Retired	36	16	51	28	53	57	58	37	28	17	226	155
Unemployed	28	39	26	43	33	49	34	73	11	39	132	243
Housewife	0	55	0	88	0	102	0	108	0	49	0	402
Others	57	84	63	71	72	47	66	85	24	45	282	332
Total	**240**	**407**	**272**	**547**	**349**	**590**	**347**	**654**	**161**	**320**	**1369**	**2518**

Source: Abuja Cancer Registry (ABCR 2021)

Table 2 above explained the trends of cancer incidence for the five years under study based on gender and occupation.

Table 3: Distribution of Cancer Cases by Place of Residence

PLACE OF RESIDENCE	2016		2017		2018		2019		2020		TOTAL	
	M	F	M	F	M	F	M	F	M	F	M	F
Urban	219	386	209	435	277	497	321	634	156	317	1182	2269
Rural	21	21	63	112	72	93	26	20	5	3	187	249
TOTAL	240	407	272	547	349	590	347	654	161	320	1369	2518

Source: Abuja Cancer Registry (ABCR 2021)

Table 3 above explained the distribution of cancer incidence for the five years under study based on gender and place of residence.

Table 4: Top Male Cancer Types for the Period 2016 - 2020

Cancer Types	2016		2017		2018		2019		2020		TOTAL	
	No	R_k	No	R_k	No	R_k	No	R_k	No	R_k	No	R_k
Prostate	99	1	69	1	86	1	117	1	48	1	419	1
Colon, Rectum, Anus	21	2	36	2	41	3	25	3	13	3	136	3
Mouth & Pharynx	20	3	32	3	47	2	31	2	23	2	153	2
Lymphoma	9	4	9	5	7	7	14	5	-	-	39	6
Leukemia	8	5	-	-	-	-	-	-	-	-	8	13
Bladder	7	6	6	7	4	10	7	8	4	7	28	8
Brain & CNS	5	7	6	8	17	5	10	6	6	5	44	5
Kidney & Urinary	5	8	6	9	8	6	8	7	3	8	30	7
Liver	5	9	8	6	4	10	-	-	-		17	10
Testis	5	10	-	-	-		-	-	-		5	15
Larynx	-	-	13	4	26	4	25	4	7	4	71	4
Pancreas	-	-	6	10	-		-	-	3	9	9	12
Stomach	-	-	6	10	5	9	6	10	3	10	20	9
Trachea, Bronchus & Lung	-	-	-	-	6	8	-	-	6	6	12	11
Oesophagus	-	-	-	-	-	-	7	9	-	-	7	14

Source: Abuja Cancer Registry (ABCR 2021)

Table 4 above explained the common types of cancer in male for the five years under study.

Table 5: Top Female Cancer Types the period 2016 - 2020

Cancer Types	2016		2017		2018		2019		2020		TOTAL	
	No	R_k	No	R_k	No	R_k	No	R_k	No	R_k	No	R_k
Breast	218	1	289	1	274	1	317	1	151	1	1249	1
Cervix	46	2	88	2	128	2	117	2	63	2	442	2
Overy & Adnexa	17	3	14	4	13	6	15	6	12	4	71	6
Mouth & Pharynx	16	4	14	4	28	3	25	4	4	8	87	4
Colon, Rectum & Anus	12	5	-	-	23	5	25	4	18	3	78	5
Kidney & Urinary	9	6	4	10	7	7	-	-	3	-	23	8
Corpus & Uterus	7	7	26	3	24	4	26	3	7	5	90	3
Brain & CNS	6	8	4	10	7	8	5	10	7	5	29	7
Leukaemia	6	8	-	-	-	-	-	-	-	-	6	13
Trachea, Bronchus, Lung	5	10	4	10	6	9	5	10	3	10	23	8
Liver	-	-	13	6	-	-	-	-	-		13	12
Lymphoma	-	-	7	7	-	-	10	7	4	7	21	10
Bladder	-	-	6	8	5	10	-	-	3	10	14	11
Pancreas	-	-	4	10	-	-	-	-	-	-	4	15
Larynx	-	-	-	-	-	-	6	8	-	-	6	13

Source: Abuja Cancer Registry (ABCR)

Table 5 above explained the common types of cancer in male for the five years under study.

Section C: This section tries to get numerical data that indicates the oncological treatment received by the patients in terms of the total number of patients per treatment protocol, the number of patients recovered based on that protocol, and the number of deaths during that particular treatment protocol for the period under investigation but it was not possible. But based on interaction and interviews with staff in the oncology unit that the treatment protocols are dynamic, some will start with chemotherapy and later shift to radiotherapy, while some will start with radiotherapy and later shift to chemotherapy, while the most common treatment is the surgery. The study further investigates the use of immunotherapy as a treatment protocol or a combination of the immunotherapy and other treatment protocol but is like they are unaware of the immunotherapy treatment protocol. The interaction/interview further revealed that a very insignificant number of successes is achieved in terms of full recovery of the patient because most of the treatment protocol will succeed in suppressing the disease for sometimes but later it reemerges with full force or even worse than before which will eventually lead to death.

