Journal of Namibian Studies, 33 (2023): 789-808 ISSN: 2197-5523 (online)

Special Issue On Multidisciplinary Research

Demographic Reporting Error Analysis of Ghana's Pre-and-Post Menopausal Breast Cancer Women

Bosson-Amedenu Senyefia (PhD) [1*], Zrelli Naouel[2] (PhD), Oduro –Okyireh Theodore [3], Osei-Asibey Eunice [4] (PhD), Nii Noye Nortey Ezekiel (PhD)[5]

[1*]Department of Mathematics and Computer Studies, Holy Child College of Education, Ghana. ORCID: 0000-0002-9272-5521, senyefiaa.bosson@hcce.edu.gh

[2] Laboratory of Mathematical and Numerical Modeling Engineering Sciences, National School of Engineers of Tunis, Tunisia

[3] Cape Coast Technical University, School of Applied Technology, Cape Coast, Ghana.

[4] Ada College of Education, Ada-Foah, Greater-Accra Region, Ghana.

[5] University of Ghana, Department of Statistics and Actuarial Science, Legon, Ghana

Abstract

The ages reported by patients significantly influence treatment choices, medication administration, and dosage requirements. Age reporting has long been known to have the most significant errors in demographic statistics. Using two demographic statistical indices, Myers' and Whipple's, this research aimed to assess the accuracy of ages reported by Ghanaian breast cancer patients. Our findings show that pre- and post-menopausal women with breast cancer accurately report their ages. Further research in Ghana is recommended to verify the accuracy of the ages provided by patients for other medical conditions.

Keywords: Myers' Index, Whipple's Index, Demographic Statistics, Reporting Errors, Breast Cancer.

Introduction

When diagnosing and administering medical treatments to breast cancer patients, age is considered a significant factor. Age influences the molecular subtype of breast cancer, the comorbid conditions to anticipate, and eligibility for mammography screening. Younger individuals in African countries have been predominantly linked to BRCA1 or BRCA2 mutations and triple-negative breast cancer. Clinical studies of competing risk events have identified age as a significant variable. The likelihood of competing events was found to increase with age, from 19% for patients under 75 years to 54% for those over 75 years [1–4]. Exaggerating life expectancy at advanced ages and misreporting age due to economic, social, political, or purely personal reasons are two additional significant causes of age misreporting. Breast cancer patients who provide clinicians with false information about their ages run the risk of seriously harming their health because the clinician will base their diagnosis and course of therapy on that information.

Numerous disciplines have assessed the accuracy of age data using demographic indices such as the UN, Myers-Blended, and Whipples. Neglecting to report and document age, the illiterate population's unawareness of their accurate ages, the tendency to report ages ending in preferred digits such as 0 or 5, and a subconscious aversion to certain numbers are just a few of the reasons why age inaccuracies occur [5–9].

Demographic statistics have been used to analyze reporting inaccuracies at the Cape Coast Teaching Hospital in Ghana, among both insured and uninsured patients [5]. The research found inaccuracies in the age data reported at Cape Coast Teaching Hospital. If not corrected, these inaccuracies could lead to clinicians performing the wrong age-dependent medical procedures. [6] in Ghana sought to assess the accuracy of ages reported by NHIS registrants in the Sekondi District of Ghana by using demographic indexes. Results from the use of Whipple's Index revealed that the dataset for both male and female registrants was of poor quality. The most accurate reported ages by registrants based on their gender ended in 0. Additionally, ages ending in 5 were found to be approximately accurate when the registrants were evaluated by gender. [9] used demographic methods to examine the ages of patients at Nigeria's Dutsin-Ma General Hospital. According to the findings, the age reports for both males and females were highly inaccurate in terms of quality. Researchers have used demographic indicators to assess whether the quality of age data in consecutive population surveys has improved [7, 8, and 10].

Researchers have identified relationships between educational attainment, profession, pathological traits, and treatment choices. The educational attainment of the patients and their various occupational categories has been found to differ significantly. For individuals with high incomes and education levels, the growth stage occurred later. Once again, patients in the lower-income worker group or those with less schooling received more radiotherapy, chemotherapy, and endocrine therapy [11–19].

