality Rate per 100,000 Population by Person, Place & Time, 2016 - 2021**

Key Study Variables	Sub-Variables	All-Cause Mortality Rate/100,000 Population			
		Reference Period (Pre-pandemic)	COVID-19 Pandemic Period (July 2020 - June 2021)	Wave 1 (July - Sept, 2020)	Wave 2 (Jan - Apr, 2021)

		Average Mortality (2016 - 2019)	Observed Mortality	Excess Mortality	Excess Mortality	Excess Mortality
Overall		**192.7**	**182.4**	**-10.3**	**-29**	**22.6**
Gender	Males	207.3	198.6	-8.7	-22.7	29.4
	Females	178.4	165.3	-13.1	-36.1	15.8
Age Group	0 -4	357.5	256.8	-100.7	-116.9	-95.7
	5 - 14	29.3	39.4	10.1	1.6	-4.7
	15 - 24	49.9	46.6	-3.3	-18.3	-0.3
	25 - 34	100.7	79.2	-21.5	-40.1	7.1
	35 - 44	192.3	174.7	-17.6	-57.4	51.3
	45 - 64	445.8	486.5	40.7	-33.6	189.9
	65 & above	1613.8	1731.5	117.7	-320.7	618.8
Geography	Western 1	310.3	207.8	-102.5	-138.1	8.4
	Western 2	97.5	104.9	7.5	25.1	-0.6
	CRR	164.2	219.8	55.6	96.7	69.0
	LRR	279.9	205.6	-74.3	-9.6	-75.6
	URR	87.5	104.3	16.8	47.7	21.7
	NBER	162.4	216.3	54.0	143.5	90.2
	NBWR	104.5	146.1	41.6	1.4	103.5

Table 6 illustrates Observed and Excess Mortality Rate per 100,000 population by person, place, and time. In analysing the overall all-cause mortality rate per 100,000 of the population, the findings reveal that during the pre-pandemic period (i.e., between 2016 and 2019), the average mortality rate was 192.7 per 100,000 of the population. During the pandemic (i.e., between July 2020 to June 2021), the mortality rate was 182.4, thus pointing to a decline in mortality by 10.3 per 100,000 during the period. The overall all-cause mortality rate in the pandemic was further disaggregated into wave 1 and wave 2. During wave 1, the observed mortality rate was 178.4 per 100,000, whilst a decline in mortality of 29.0 per 100,000 of the population was found. In the second wave, the observed mortality was 205.5 per 100,000, whilst an excess mortality of 22.6 per 100,000 was noted. The findings show that during the pre-pandemic period, the average all -cause mortality rate among males was 207.3, whilst in the pandemic period, the observed mortality rate was 198.6 per 100,000, thus representing a decline in mortality rate of (8.7) per 100,000. During wave 1, the observed mortality rate among males was 194.9 and that of females was 161.2. The mortality has declined among both males and females (22.7 and 36.1 per 100,000 respectively). In wave 2, the observed mortality rate among males was 225.4 and that of females was 185.8 per 100,000. The excess mortality rates were 29.4 and 15.8 per 100,000 for males and females respectively.

With regards to all-cause mortality rates among age groups, it was observed that during the pre-pandemic period, the average mortality rate among those aged between 15-24 is 49.9 per 100,000, whilst during the pandemic period, the observed mortality rate within this age group was 46.6 per 100,000, representing a decline in mortality by 3.3 per 100,000. In wave 1 of the pandemic, the observed mortality rate among those aged 15-24 was 34.0 per 100,000 and a decline in mortality by 18.3 per 100,000. However, during wave 2, the observed mortality rate rose to 45.9 per 100,000, while a fall in mortality rate was 0.3 per 100,000. Among those aged between 45-64, the average mortality rate during the pandemic was 445.8 per 100,000. However, during the pandemic period, the observed mortality rate among this age group was 486.5. An excess mortality rate of 40.7 per 100,000 during wave 1 of the Covid-19 pandemic was revealed. The observed mortality rate among those aged 45-64 was 419.2, whilst a decline in mortality was 33.6 per 100,000. In wave 2, the observed mortality rate was 611.4 and the excess mortality was 189.9 per 100,000. Among those aged between 65 and above, the average mortality rate during the pandemic was 1613.8 per 100,000. However, during the pandemic period, the

observed mortality rate among this age group was 1731.5 and had an excess mortality rate of 117.7 per 100,000. During wave 1 of the Covid-19 pandemic, the observed mortality rate among those aged 65 and above was 1748.8, whilst the decline in mortality was 320.7 per 100,000. In wave 2, the observed mortality rate was 2135.8, whilst the excess mortality was 618.8 per 100,000.

