



PIONEER

MEDICAL JOURNAL

Vol. 4 No. 1 Jan. - Jun., 2024

www.pioneermedicaljournal.com

ERRATUM:

This article was inadvertently republished under Volume 4, No. 1 (January-June 2024) following a redesign and restructuring of the journal website. The correct bibliographic designation for this article is Volume 10, No. 1 (January-June 2024), under which it was originally published. This correction affects only the volume, issue, and publication-period metadata. The article content, DOI, authorship, pagination, and publication date remain unchanged.

ISSN: 2354 - 1954

Official Publication of The Medical and Dental Consultants' Association of Nigeria (**MDCAN**)
FMC, Umuahia Chapter.

Editor In-Chief
DR. CHIMEZIE GODSWILL OKWUONU

**PIONEER
MEDICAL
JOURNAL**

**FEDERAL MEDICAL
CENTRE (FMC),
UMUAHIA,
ABIA STATE, NIGERIA**

Original Article

THE BURDEN OF NEOPLASTIC DISEASES AND TRENDS OF NEOPLASTIC MORTALITY IN NIGERIA: A TERTIARY HEALTH CENTER PERSPECTIVE IN SOUTH-EASTERN NIGERIA.

Ehidihamhen FE,¹ Ogbata SE,¹ Anemeje OA,² Ugwuanyi RU,³ Enaholo JE,⁴ Akwada O R,⁵ Dafup KI²

¹Department of Pathology, faculty of Basic clinical sciences,
David Umahi Federal University of Health Sciences,
Uburu, Ebonyi State, Nigeria.

²Department of Family Medicine,
David Umahi Federal University of Health Sciences,
Uburu, Ebonyi State, Nigeria.

³Department of Obstetrics and Gynaecology,
David Umahi Federal University of Health Sciences,
Uburu, Ebonyi State, Nigeria.

⁴Department of Surgery,
University of Benin Teaching Hospital, Benin City.

⁵Department of Surgery,
David Umahi Federal University of Health Sciences,
Uburu, Ebonyi State, Nigeria.

Corresponding Author

Felix Edoiseh, Ehidihamhen.
Department of Pathology, faculty of Basic clinical sciences,
David Umahi Federal University of Health Sciences,
Uburu, Ebonyi State, Nigeria
edoisehef@dufuhs.edu.ng
+2348038686649

ABSTRACT

Background. Morbidity and Mortality analysis in relation to neoplastic diseases is an exposition on the pattern, trends and frequencies of neoplastic deaths. This knowledge is relevant to public health planning, essential health needs, assessing intervention programs, and re-evaluation of health policies in any organized society both in developed and developing countries worldwide.

Aims. To determine the burden and the frequency of neoplastic deaths in David Umahi Federal University Teaching Hospital, Uburu.

Objectives: To determine social demography of neoplastic deaths in DUFUTH and the frequency of mortality and the burden due to Neoplastic diseases in David Umahi Federal University Teaching hospital between 2022 to 2025.

Result: Death due to neoplasm accounted for 19% (54) out of 291 mortalities within the study period. Prostatic carcinoma was the highest cause of death which accounted for 33.3%. Breast cancer followed this trend with 20.5% (11 deaths) occurrence. Liver cancer is third

most common cause of cancer deaths accounting for 11.2% (6 deaths) while this was closely followed by intracranial meningioma (WHO grade 2) 7.5%(4 deaths). Cases of Leiomyosarcoma, Fibrosarcoma of the spine, gastric cancer, colon cancer, lymphoproliferative disorder, bronchogenic carcinoma, metastatic Fibrosarcoma, all stood at 1.8%(1 deaths) respectively. Osteosarcoma, Cervical cancer, Nasopharyngeal carcinoma and endometrial cancer took a frequency of 3.7%(2 deaths) per case respectively.

Conclusion. Prevention and effective treatment remain the only feasible approach to reverse the global increase in neoplastic death and its negative impact on our fragile health facilities across the country. Although no cancer is more bothersome than the other, there is urgent need to improve screening, prevention and effective treatment methods for prostatic cancers in males and breast cancers in females due to their rising incidence and their devastating effects on the affected patients and family cannot be overemphasized. Although some cancer cases may be inevitable, government can establish policies that can reduce population-level exposure to recognized cancer risk factors, including smoking, overweight, obesity, and infections

Keywords: Pattern of death, Mortality, policy, cancer, neoplastic diseases, neoplastic deaths.