Method

Using demographic indicators, we examined the retrospective demographic data of 559 breast cancer patients diagnosed at Korle Bu Teaching Hospital between January 2010 and December 2013 for inaccuracies in age reporting. The information was presented in five-year age segments as well as single-year age intervals. The aim of the study was to measure the error in age reporting using demographic statistical indices. The age distribution among patients was assessed using the Whipple's and Myers indices. The data was processed using Microsoft Excel. The preference for or aversion to a specific digit was measured using the Whipple index. A five-year age span, assumed to be linear or rectangular, is used for the purposes of this index. When comparing populations with terminal age digits that are divisible by 5, one-fifth of the total population within the age range is used as the divisor, as shown in equation (1). This helps to identify age heaping based on ages with ending digits of 0 and 5 among individuals aged 23 to 62.

$$Whipples\ Index = \frac{P_{25}+P_{30}+P_{35}+P_{40}+\ldots+P_{55}+P_{60}}{\frac{1}{5}(P_{23}+P_{24}+P_{25}+\ldots+P_{61}+P_{62}} \times 100 = \frac{\sum_{23}^{62} P_a\ \ ending\ in '0' or\ '5'}{\frac{1}{5}\sum_{23}^{62} P_a} \times 100 \qquad (1)$$

The reliability and interpretation of Whipple's index are measured within a range of values.

Highly accurate (index below 105)

Fairly Accurate (Index between 105 and 109.9)

Approximate (index between 110 and 124.9)

Rough (index between 125 and 174.9)

Very rough (175+)

One popular method for measuring age choice at each digit is the Myers index. It can be used to assess the accuracy of reported age data. This index is used to determine a person's preference for or aversion to each of the ten numbers used to report their age. It applies when the age information is given in individual years. Since it was developed to reduce errors in age reporting, it is referred to as a blended index. The Whipple's index is responsible for this bias because, for example, the final digit of an integer is more frequently recorded as 0 than as 1 or 9. The sum of the absolute deviations from 10% divided by the total number of terminal digits yields the Myers index for terminal digits for the reported ages. The index values range from 0 to 90.

$$Myers\ Blended\ Index = \left[\sum_{i=0}^{9} \frac{B_i}{\sum_{i=0}^{9} B_i} \times 100\right] - 10\% \qquad (2)$$

B_i denotes the Blended population i varying from $0-9$.

$$Grand\ Blended\ population = \sum_{i=0}^{9} B_i \qquad (3)$$

$$Magnitude\ of\ preference\ = \left[\sum_{i=0}^{9} \frac{B_i}{\sum_{i=0}^{9} B_i} \times 100\right]_{-10} \qquad (4)$$

Results

The Myers index was utilized to facilitate the assessment of patients' preferences and dislikes for each of the ten terminal digits, as depicted in Tables 1, 2, and 3. To calculate the overall Summary Index of Age Preference for all terminal digits, add up the total absolute deviations from 10% and multiply the sum by one-half. The Myers' index of preferences for the entire dataset (i.e., 559 women with breast cancer), including both premenopausal and postmenopausal patients, was found to be close to zero for each group. A Myers' index close to zero observed in each case indicates that age heaping is not very common among breast cancer patients in Ghana.

In relation to the overall breast cancer patients in Table 1, the findings revealed a higher preference (16%) for ages ending in 0, while ages ending in six had the least influence (5%). There was an overrepresentation of ages ending in 0, 1, 2, 3, 5, 7, and 8, as indicated by the combined sum of those digits exceeding 10% (equivalent to 3899) of the total population. The digits 4, 6, and 9 were under-selected because their combined sums represented less than 10% of the entire population of blended numbers. Age heaping was present at very low levels, as indicated by the Summary Index of Age Preference of 12.64, which was very close to zero.

The summary index of age preference for premenopausal breast cancer patients in Table 2 indicates that age heaping is not very common among them. The findings also revealed a higher preference (17%) for terminal digits 4, 5, and 7 across all age groups. The terminal digit zero had the least influence (5%). There was an over-representation of ages ending in digits 3, 4, 5, 6, 7, and 8, as indicated by the combined total of those digits exceeding 10% (26672) of the total population. Digits 1, 2, and 9, however, were underrepresented because their combined sums accounted for less than 10% of the entire population of blended numbers. Age heaping was present at very low levels, as indicated by the Summary Index of Age Preference of 22.14, which was very close to zero.