Discussion of the Result

This section was generally designed to investigate cancer incidence in Nigeria and their types. This section of the study was guided by three (3) sections of the data collection instrument (CIAI). Table 1 examine and compare the different age groups of cancer incidence among males and females. The table revealed that cancer may start in the early stage of life and may also occur in old age but it is more frequent at youthful ages in both males and females. It also revealed that women are more affected by cancer disease than their male counterparts. Table 2 indicated cancer incidence based on occupation and the table revealed that cancer is more frequent among civil servants and especially females. Followed by traders/business and also housewives. Table 3 indicate the distribution of cancer incidence based on place of residence. The table further revealed that females of the urban areas have the highest frequency of cancer incidence than their female counterparts of rural areas and even males of the urban areas. Table 4 and 5 covers the distribution of first top ten cancer disease in both male and female respectively for the years under investigation. Even though there is a variation of the ranking of the disease every year but Breast and Prostate cancers maintain the number one in both females and males respectively for the period under investigation. Based on the interview conducted there is no reliable treatment protocol that ensures complete recovery of the patients.

Recommendations

Unlike other diseases, cancer is surrounded by many consequences which include social, economic, emotional and psychological as such the government, the private sector and the Non – Governmental Organizations (NGOs) should be committed to safeguarding the life of cancer patients by providing adequate financial support geared to eradication and reduction of cancer incidence in the nation through the following ways

1. Provide an avenue for cancer screening so that the diseases can be detected at its early stage thereby morbidity and mortality are reduced.

2. Provide an easy, accessible and less expensive treatment centers that are well equipped with drugs, consumables and modern technologies that will provide hope to the cancer patients.

3. Guidance and counselling units on cancer should be established not only in the main hospitals and cancer registries but also in the Public Health Care Units

References

Musiliu Folarin Farayola, Sharidan Shafie, Fuaada Mohd Siam, Ilyas Khan, Numerical Simulation of Normal and Cancer Cells' Populations with Fractional Derivative under Radiotherapy, *Computer Methods and Programs in Biomedicine* (2019)

Abimbola S., Maryna V., Lucinda B. and Trevor K. (2011) Cytotoxicity Evaluation of Selected Nigerian Plants used in Traditional Cancer Treatment. Journal of Medicinal Plants Research Vol. 5(11), pp. 2442-2444.

Abubakar I.B., Ukwuani-Kwaja A.N., Garba A.D. (2020), Ethnobotanical study of medicinal plants used for cancer treatment in Kebbi state, North-west Nigeria, Acta Ecologica Sinica

Abubakar M.S., Musa A.M., Ahmed A., Hussaini I.M. (2017) The Perception and Practice of Traditional Medicine in the Treatment of Cancers and Inflammations by the Hausa and Fulani tribes of Northern Nigeria. Journal of Ethnopharmacology 111 625–629

Aliyu UM, Awosan KJ, Oche MO, Taiwo AO, Jimoh AO, Okuofo EC. Prevalence and Correlates of Complementary and Alternative Medicine use among Cancer Patients in Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria. Niger J Clin Pract. 2017;20:1576-83.

Avila J. L., Bonnet C., Clairambault J., Ozbay H., Niculescu S. I., Merhi F., Tang R. and Marie J.P. (2012) A New Model of Cell Dynamics in Acute Myeloid Leukemia involving Distributed Delays; Proceeding of the 10th IFAC Workshop on Time-Delay Systems. The International Federation of Automatic Control Northeastern University, Boston, USA. June 22 – 24.

Chih-Yang H., Da-Tong J., Chih-Fen C., Muralidhar R. P. and Bharath K. V. (2017) A Review on the Effects of Current Chemotherapy Drugs and Natural Agents in Treating Non–Small Cell Lung Cancer. *BioMedicine* Vol. 7, No. 4, (23), 12-23

Clarke, M.F., Dick, J.E., Dirks, P.B., Eaves, C.J., Jamieson, C.H., Jones, D.L., Visvader, J., Weissman, I.L., and Wahl, G.M. (2006). Cancer stem cells–perspectives on the current status and future directions: AACR workshop on cancer stem cells. Cancer Res. 66, 9339–9344.