INTRODUCTION

Morbidity and Mortality analysis of neoplastic diseases with an exposition on the pattern, trends and frequencies are relevant parameters for documentation of the geographical burden of diseases and for public health planning, involving essential health needs, assessing intervention programs, and reevaluation of health policies in any organized society¹. Malignant tumors are one of the negative trends in the health status of the population in any given society. When it comes to neoplastic diseases, knowledge about the causes and preventions of malignant neoplasms has been largely based on the development of cancer epidemiology, novel treatment, prevention and screening modalities². Death analysis is a relevant tool for keeping track of the wellbeing of the populations as well as for effective health interventions to changes in disease epidemiology. It also serves as tool for quality control in any healthcare facility. For instance, amenable mortality is an indicator of national level of personal health-care access and quality healthcare to the populace³

Globally, there were about 18.1 million new cancer cases and 9.6 million cancer

deaths in 2018 ^{4,5,6} and out of a total of 18,107 patients admitted, in FMC Umuahia in 2014, 2,172 deaths were neoplastic⁴, stressing the burden the healthcare facilities currently faced with neoplastic diseases and its related mortalities. Many literatures have reported increasing incidence of cancer among African populations as cancer has one of the most dreaded non – communicable epidemiological burden becoming the second leading cause of premature mortality (about 9.3 million deaths) in low- and middle-income countries (LMICs), most especially for individual within the ages of 30 to 69 years ^{7,8,9}. In 2020, Africa recorded around 1.1 million new cancer cases and 700,000 deaths, accounting for 5.7 % of global cancer incidence. Cancer death rates in Africa are projected to exceed the global average by 30% in the next 20 years^{10,11}. Similarly, Nigeria recorded a total of 124,815 new cases of cancer with 51,398 occurring in male (prostate cancer being the commonest at 29.8%) and 73,417 occurring in females (with breast cancer being the commonest, 38.7% followed by cancer of the cervix, 16.47%)¹¹. Excluding non-melanoma skin cancer, prostate, colorectal, non-Hodgkin

lymphoma, liver, and leukemia remain the top five most frequent cancers in males while breast, cervical, non-Hodgkin lymphoma, ovarian, and colorectal are the top five in females¹². Surprisingly, skin cancers like Basal and Squamous cell are gradually finding their way into our environment as a reported 24.7% for cutaneous SCC and 15.8% for cutaneous BCC in a Federal Medical Centre Umuahia by Ehidihamhen et al south eastern hospital in Nigeria¹³.

Similar to the situation in the rest of the developing world, a significant proportion of the increase in incidence of cancer in Nigeria is due to increasing life expectancy, reduced risk of death from infectious diseases, increasing prevalence of smoking, physical inactivity, obesity as well as changing dietary and lifestyle patterns^{14,15,16,17}.

Neoplastic diseases have been classified as civilization diseases and more than 80% of tumours are connected to lifestyle, which is why health behaviors are extremely important in the prevention of neoplastic diseases, and are a significant part of preventive measures^{18,19,20,21,22,23}.

Women have a 14.1% risk of developing cancer by the age of 75 in Sub-Saharan Africa, with breast and cervical cancers accounting for 50% of this risk at 4.1% and 3.5%, respectively. The overall risk of cancer-related death among women in Africa was similar to the risks observed in women in Northern America and the wealthiest European countries. Consequently, comprehensive assessments of cancer burden will provide valuable insights for improving the global cancer quality control management system^{22,23,24}.

PROBLEM STATEMENT

In developing countries such as Nigeria, limited resources require that health priorities be selected wisely and death-related research is clearly warranted²³. Hence, this study is aimed at bridging this

gap by reviewing comprehensive data on mortalities especially deaths due to neoplastic disease in David Umahi Federal University Teaching Hospital, Uburu Ebonyi State as to develop the death pattern and common causes of death in our locality for effective health resources allocation and policy formulation.

AIM: To determine the burden and the frequency of neoplastic deaths in David Umahi Federal University Teaching Hospital Uburu.