From Table 3, the Myers summary index for postmenopausal breast cancer patients suggests that age heaping is not very common among them. The findings also revealed a higher preference (16%) for ages ending in 1. The ages ending in the digit 3 were the least influential (5%). There was an over-representation of ages ending in 0, 1, 2, 5, 7, and 8, as indicated by the combined total of those digits exceeding 10% (equivalent to 1435) of the entire population. The remaining digits 3, 4, 6, and 9 were under-selected because their corresponding combined totals were less than 10% of the total population of combined numbers. Age heaping was present at very low levels, as indicated by the Summary Index of Age Preference of 14.77, which was very close to zero.

Table 1: Myers Index for Overall Dataset

Term. Digit	Sum of age 10-89	Coef.	Ages 10-89 coef. product	Sum of age 20-89	Coef.	Ages 20-89 coef. product	Blended sum	%Distri.	Deviation from 10
0	69	1	69	69	9	621	690	15.5091	5.5091

1	49	2	98	49	8	392	490	11.0137	1.0137
2	62	3	186	62	7	434	620	13.9357	3.9357
3	46	4	184	45	6	270	454	10.2045	0.2045
4	34	5	170	34	5	170	340	7.6422	-2.3578
5	57	6	342	56	4	224	566	12.7220	2.7220
6	21	7	147	21	3	63	210	4.7202	-5.2798
7	48	8	384	48	2	96	480	10.7889	0.7889
8	60	9	540	59	1	59	599	13.4637	3.4637
SUM	**446**			**443**			**4449**	100	10
Absolute sum of deviations from 10									**25.28**
Summary Index of age preference (Myers' index)									**12.64**

The total percentage deviations of the combined population from the expected distribution of 10 along each terminal number are shown in Figure 1 as a sum. In reporting age, the terminal digits 0 and 2 were the most commonly used, while 8 and 4 were notably avoided. Figure 2 displays the percentage distribution based on the terminal digit. With a percentage distribution of approximately 16%, the terminal digit 0 was the most commonly chosen, followed by 14% for the terminal digit 2. The less frequently occurring terminal digits in terms of percentage distribution were 6 and 4, which had similar percentage distributions of approximately 5% and 8%, respectively. The terminal digit percentage distribution pattern depicted in Figure 3 illustrates a decreasing preference from the highest peak of 0, which ranges from approximately 16% to around 11%. The preference for terminal numbers 2, 5, and 8 has clearly increased in distribution. The distribution pattern indicated lower preferences for the terminal numbers 1, 4, and 6, as illustrated in Figure 3. Figure 4 displays the plot of deviations in the combined population by the final digit of each age, compared to the expected distribution. When reporting age, the most preferred terminal numbers were 0 and 2, while the most despised were 3 and 7. However, ages ending in the digit 1 were less preferred. A similar pattern to that described in Figure 3 can be observed in Figure 5, which illustrates the distribution of terminal digits for deviations relative to the combined population.