The pre-pandemic average mortality rate for the Western Region 1 was 310.3 per 100,000, whilst the mortality rate during the pandemic is 207.8 per 100,000. A mortality declines of 102.5 per 100,000 was observed. For Western Region 2, the pre-pandemic average mortality rate was 97.5 per 100,000, whilst the rate during the pandemic was 104.9 per 100,000, pointing to an excess mortality rate of 7.5 per 100,000.

In the Upper River Region (URR), the pre-pandemic average mortality rate was 87.5 per 100,000, whilst during the pandemic, the average mortality rate is 104.3 per 100,000. The excess mortality between the pre-pandemic and the pandemic period is 16.8 per 100,000.

Table 7: **Proportion of All Deaths Observed by Broad Categorization of Cause of Death Overtime and during the COVID-19 Pandemic, 2016 - 2021**

Key Study Variable	Sub-Variables	% Proportion of All Deaths in State Time Period							
		2016	2017	2018	2019	2020	2021 (Jan - Jun)	During Covid-19 Pandemic (Wave 1)	During Covid-19 Pandemic (Wave 2)
Cause of Death	Malaria	1.8	1.2	1.4	0.9	1.7	0.1	1.2	0.2
	HIV	1.8	1.3	1.7	1.5	1.7	0.7	1.8	0.7
	Cardiac Failure	4.0	5.3	5.2	5.8	5.5	3.4	6.1	2.8
	Cancer	0.6	1.4	1.5	1.2	0.7	1.1	0.7	1.1
	Diabetes	0.9	1.3	1.0	1.4	1.7	1.7	2.1	1.6
	Hypertension	4.3	4.9	3.2	3.6	4.4	4.1	4.6	4.3

Sepsis	11.5	12.5	10.4	10.4	9.5	6.4	7.3	6.4
Stroke	4.6	4.7	3.8	4.3	5.8	5.4	4.9	5.1
TB	2.2	2.4	2.0	1.0	1.1	2.3	1.2	0.8
Respiratory Failure	3.5	5.3	2.6	3.8	3.6	3.0	4.8	3.6
Pneumonia	4.9	4.9	3.2	3.3	4.0	4.3	4.0	4.6
Covid-19	0.0	0.0	0.0	0.0	2.8	3.0	6.5	3.0
Accidents	2.2	2.4	2.0	1.0	1.1	2.3	0.5	1.8
Maternal Complications (Deaths)	0.3	0.3	0.6	0.3	0.4	0.2	0.7	0.2
Fetal Complications (IUFDs)	11.1	7.0	6.6	10.2	8.6	14.3	11.7	13.2

Table 7 shows proportions of deaths observed by a broad categorization of causes of deaths overtime and during the COVID-19 pandemic. The analysis shows that the proportion caused by malaria in 2016, 2017 and 2018 were 1.8%, 1.2% and 1.4%, respectively. In 2019, the proportions of deaths caused by malaria were 0.9 %, and 1.7% in 2020. In 2021, between January to June 2021, malaria deaths constituted 0.1% of the total number of deaths. During wave 1 of the Covid-19 pandemic, malaria deaths constituted 1.2% of the total deaths, and in wave 2, the proportion of deaths caused by malaria dropped to 0.2%.

It was observed that there was a rise in the proportion of deaths caused by cardiac failure during wave 1 of the pandemic with 6.1% of the total deaths. However, in wave 2, there was a drastic drop in the proportion of deaths due to cardiac failure to 2.8%

Diabetes constituted 0.9% of all causes of deaths in 2016, 1.3% in 2017 and 1% in 2018. It was discovered that more than 1% of the deaths in 2019 were caused by diabetes, and 1.7% in 2020

and 2021. During wave 1 of the Covid-19 pandemic, diabetes deaths contributed to 2.1% of the deaths, whilst in wave 2, the proportion of deaths attributed to diabetes was 1.6%.