OBJECTIVES

1. To determine the social demography of cases of neoplastic deaths in DUFUTH
2. To determine the frequency of mortality and the burden due to Neoplastic diseases in David Umahi federal university Teaching hospital between May 2022 to June 2025.

MATERIALS AND METHODS

Study Design

This is a descriptive cross-sectional retrospective study which analyzed the cases of mortality due to cancers in David Umahi Federal University Teaching Hospital, Uburu.

Study Area

This study was conducted at David Umahi Federal University Teaching Hospital, Uburu Ebonyi State, Nigeria. DUFUTH is a 500 bed space capacity tertiary health care institution with active clinics and wards respectively. It is generally stratified into health care service department and administrative department with effective mortuary services.

Study Population

Patients who were admitted, managed for neoplastic condition, died (while in admission) within May 2022 to June 2025 were included in the study.

Data Collection

Data were retrospectively extracted from the health records department as well as the mortuary unit of the Anatomic Pathology department

Data Analysis

Statistical analysis of data generated in this study was entered and analyzed using SPSS version 22 (IBM Corps, Armonk, NY, USA). Frequencies and Percentages were used to represent the categorical variables.

Inclusion and Exclusion Criteria

Patients who were admitted, managed for neoplastic condition, died (while in admission) within May 2022 to June 2025 were included in the study.

SEX DISTRIBUTION OF THE MALIGNANT NEOPLASTIC MORTALITIES

AGE DISTRIBUTION

The highest frequency of deaths due to neoplastic diseases occurred at age range between 30-40 and 71-80 years recording a number of 14(26%) each of the total number of malignant neoplastic deaths.

NEOPLASM/MALIGNANCIES

Death due to neoplasm accounted for 19% of all mortalities and death due to prostatic carcinoma was the highest cause of death due to neoplasm, which accounted for 33.3%. This was followed by breast cancers which accounted for 20.5% (11 deaths). Liver cancer is third most common cause of cancer deaths accounting for 11.2% (6 deaths) while this

Discussion

Neoplastic deaths falls among the first five leading cause of deaths due to non-communicable diseases in our region. Currently, neoplastic diseases alongside the other non-communicable diseases have successfully shifted the death pattern in many developing countries including ours

Cases of incomplete , missing and unclear records were excluded from this study.

Ethical Approval

Approval was secured for this study from the department of research and Ethics in David Umahi Federal University Teaching Hospital, Uburu.

RESULT

DUFUTH recorded a total of 291 mortalities between May 2022 to June 2025. Out of these, 54 (19%) was due to neoplastic (malignant) diseases. 253 cases of malignant neoplastic diseases were treated in DUFUTH using various modalities of cancer treatment within the period of which 54 (21.3%) mortalities were recorded.

Out of the 54 cases of mortality recorded, 20 (37%) were female while 34(63%) were males.

This is followed by ages 60-70 which recorded 10 (18.4%) deaths. Ages 50-60 recorded 9 (16.6%) deaths while 41-50 years recorded 5(9.3%) deaths respectively. Ages less than 30 recorded 3.7% deaths and ages> 80 recorded no neoplastic deaths.

was closely followed by intracranial meningioma 7.5%(4 deaths). Cases of Leiomyosarcoma, fibrosarcoma of the spine, gastric cancer, colon cancer, lymphoproliferative disorder, bronchogenic carcinoma, metastatic angiosarcoma all stood at 1.8%(1 deaths) respectively. Osteosarcoma, Cervical cancer, Nasopharyngeal carcinoma and endometrial cancer took a frequency of 3.7% (2 deaths) per case respectively.

from infectious diseases which has served as the leading cause of deaths for decades, however, that change is gradually been attributed to change in lifestyle. The findings of this study arguably show the mortality pattern of neoplastic diseases and it underscores the rising incidence and the

burden of malignant neoplastic diseases in our health sectors.

This study recorded prostatic adenocarcinoma as most common cause of deaths in the range of mortalities in DUFUTH and even among the male folks with a frequency of 33.4%(18) while Breast cancer stood as the most common cause of neoplastic deaths among the female patients within the study period with a frequency of 20.5%(11). These findings are quite similar with popular documented incidences of the occurrence of cancer among males and females respectively. According to the Global Cancer Observatory, Most deaths from malignant neoplastic conditions in Nigeria and sub Saharan Africa are reportedly due to breast, liver, prostate, uterine and cervical cancers [1].