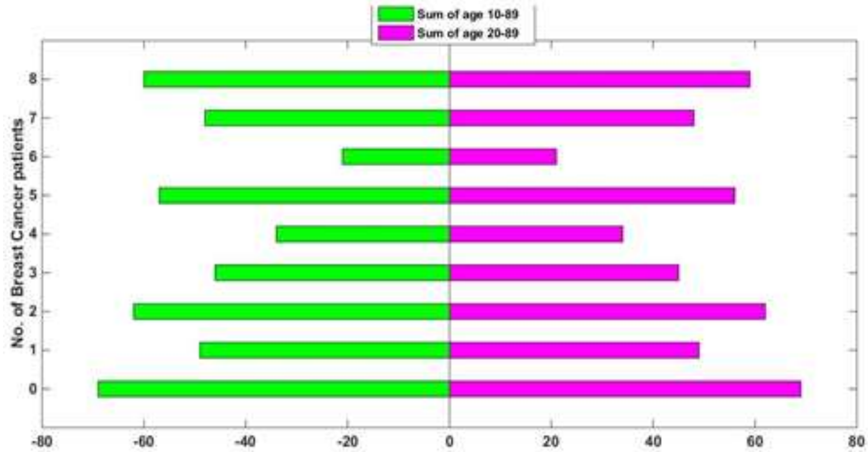

Figure 1. BC Incidence Terminal Digit Distribution for Overall Dataset

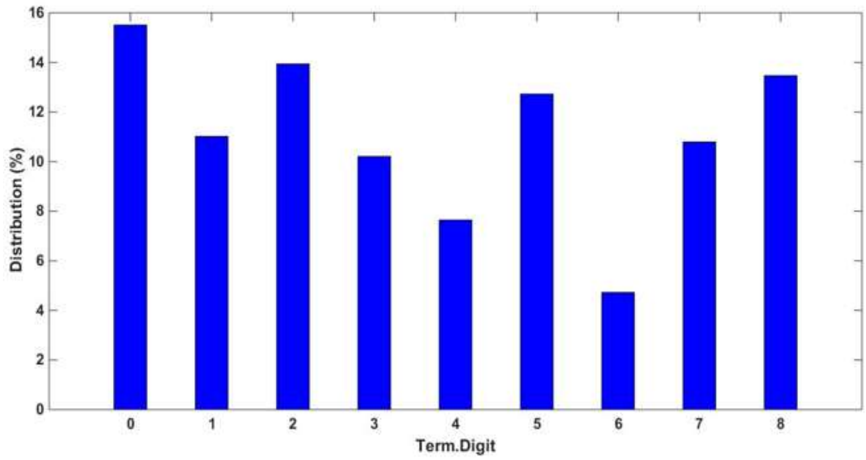

Figure 2. Percentage Distribution as a Function of the Terminal Digit

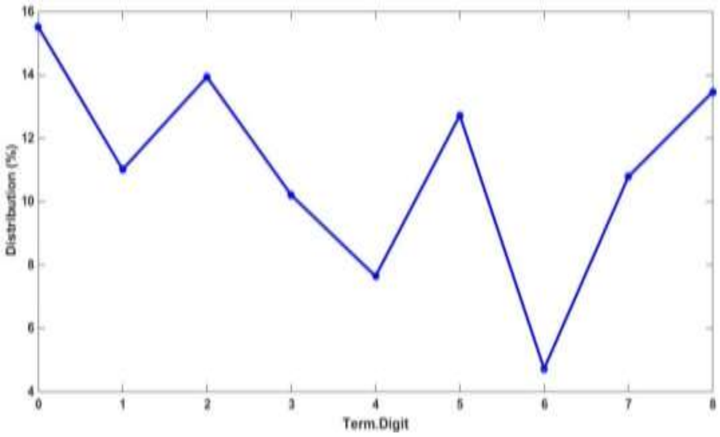

Figure 3. Pattern of Terminal Digits Distribution for Percentage Distribution of Terminal Digits