There was a reduction in the proportion of deaths caused by accidents during wave 1 of the Covid-19 pandemic with 0.5% of the total deaths compared to years prior to the pandemic.

Summary of Findings

1. Overall, there has been a consistent and steady trend of all-cause mortality in the Gambia over the past 5.5-year period (2016 – June 2021).
2. The average rate of mortality in the Gambia over the past five years was found to be 191.9 per 100,000 population.
3. The mortality rate was much higher among males and the age group 45 years & above, particularly those above 65 years. The age category with the least rate of mortality was 5 – 24 years.
4. The regions with the highest mortality rates were Western 1 and LRR, respectively; with the lowest rate observed in URR.
5. Generally, the rate of mortality in the Gambia has declined during the pandemic by 10.3 per 100,000 population; though a slight excess mortality rate was observed during the second wave of the pandemic.
6. The rate of mortality has declined for both gender during the pandemic; yet an excess number of deaths was noted among both male and female in the second wave.
7. The age group greatly affected during the pandemic, more so in the second wave was 65 years & above; with a considerably declined in mortality among the under-fives'.
8. Western region 1 has greatly experienced a reduction in mortality during the pandemic; with a very minimal excess deaths in the second wave (8.4 per 100,000). LRR equally noted similar trend during both waves of the pandemic. However, CRR, NBER & NBWR

had the greatest burden of excess mortalities during the pandemic period including both wave 1 & 2.

9. During the first wave of the pandemic, fetal complications (IUFDs), Sepsis, Covid-19 & Cardiac failure were the main leading causes of deaths; whereas in the second wave, IUFDs, Sepsis, Stroke and Pneumonia constituted the greatest burden among the causes of deaths recorded during the period.
10. Imperatively, excess mortality was remarkable observed in the second wave of the pandemic as compared to wave 1; though a decline in mortality was found overall during the pandemic period in the Gambia.

Chapter Four: Discussion

Several evidences suggests that Covid-19 infection increases mortality risk from a number of other conditions due to diversion of vital health care resources and interventions. In The Gambia, Covid-19 testing capacity and access to testing are been limited, meaning a large number of undiagnosed cases and deaths are likely to occur in the country. Also, registration and monitoring of deaths in the country are very weak or absent in many facilities and communities. Therefore, use of routine data to assess excess mortality is unlikely to estimate the impacts of the Covid-19 pandemic in the country. All-cause mortality assessment provides a more complete and comprehensive measure of the impact of the Covid-19, as it captures the net effect of all factors that may increase or decrease mortality. Thus, this rapid assessment aims to generate accurate and credible baseline information on mortality over the past five years period as well as estimate the impact of Covid-19 pandemic in The Gambia.

The study findings indicated that the year 2020 constituted the highest number of death (19%) over the five-year period (2016-2021). This could be attributed to the fact that, covid-19 emerged in the Gambia in 2020 which subsequently resulted to lot of disruptions in service delivery coupled with major restrictions. Overall, there has been a consistent and steady trend of all-cause mortality in the Gambia over the past 5.5-year period (2016 – June 2021). The average rate of mortality in the Gambia over the past five years was found to be 191.9 per 100,000 population. Generally, the rate of mortality in the Gambia has declined during the pandemic by 10.3 per 100,000 population; though a slight excess mortality rate was observed during the second wave

of the pandemic. This finding corresponds with a study conducted in Europe which revealed that, in 2020, there was barely any excess mortality in both Germany and Sweden (5).

The analysis revealed that public health facilities constituted the largest proportion of deaths (80%). The country has several public health facilities ranging from minor health facilities to hospitals in the various regions for the purpose of health care service delivery including patient care and management of dead bodies (mostly brough in for the purpose of confirmation and last office procedures). As such, deaths reported by public health facilities was expected to be greater than that of private facilities and communities due to the affordability and accessibility of health care services attributed to public health facilities.

It was found out that males had a higher death occurrence than females throughout the study period. The rate of mortality has declined for both gender during the pandemic; yet an excess number of deaths was noted among both male and female in the second wave. A similar conclusion was made which indicated that men had consistently higher age standardized mortality rates than women across the period in all the countries (6). Therefore, it could be assumed that the male folks are most likely to be involved in risky behaviors or situations which exposes them to unfavorable circumstances and thereby contributing to the high number of deaths.