Similarly, in port Harcourt teaching hospital malignant neoplasms was the fourth most common cause of deaths having accounted for 11.6% of the overall mortality, even in south east Nigeria, 3.5% frequency was reported, 8.6% in Ile-Ife and 15.2% reported in Irrua, Edo State [1]. These incidence though appears low may not be a true reflection of the definite burden of the cancer incidence and death in Nigeria which is often inhibited by poor reportage of cancers, traditional/religious beliefs, weak country cancer monitoring/registry services and poor health policies on cancer management.

Despite the fact that malignant neoplastic deaths is largely under-reported among young people basically less than 30 years of age,, this is further supported by the low frequency of malignant neoplastic death recorded in this research between the ages of 30 and below with a frequency of 3.7%(2). A remarkable frequency was documented in studies done in port Harcourt recording a frequency of 46 cases of mortality among 5-years due to childhood malignancies and 29 deaths

recorded in university of Abuja Teaching Hospital Nigeria[1]. Globally, about 10% of cancers occur among children with about 20000 children being diagnosed with cancers annually and of this, 80% are from developing countries like Nigeria[1].

In Poland, Childhood cancers are rare and its prevalence in the pediatric population is estimated to be about 151: 1 million children per year and the most common childhood cancer is leukemia. It accounts for 27% of all illnesses [22]. This is similar to our findings of lymphoproliferative disorder as the common cause of neoplastic deaths among the young less than 30 years of age.

Liver cancer was the third most common cause of cancer deaths in this research and was among the leading cause of deaths among ages 30-40 years. This was closely followed by intracranial tumors of which the most implicated was intracranial meningioma. Intracranial neoplasms often have debilitating effect due to late presentation. In a study done in Poland, Neoplasms located in the central nervous system assumed a second cause of death position with a frequency of 23%[22].

It is well-documented findings that most developing countries are disproportionately affected by cancer related to infectious agents[4], this is also applicable in cases of cervical cancer which stood at a frequency of 3.7% (2) in this research. Cervical cancer is another very worrisome cancer in females which also contribute significantly to neoplastic deaths globally. Recently developed cervical cancer vaccines have the potential to prevent HPV infection which is a known etiology for cervical cancer; however, effective vaccines against HPV infection are too costly to be available in high-risk areas [25][26]. Amongst others, circumcision apparently reduces the risk of transmission and acquisition of HPV as well as the risk of cervical cancer among female partners [26]. Detection of high-

grade squamous intraepithelial lesion and carcinoma in situ by Pap testing, with effective treatment of precancerous lesions, is currently the most effective way to prevent cervical cancer. Visual inspection of the cervix after applying acetic acid is one cost-effective technique ²⁷.

Liver cancer is the fifth most common cancer in men and the eighth most common in women and is the third leading cause of cancer death worldwide with an estimated 680 000 deaths globally ²⁵. Most of the liver cancers are of hepatic cell origin (hepatocellular carcinoma). More than 80% of cases occur in developing countries and liver cancer incidence rates are highest in West and Central Africa and in Asia, especially among men ²⁶.

Globally, 75% of all liver cancer cases and 50% of all deaths are caused by chronic infection with either HBV or HCV ¹. The fraction of cases attributable to HBV is greater in developing countries (59%) than in developed countries (23%) and Both HBV and HCV are directly transmitted by person-to-person contact with blood or other body fluids ²⁶. Luckily, safe and effective vaccine against HBV has been available since 1982 although no vaccine is yet available for HCV. Vaccination for HBV is the most cost-effective strategy to reduce liver cancer. Universal precautions designed to prevent transmission of blood-borne pathogens and safer needle design have reduced risks of infection among health care workers ²⁶

Other cancers that stood a relatively worrisome deaths in this research are nasopharyngeal cancer, osteosarcoma and endometrial cancer with each taking a frequency of 3.7% respectively. Worthy to mention are leiomyosarcoma, bronchogenic carcinoma, gastric and colon cancers and Fibrosarcoma of the spine also cause significant deaths with a frequency of 1.8% respectively. Malignant neoplasms of the digestive system in