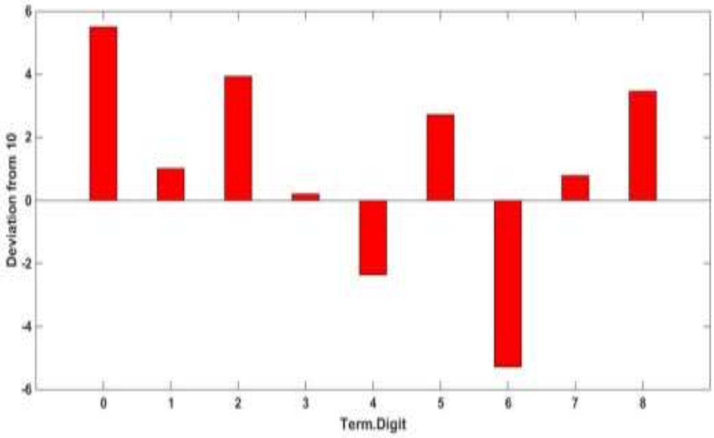

Figure 4. Percentage Deviations Distribution by Terminal Digit

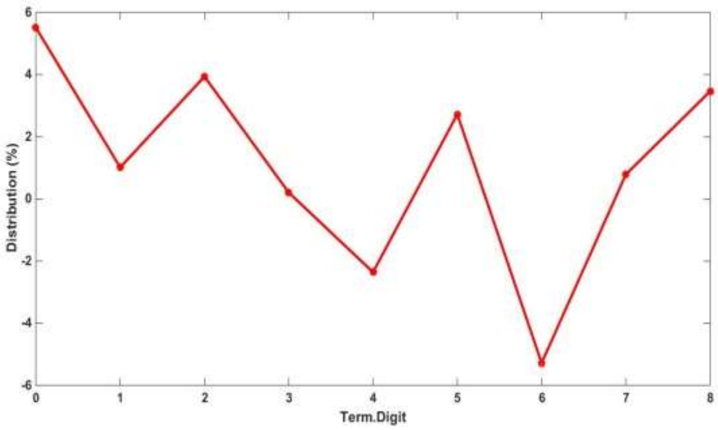

Figure 5. Terminal Digits Distribution Pattern for Percentage Deviations of the Blended Population

Table 2: Myers Index for Premenopausal Women

Term. Digit	Sum of age 10-89	Coef.	Ages 10-89 coef. product	Sum of age 20-89	Coef.	Ages 20-89 coef. product	Blended sum	%Distri.	Deviation from 10
0	42	1	42	42	9	378	420	1.3721	-8.6279
1	20	2	40	80	8	640	680	2.2215	-7.7785
2	43	3	129	387	7	2709	2838	9.2715	-0.7285
3	36	4	144	576	6	3456	3600	11.7609	1.7609
4	40	5	200	1000	5	5000	5200	16.9879	6.9879
5	34	6	204	1224	4	4896	5100	16.6612	6.6612
6	26	7	182	1274	3	3822	4004	13.0807	3.0807
7	38	8	304	2432	2	4864	5168	16.8834	6.8834
8	40	9	360	3240	1	3240	3600	11.7609	1.7609

Term. Digit	Sum of age 10-89	Coef.	Ages 10-89 coef. product	Sum of age 20-89	Coef.	Ages 20-89 coef. product	Blended sum	%Distri.	Deviation from 10
SUM	**319**			**10255**			**30610**	100	10
Absolute Sum of Deviation from10									**44.27**
Summary of preference (Myers' index)									**22.14**

Figure 6 shows the total sum of percentage deviations in relation to the terminal digit for the entire population. The digits 8 and 7 were the most commonly used to report age, while 0 and 1 were particularly avoided. The percentage distribution as a function of the terminal number is shown in Figure 7. The distribution of terminal digits as a percentage showed that the digits 4 and 7 were the most common, each accounting for approximately 17% of the total. The numeral 5 was ranked second, with a percentage distribution of approximately 16%. The terminal digits 0 and 1, which each had a similar percentage distribution of about 2%, were the least frequent in terms of frequency. Figure 8 illustrates the distribution of terminal digit percentages, indicating a growing preference beginning with the lowest terminal number of 0. The distribution of preferences has shifted in favor of the terminal numbers 1, 2, 3, 4, and 7. The pattern also indicates a preference for decreasing terminal numbers 6 and 8. Figure 9 displays the percentage deviations of the merged population for each terminal number, starting at 10. The numbers 4, 5, and 7 were the most frequently occurring ending digits, while the least common ending digits were 3, 6, and 8. Figure 10 displays the distribution pattern of terminal digits for percentage deviations of the blended population, which is comparable to the pattern described in Figure 8.