Deaths due to chronic conditions such as cardiac failure, hypertension, respiratory failure, stroke, and pneumonia during wave 1 & 2 was notably observed, and claimed more lives among men than women during the pandemic. Most of these conditions largely affect adults and during this period most people do not either visit the health facilities or report late to health facilities. This is justified based on the 2021 Statistical Update which furnished U.S. mortality data from 2018, which shows that cardiovascular disease remains the leading cause of death in the U.S (7). Also, the World heart foundation reported that the majority of deaths due to CVD are precipitated by risk factors such as high blood pressure, high cholesterol, obesity, or the presence of diabetes, which can, to a large extent, be prevented or controlled through the consumption of a healthy diet, regular exercise and avoiding tobacco. According to the report, the rise of CVD has therefore been linked to progressive urbanization (8). Similarly, in the Gambia, non-communicable diseases (CVD) are steadily on the rise at an alarming rate and if not properly addressed may end up wiping the adult population in the country.

Covid-19 constituted 6.5% of deaths in wave one while 3% of the deaths in wave two. This is significantly high compared to other disease conditions. Due to the fact that more concentrations were on its consequences, this has promoted health inequalities as in relation to other deadly conditions. The age group greatly affected during the pandemic, more so in the second wave was 65 years & above; with a considerably declined in mortality among the under-fives'. This age (65 years & above) by mortality effect is consistent with the global data on excess mortality that shows the highest mortality risk in those who are aged 65 years or older (9, 10 & 11). A Similar study done in America found that 95% of Americans killed by covid-19 were 50years or older (7). Also, another demographic surveillance conducted in Bangladesh reported a 28% increase in excess deaths among the elderly population during the first months of the pandemic (5). This could be due to the fact that this population is seen to be the most vulnerable group for COVID-19 infections apart from people living with chronic conditions. This statement was backed by a study which concluded that the number of deaths from covid-19 is mostly associated with either old age or people living with other chronic conditions such as CVD, Diabetes, Hypertension, respiratory diseases etc. (8). The pandemic may result in increased deaths from other causes for a number of reasons including weakened healthcare systems; fewer people seeking treatment for other health risks; or less available funding and treatment for other diseases e.g. malaria, tuberculosis, HIV/AIDS.

Western 1 as the most densely populated region in the country has greatly experienced a reduction in mortality during the pandemic; with a very minimal excess deaths in the second wave (8.4 per 100,000). LRR equally noted similar trend during both waves of the pandemic. Yet, CRR, NBER & NBWR had the greatest burden of excess mortalities during the pandemic period including both wave 1 & 2. The circumstances surrounding this epidemiological phenomenon is yet to be explored and therefore remained unknown. Contrary to this, a study done in America found out that places that have borne the brunt of the coronavirus outbreak are densely populated urban and suburban areas (12).

Nonetheless, the regions with the highest mortality rates were Western 1 and Lower River Region, respectively; with the lowest rate observed in URR. Surprisingly, LRR which is the smallest region in the country was the second leading region in terms of mortality rate. Nonetheless, it could be presumed that the region may have a high prevalence of non-communicable & chronic diseases

(prominent leading causes of deaths) that are highly common in the rural than the urban settlement. Those in the urban areas might have a better opportunity in terms of awareness and positive health seeking behaviours with better health care services. This finding could be supported by a study done in China Hubei province which concluded that 86.2% of deaths were attributed to chronic & non-communicable diseases as the main leading causes of deaths in both urban and rural areas, and the mortality rates were higher among rural residents (13).

Fetal complications (IUFD) were found to be the first leading cause of mortality in both wave 1 & 2 with 11.7% and 13.2%, respectively. In the Gambia, the still birth rate is 24 per 1000 births (14) and this figure is significantly high. The causes of fetal deaths are numerous and that there is a need for further in-depth studies to explore probable causes of IUFDs and device strategies to reduce this mortality burden. Although it could be predicted that chromosomal abnormalities and congenital malformations are unavoidable, routine antenatal screening and unjustifiable termination of pregnancies may reduce these deaths. Other possible causes of fetal demise like Pregnancy Induce Hypertension, Diabetes, and certain congenital malformation, maternal infection, and Rhesus isoimmunization can be preventable. Therefore, proper antenatal care, recognition of risk factors, appropriate management, judiciously timed delivery, intra partum monitoring and timely intervention could significantly reduce the incidence of fetal deaths resulting from these factors.