Poland is a significant cause of death which corresponded to a loss of 158.6 per 10,000 men and 105.3 years per 10,000 women serving as the second most important cause of deaths due to malignant neoplasms in the world ^{19,23}

Incidence and death rates from stomach cancer have steadily declined over the last 50 years in Asian countries, despite falling incidence rates, the number of new cases and deaths continues to increase globally because of population growth and aging in high-risk countries. Risks are generally highest in Asia (Korea, Japan and China) and parts of Central and South America (Costa Rica, El Salvador and Columbia) and lowest in North America and most of Africa ²⁶. Unfortunately, there is no screening program for the early detection of malignant neoplasms of the stomach. A growing number of tests, performed in order to detect a symptomatic *Helicobacter pylori* infection, as well as attempts to eradicate the bacteria, which is considered the most potent risk factor for this disease, have probably contributed to an improvement in mortality rates due to stomach neoplasms [23]. Many researchers have mentioned a negative effect of under-consumption of fruit and vegetables, obesity and smoking nicotine. The identification of modifiable risk factors may allow the creation of a programme for primary prevention of this disease, which still remains a global problem. Numerous researches in Poland and worldwide have proved that reduction of risk of tumours is mostly effective by adopting a healthy lifestyle, avoiding exposure to carcinogenic factors and regular performance for screening tests [19]. The exact causes of the worldwide decline in gastric cancer incidence in the past decades are probably due to improvements in diet, food storage and a decline in *H.pylori* infection due to a general improvement in sanitary conditions and increasing use of antibiotics²⁶

CONCLUSION

Prevention and effective treatment remain the only feasible approach to slow and ultimately reverse the global increase in cancer, death frequencies and its heavy negative impact on our fragile health facilities across the country. Although no cancer is more bothersome than the other, the urgent need to improve screening, prevention and effective treatment methods for prostatic cancers in males and breast cancers in females dues to their

rising incidence and their devastating effects on the affected patients and family.

RECOMMENDATION

Primary prevention methods for all cancers should be a focus of all researchers to reduce the devastating effects of cancers.