Craig T. J., Monica L. G., and Mark N. (2006); A Review Article Mechanisms of Disease; Cancer Stem Cells, The New England Journal of Medicine

Djema W., Bonnet C., Clairambault J., Mazanc F., Hirsch P. and Delhommeau F. (2017) Analysis of a Model of Dormancy in Cancer as the State of Coexistence Between Tumor and Healthy Stem Cells. American Control Conference May 24 – 26, 2017, Seattle USA

Djema W., Bonnet C., Clairambault J., Mazanc F., Hirsch P. and Delhommeau F. (2016) Stability of a Delay System Coupled to a Delay Differential – Difference System Describing the Coexistence of Ordinary and Mutated Hematopoietic Stem Cells

Djema W., Catherine B., Frederic M, Jean C, Emilia F, Pierre H. and Francois D (2018); Control in Dormancy or Eradication of Cancer Stem Cells; Mathematical Modeling and Stability Issues, Journal of Theoretical Biology (2018)

Engel N., Oppermann C., Falodun A. and Kragl U. (2011); Proliferative Effects of Five Traditional Nigerian Medicinal Plant Extracts on Human Breast and Bone Cancer Cell Lines. Journal of Ethnopharmacology 137 (2011) 1003– 1010

Emilia K. (2019); Mathematical Modeling of Treatment Resistance in Cancer. Helsinki 2019

Freedman H.I. and Belostotski G., (2009); Perturbed Models for Cancer Treatment by Radiotherapy. Differential Equations and Dynamical Systems Vol. 17, Nos. 1 & 2, January & April 2009, pp. 115−133.

Gabrilovich D. I. (2007). Combination of Chemotherapy and Immunotherapy for Cancer; A Paradigm Revisited. The Lancet Oncology, 8(1), 2 – 3

Gbadamosi I. T. and Erinoso S. M. (2016) A Review of Twenty Ethnobotanicals used in the Management of Breast Cancer in Abeokuta, Ogun State, Nigeria. African Journal of Pharmacy and Pharmacology. Vol. 10(27), pp. 546-564, 22 July 2016

Haume k., Soraia R, Sophie G, Małgorzata A. Ś., Karl T. B., Andrey V. S., Kevin M. P., Jon G. and Nigel J. M. (2016); Gold Nanoparticles for Cancer Radiotherapy: a review. Haume *et al. Cancer Nano (2016) 7:8*

Heiko E. (2013), *Systems Biology of Tumor Dormancy*, Advances in Experimental Medicine and Biology 734, Springer Science + Business Media New York 2013

Hongsheng Lin, Jie Liu, and Ying Zhang (2011); Developments in cancer prevention and treatment using Traditional Chinese medicine. Front. Med. 2011, 5(2): 127–133.

Joseph O. O. (2018) New Plan will Help Improve Cancer Treatment and Save Lives in Nigeria Judah F. and Raghu K. (2004) Cancer without Disease. *Nature* volume 427, page 787

Jianping Liu, Xun Li, Jingyuan Liu, Lixin M., Xinxue Li, and Vinjar Fønnebø (2011); Traditional ChineseMedicine in Cancer Care: A Review of Case Reports Published in Chinese Literature. Forsch Komplementmed 2011;18:257–263

Kolawole A. O. (2011) Feasible Cancer Control Strategies for Nigeria: Mini-Review. *American Journal of   TROPICAL MEDICINE &Public Health 1(1): 1-10, 2011*

Kwatra D, Venugopal A, Anant S. Nanoparticles in Radiation Therapy (2013): A Summary of various Approaches to enhance Radio-sensitization in Cancer. Transl Cancer Res. 2013; 2(4):330–42

K.Y. Tan, C.B. Liu, A.H. Chen, Y.J. Ding, H.Y. Jin, F. Seow-Choen (2008). The Role of Traditional Chinese Medicine in Colorectal Cancer Treatment. Tech Coloproctol (2008) 12:1–6

Leland H. H. and Michael B. K (1994) Cell Cycle Control and Cancer. Science VOL. 266 Downloaded from www.sciencemag.org on June 9, 2012

Liu Z. and Yang C. (2014); A Mathematical Model of Cancer Treatment by Radiotherapy. Computational and Mathematical Methods in Medicine Volume 2014, pp. 1 – 12

Lynne E. (2020) Cancer Cells: How they Start and Characteristics. Medically reviewed by Sanja Jelic, MD

Max S. W., Suling L, and Gabriela D. (2006) Cancer Stem Cells: An Old Idea—A Paradigm Shift. Cancer Res 2006; 66: (4).