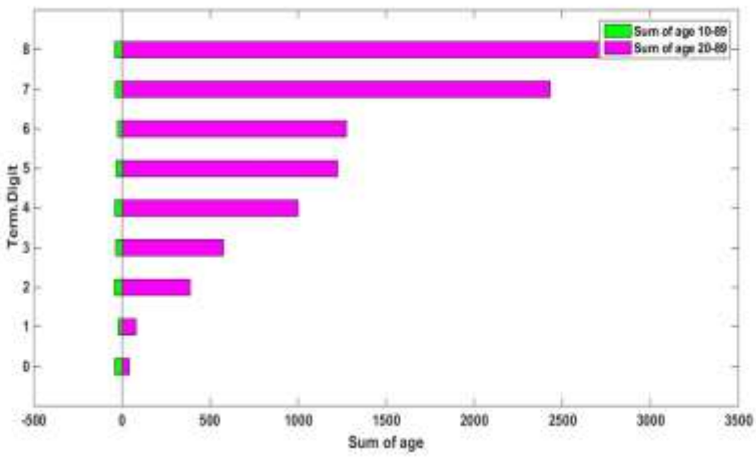

Figure 6. BC Incidence Terminal Digit Distribution for Overall Dataset

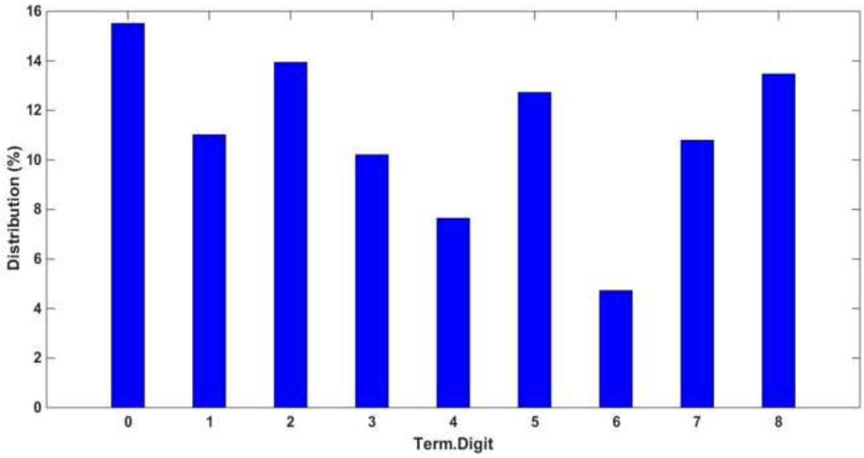

Figure 7. Percentage Distribution as a Percentage of Terminal Digits

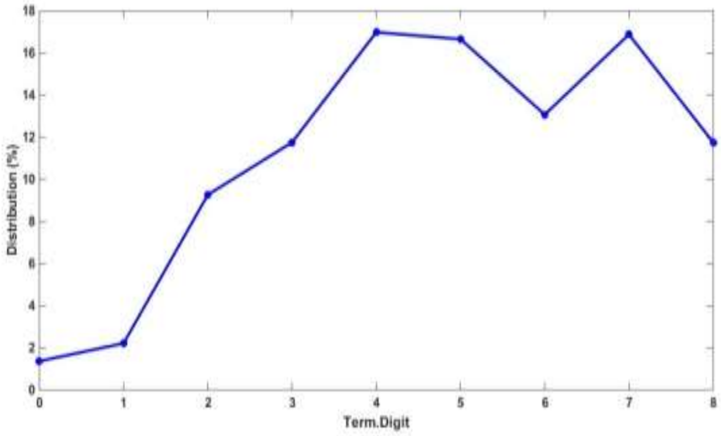

Figure 8. Distribution Pattern of Terminal Digit

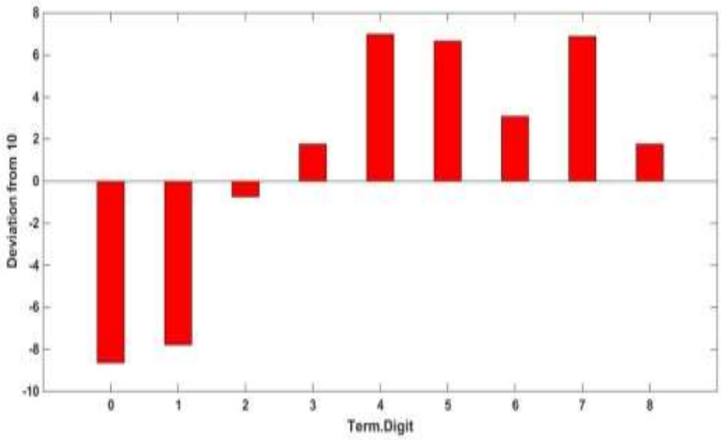

Figure 9. Plot of Deviation from 10

Figure 9 displays the combined percentage population deviations from 10 with respect to each terminal digit (expected distribution). When reporting age, terminal numbers 4, 5, and 7 were the most preferred, while 2, 3, and 8 were the least favored. Figure 10 shows a similar distribution pattern of terminal digits for deviations from the blended population as described in Figure 8. The expected distribution for each terminal digit is depicted in Figure 11 as a sum. In reporting ages, the terminal digits 1 and 7 were the most commonly used, while 3 and 4 were notably avoided. Figure 12 displays the percentage distribution based on the terminal digit. With a percentage distribution of about 15.5%, the digit 1 was the most preferred terminal digit, followed by 15% for the digit 7. The less common terminal digits in terms of percentage distribution were 3 and 4, which had similar percentage distributions of approximately 5% and 6%, respectively. Figure 13 shows the combined percentage population