CONFLICT OF INTERESTS

The author declare no conflict of interest

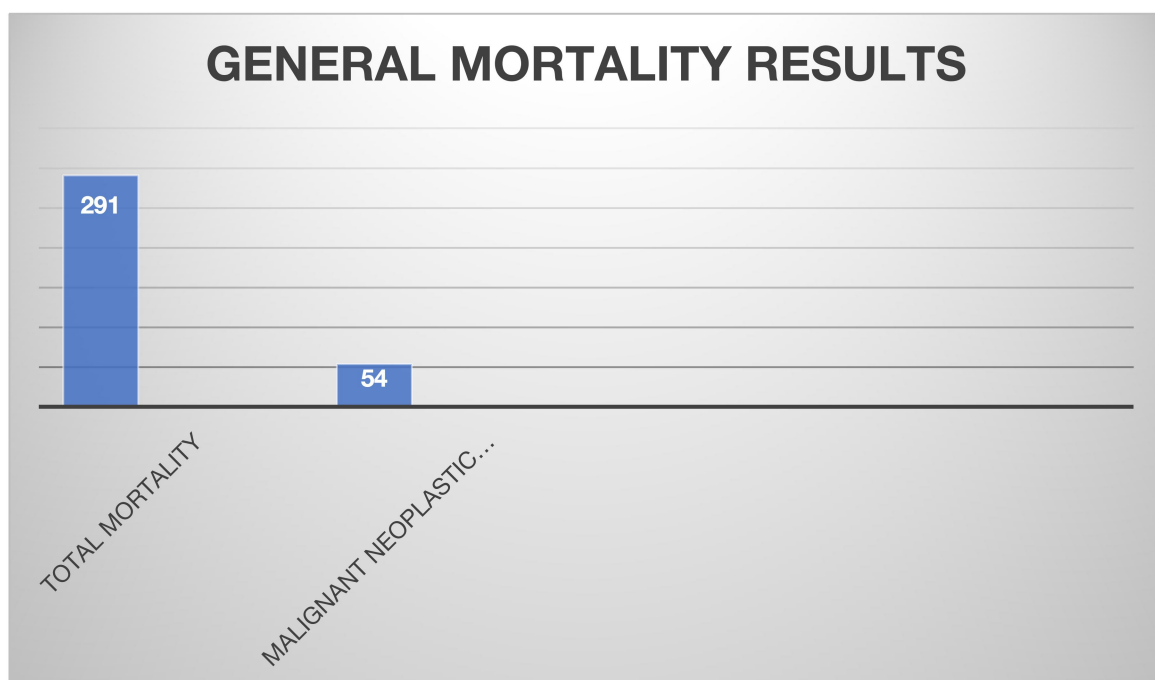


Fig.1 showing the overall frequency of neoplastic deaths from the total mortality in DUFUTH.

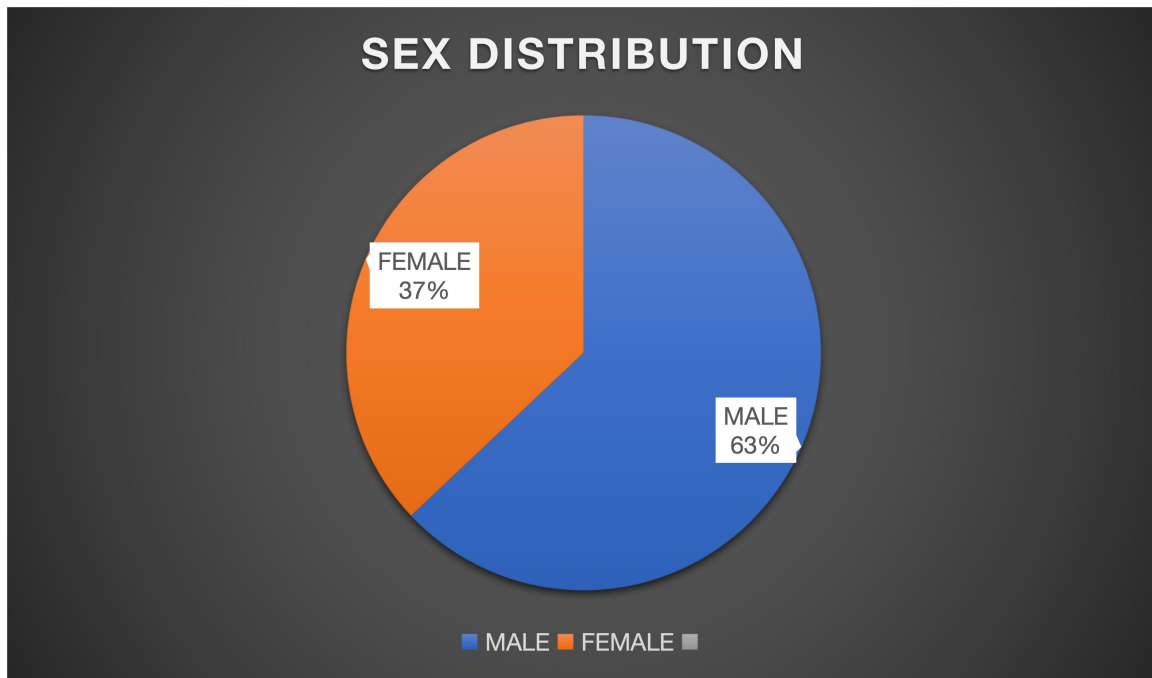


Figure 2; showing the sex distributions of the cases of malignant neoplastic mortalities.

Table 1 showing the age distribution of neoplastic death and the most common neoplastic death among age group.

S/N	AGE RANGE(YEARS)	NUMBER	PERCENTAGE	MOST COMMON CAUSE OF DEATH
1	< 30	2	3.7	Lymphoproliferative disorder
2	30-40	14	26	Breast cancer, PLCC and Meningioma
3	41-50	5	9.3	Prostate cancer
4	50-60	9	16.6	Prostatic cancer
5	60-70	10	18.4	Prostatic cancer
6	71-80	14	26	Prostatic cancer and breast cancer
7	>80	0	0	-
8	TOTAL	54	100	