Mackey C. M. (1978) Unified Hypothesis for the Origin of Aplastic Anemia and Period Hematopoiesis. Blood, Vol. 51, No. 5 (May)

Mike O. S., Amusa N. A, Salmot .O. R., Emmanuel C. C., and Ayanbamiji, A. T. (2010) Ethnobotanical Survey of Anti-Cancer Plants in Ogun State, Nigeria. Annals of Biological Research, 2010, 1 (4) : 261-273

Mostafa A., Abdennasser C. and Tarik – Mohammed T (2015); Age – Structured and Delay Differential – Difference Model of Hematopoietic Stem Cell Dynamics. Discrete and Continuous Dynamical Systems – Series B, American Institute of Mathematical Science, 2015, 20 (9), pp 27

Matthew D. V., Michael H. K., Robert D. S., and Mark J. S. (2011) Natural Innate and Adaptive Immunity   to Cancer. www.annualreviews.org • Cancer Immunosurveillance and Immunoediting 257

Morgan D. (2006); The Cell Cycle: Principles of Control, Primers in Biology Series, Oxford University Press, 297

Mohammad H., Ben J. M. H., Dirk V., and Andrew N. (2018); Automation in Intensity Modulated Radiotherapy Treatment Planning—a Review of Recent Innovations, Br J Radiol 2018; 91: 20180270.

Musiliu F. F., Sharidan S. Fuaada M. S. and Ilyas K. (2019); Numerical Simulation of Normal and Cancer Cell's Populations with Fractional Derivatives under Radiotherapy, Computer Methods and Program in Biomedicine

Olanipekun M.K., Arowosegbe S., Kayode J.O, and Oluwole T.R. (2016) Ethnobotanical survey of medicinal plants used in the treatment of women related diseases in Akoko Region of Ondo-State, Nigeria. Journal of Medicinal Plants Research. Vol. 10(20), pp. 270-277, 25 May 2016

Patrick C. H., Stephan L. H., Tanja H, Alexandra A, Joachim W. E., Markus G, Christiane J. B. and Christopher H. (2007); Cancer Stem Cells in Tumor Metastasis, Cell Stem Cell 1, 313–323

Piero D., Robert W. C., and Michael F. C. (2007); Cancer Stem Cells: Models and Concepts *www.annualreviews.org • Cancer Stem Cells*

Puzanov I. et. al (2017) Managing Toxicities Associated with Immune Checkpoint Inhibitors: Consensus Recommendations from the Society for Immunotherapy of Cancer (SITC) Toxicity Management Working Group. Journal for ImmunoTherapy of Cancer (2017) 5:95

Pujo-Menjouet L. (2016); Blood Cell Dynamics: Half of a Century of Modelling, Math. Model. Nat. Phenom. Vol. 11, No. 1, 2016, pp. 92 – 115

Qian Chen et al (2019) In Situ Sprayed Bioresponsive Immunotherapeutic Gel for Post-Surgical Cancer Treatment. Nature Nanotechnology VOL 14 89–97

Robert D. S., Lloyd J. O. and Mark J. S. (2011); Cancer Immunoediting: Integrating Immunity's Roles in Cancer Suppression and Promotion. Science Vol 331

Sara B. M. et al (2019) Surgical Treatment and Survival from Colorectal Cancer in Denmark, England, Norway, and Sweden: A Population-Based Study. Lancet Oncol 2019; 20: 74–87

Segun, Peter A., Ogbole, Omonike O., Ajaiyeoba, Edith O., (2018) Medicinal Plants Used in the Management of Cancer among the Ijebus of Southwestern Nigeria.Journal of Herbal Medicine

Sharan Merriam and Mazanah Muhamad (2013); Roles Traditional Healers Play in Cancer Treatment in Malaysia: Implications for Health Promotion and Education. *Asian Pacific Journal of Cancer Prevention, Vol 14, 2013*. 3593-3601.

Stewart, S. L., Hayes, N. S., Moore, A. R., II, R. B., Brown, P. M., & Wanliss, E. (2018). *Combating Cancer*

Through Public Health Practice in the United States: An In-Depth Look at the National Comprehensive Cancer Control Program. Public Health - Emerging and Re-Emerging Issues. doi:10.5772/intechopen.78582

Susanne H. B., Gordon J. F., Glenn D., and Arlene H. S. (2016) Coinhibitory Pathways in Immunotherapy for Cancer. Annu. Rev. Immunol. 2016. 34:539–73

Taye T. A. (2013); An Overview of the Anti-Cancer Properties of some Plants used in Traditional Medicine in Nigeria. International Research Journal of Biochemistry and Bioinformatics (ISSN 2250-9941) Vol. 3(1) pp. 7-14, January 2013

Vincent T. DeVita, Jr. and Edward C. (2008); A History of Cancer Chemotherapy, Cancer Research 2008; 68: (21) November 1, 2008

Walid D., Frédéric M. and Catherine B. (2017) Stability Analysis and Robustness Results for a Nonlinear System with Distributed Delays Describing Hematopoiesis. Systems and Control Letters, Elsevier, 2017

World Health Organization (WHO) Cancer killed 41,000 People in Nigeria in 2018. Premum Times, Saturday, June 6, 2020