Sepsis among both adults and children was the second leading cause of death in both waves of the pandemic. Although the prevalence is higher among children under-five, particularly neonates. Therefore, there is need for concerted efforts in the fight to reduce under-five mortalities due to sepsis.

Conclusion

Even though the Ministry of Health provides daily statistics on confirmed cases of COVID-19 and its related deaths, the actual death toll from COVID-19 remains unknown. This uncertainty could be attributed to several factors, such as limited testing capacity, inadequate trained human resources, and a lack of well-established vital statistics registry, to name just a few. In the absence of adequate testing services, a substantial number of undiagnosed cases and deaths were likely to occur unreported. In the light of this, reliance on public health facilities routine data alone considered inadequate to estimate excess mortality during the pandemic. This explains the need for the inclusion of private health facilities and all communities served by CHNs under the PHC programme in the rapid assessment of deaths that occurred in the past five-year-period (January 2016 – June 2021). A secondary data collection was done to gather data on mortalities countrywide for the period under review. The study sought to estimate excess mortality from COVID-19 and describe trends in mortalities over time. Data sources were health facilities records (public and private) and CHNs in the communities.

The findings showed a consistent and steady trend of all-cause mortality in the Gambia over the past 5.5-year period; with an average mortality rate of 191.9 per 100,000 population. The rate of mortality was much higher among males and the age group 45 years & above, particularly those above 65 years. The age category with the least rate of mortality was 5 – 24 years. The regions with the highest mortality rates were Western 1 and LRR, respectively; with the lowest rate observed in URR. Generally, the rate of mortality has declined during the pandemic by 10.3 per 100,000 population; though a slight excess mortality rate was observed during the second wave of the pandemic. The mortality rate has declined for both gender during the pandemic; yet an excess number of deaths was noted among both male and female in the second wave. The age group greatly affected during the pandemic, more so in the second wave was 65 years & above; with a considerably declined in mortality among the under-fives'. There was a reduction in

mortality during the pandemic in Western 1; with a very minimal excess deaths in the second wave (8.4 per 100,000). LRR equally noted similar trend during both waves of the pandemic. However, CRR, NBER & NBWR had the greatest burden of excess mortalities during both wave 1 & 2. Imperatively, excess mortality was remarkable observed in the second wave of the pandemic as compared to wave 1; though a decline in mortality was found overall during the pandemic period in the Gambia.

During the first wave of the pandemic, fetal complications (IUFDs), Sepsis, Covid-19 & Cardiac failure were the main leading causes of deaths; whereas in the second wave, IUFDs, Sepsis, Stroke and Pneumonia constituted the greatest burden among the causes of deaths recorded during the period.

Thus, the study strongly recommends the establishment of an electronic Civil Registration and Vital Statistics (CRVS) and mortality surveillance system in the Gambia to ensure a reliable and complete mortality database for subsequent similar studies. There is a need to conduct further studies on factors contributing to the high mortality due to fetal complications (IUFDs), Sepsis and NCDs, particularly Stroke and Cardiac Failure. The general public needs to be well sensitized across the country about COVID-19 and its consequences in order to reduce its associated morbidities and mortalities. There is a need to decentralized health care services to reduce the mortality burden in the West Coast Region through an equitable distribution of tertiary health facilities across the country.

Recommendations

1. We strongly recommend the establishment of an electronic Civil Registration and Vital Statistics (CRVS) and mortality surveillance system in the Gambia to ensure a reliable and complete mortality database for subsequent similar studies.
2. There is a need to conduct further studies on factors contributing to the high mortality due to fetal complications (IUFDs), Sepsis and NCDs, particularly Stroke and Cardiac Failure.
3. Sensitization of the general public about COVID-19 and its consequences should be intensified across the country in order to reduce its associated morbidities and mortalities.
4. Health care services should be decentralized to reduce the mortality burden in the West Coast Region

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