TABLE 2 SHOWING THE CAUSES OF DEATHS AMONG MALIGNANT NEOPLASMS

CAUSE OF DEATHS	NUMBER	PERCENTAGES
LEIOMYOSARCOMA	1	1.8
BREAST CA	11	20.5
LIVER CA	6	11.2
FIBROMSARCOMA OF THE SPINE	1	1.8
OSTEOSARCOMA	2	3.7
PROSTATIC CA	18	33.4
GASTRIC CA	1	1.8
COLON CA	1	1.8
CERVICAL CA	2	3.7
NASOPHARYNGEAL CA	2	3.7
LYMPHO PROLIFERATIVE DISORDER	1	1.8
INTRACRACIAL MENINGIOMA(WHO GRADE 2).	4	7.5
BRONCHOGENIC CARCINOMA	1	1.8
METASTATIC ANGIOSARCOMA	1	1.8
ENDOMETRIAL CA	2	3.7
LYMPHOPROLIFERATIVE DISORDER	1	1.8
TOTAL	54	100

REFERENCES

1. Christopher Chinedu Obiorah, Cause specific and trends of mortality in Nigeria: A six year study of a tertiary hospital; International Journal of Medicine and Medical Sciences. Vol. 12, pp. 1-7, January-June 2020
2. Fadelu, T., Rebbeck, T.R. The rising burden of cancer in low- and middle-Human Development Index countries. *Cancer*. 2021; 127: 2864-2866.
3. Okoroiwu HU, Uchendu KI, Essien RA (2020) Causes of morbidity and mortality among patients admitted in a tertiary hospital in southern Nigeria: A 6 year evaluation. *PLoS ONE* 15: e0237313.
4. C. C. Nwafor Chukwuemeka Charles, M. A. Nnoli Mar n Azodo1, C. AbaliChuku; Causes and pattern of death in a tertiary hospital in south eastern Nigeria. *Sahel Medical Journal*. VOL. 17 Issue 3 July-September 2014.
5. Brown KF, Rumgay H, Dunlop C, Ryan M, Quartly F, Cox A, Deas A, Elliss-Brookes L, Gavin A, Hounscome L, Huws D. The fraction of cancer attributable to modifiable risk factors in England, Wales, Scotland, Northern Ireland, and the United Kingdom in 2015. *British journal of cancer*. 2018; 118: 1130-41.
6. Obiora Jude Uchendu. Cancer Incidence in Nigeria: A Tertiary Hospital Experience. *Asian Pac J Cancer Care*, 2020. 5, 27-32
7. Cecchini M, Devaux M, Sassi F. Assessing the impacts of alcohol policies: A microsimulation approach. *OECD Health Working paper* 80. 2015.
8. Bray F, Laversanne M, Weiderpass E, Soerjomataram I. The ever-increasing importance of cancer as a leading cause of premature death

- worldwide. *Cancer*. 2021; 127:3029-3030.
9. Available at <https://www.afro.who.int/health-topics/noncommunicable-diseases> WHO. Non communicable Diseases. 2024. Accessed November 6, 2024.
10. Ferlay J, Laversanne M, Ervik M, et al. Global Cancer Observatory: Cancer Tomorrow. International Agency for Research on Cancer. Accessed November 6, 2024.
11. Torre LA, Siegel RL, Ward EM, Jemal A. Global cancer incidence and mortality rates and trends—an update. *Cancer epidemiology, biomarkers & prevention*. 2016 Jan 1;25:16-27
12. . Omosun A, Abayomi A, Ogboye O, Lajide D, Oladele D, Popoola A, Banjo AA, Chugani B, Mabadeje B, Abdur-Razaak H, Wellington O, Andu L, Adepase A, Adesina F, Olonire O, Fetuga A, Onasanya O, Awosika F, Folarin-Williams O, Anya SE. Distribution of Cancer and Cancer Screening and Treatment Services in Lagos: A 10-Year Review of Hospital Records. *JCO Glob Oncol*. 2022; 8: e2200107.
13. Felix E. Ehidihamhen^{1,2*}, Godson O. Eze³, Stanley E. Ogbata^{1,2}, Cornelius C. Chukwuegbo¹, Lateef A. Odukoya⁴, Andrew I. Okoawoh⁵, Doubra O. Owolabi⁶, Robinson U. Ugwuanyi⁷, Olushola O. Jegede¹, Chinedu N. Idakari⁸, Martins A. Nnoli⁹, Modupeola O. Samaila¹⁰: Comparative Analysis of Ki-67 Protein as a Proliferative Expression Index in Cutaneous Basal and Squamous Cell Carcinoma in Federal Medical Centre Umuahia, Nigeria, *Open Journal of Pathology*, 2024, 14, 91-106
14. Shah SC, Kayamba V, Peek RM Jr, Heimbürger D. Cancer Control in Low- and Middle-Income Countries: Is It Time to Consider Screening? *J Glob Oncol*. 2019; 5:1-8. doi:10.1200/JGO.18.00200
15. WHO Guide to cancer early diagnosis. 2024. Accessed November 6, 2024. https://www.who.int/cancer/publications/cancer_early_diagnosis/en
16. Stefania Boccia, Carlo La Vecchia and Paolo Boffetta. Epidemiology of Cancer and Principles of Prevention. Springer International Publishing Switzerland 2015 S. Boccia et al. (eds.), A Systematic Review of Key Issues in Public Health, Chapter · March 2015 DOI: 10.1007/978-3-319-13620-2_5
17. Sagan A, McDaid D, Rajan S, Farrington J, McKee M. Screening: When is it appropriate and how can we get it right? Copenhagen (Denmark): European Observatory on Health Systems and Policies; 2020
18. Cheatley J, Aldea A, Lerouge A, Devaux M, Vuik S, Cecchini M. Tackling the cancer burden: the economic impact of primary prevention policies. *Molecular Oncology*. 2020; 15779-789
19. Anna Lewandowska¹, Rafał Filip². Knowledge on neoplastic diseases among young rural inhabitants: *Annals of Agricultural and Environmental Medicine* 2017, Vol 24, No 3, 496–501
20. Gulmira Umarova*, Arstan Mamyrbayev, Saule Bermagambetova, Akmaral Baspakova, Umyt Satybaldieva, Valentina Sabyrakhmetova, Talgar Abilov, Gulnar Sultanova, Raisa Uraz. Morbidity, Disability and Death Rates of The Population Due to Malignant Neoplasms in Uralsk City in The Republic of Kazakhstan. *Asian Pac J Cancer Prev*, 17, 5159-5164

21. Jiali Fang¹· Xiaoyue Zhang²· Rui Zhu³· Xing Xing⁴· Ziyuan Shen²· J isen Zhang¹· Guoqi Cai^{2,5}. Global trends and projections in the burden of malignant neoplasm of bone and articular cartilage. *Discover Public Health* (2025) 22:110 | 22.
Zachorowalność wśród dzieci i młodzieży na wybrane choroby nowotworowe w województwie śląskim. The incidence of selected neoplastic diseases among children and adolescents in the Silesian Voivodeship. PRACE EMPIRYCZNE I DONIESIENIA Z BADAŃ EMPIRICAL STUDIES AND RESEARCH REPORTS. *Sztuka Leczenia* 2023, tom 38, nr 1, ss. 15–22 <https://doi.org/10.4467/18982026SZL.23.002.17916>.
22. 23. Paulina Paciej-Golećbiowska, Małgorzata Pikala and Irena Maniecka-Bryła. Years of life lost due to malignant neoplasms of the digestive system in Poland in the years 2000–2014. *United European Gastroenterology Journal* 6(6) 943–951
23. Zenghong Wu^{1*}, Fangnan Xia² and Rong Lin^{1*} Global burden of cancer and associated risk factors in 204 countries and territories, 1980–2021: a systematic analysis for the GBD 2021. Wu et al. *Journal of Hematology & Oncology*
24. Bello Yusuf Jamoh, Sani Atta Abubakar, Sani Muhammad Isa. Morbidity and mortality profile of patients seen in medical emergency unit of a Teaching Hospital in Nigeria: A 4-year audit. *Sahel Medical Journal* | Published by Wolters Kluwer – Medknow. May 20, 2019, IP: 197.157.252.242
25. Michael J.Thun, John Oliver DeLancey, Melissa M.Center, Ahmedin Jemal and Elizabeth M.Ward. The global burden of cancer: priorities for prevention. *Advance Access publication November 24, 2009. Carcinogenesis vol.31 no.1 pp.100–110, 2010 doi:10.1093/carcin/bgp263*