deviations from 10 with respect to each terminal digit (expected distribution). In terms of reporting age, the most commonly preferred digits were 1, 0, and 7, while the least favored were 2 and 8. The distribution of terminal digit percentages in Figure 14 shows a zigzag pattern, indicating a reversal in the percentage preference for a specific terminal digit over time.

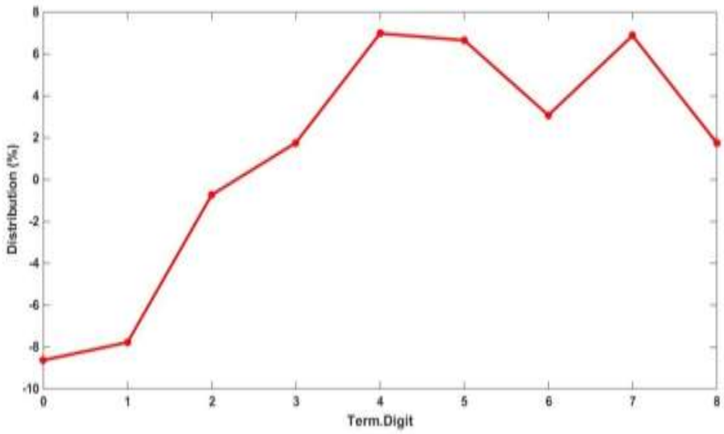

Figure 10. Distribution Pattern of Terminal Digit

Table 3: **Myers Index for Postmenopausal Women**

Term. Digit	Sum of age 10-89	Coef.	Ages 10-89 coef. product	Sum of age 20-89	Coef.	Ages 20-89 coef. product	Blended sum	%Distri.	Deviation from 10
0	27	1	27	27	9	243	270	15.0083	5.0083
1	28	2	56	28	8	224	280	15.5642	5.0083
2	19	3	40	19	7	133	190	10.5614	0.5614
3	10	4	55	9	6	54	94	5.2251	-4.7749
4	11	5	138	11	5	55	110	6.1145	-3.8855
5	23	6	112	22	4	88	226	12.5625	2.5625

Term. Digit	Sum of age 10-89	Coef.	Ages 10-89 coef. product	Sum of age 20-89	Coef.	Ages 20-89 coef. product	Blended sum	%Distri.	Deviation from 10
6	16	7	216	16	3	48	160	8.8938	-1.1062
7	27	8	180	27	2	54	270	15.0083	5.0083
8	20	9	**881**	19	1	19	199	11.0617	1.0617
SUM	**181**			**178**			**1799**	100	10
Absolute Sum of Deviation from10									**29.53**
Summary of preference (Myers' index)									**14.77**

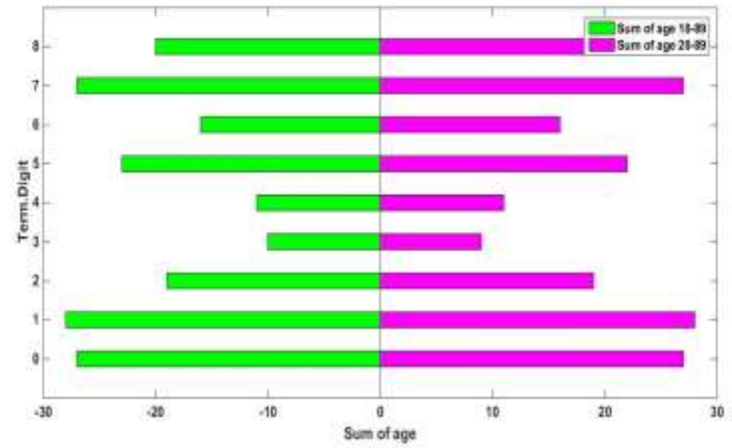

Figure 11. Myers's Index Terminal Digit Distribution Plot

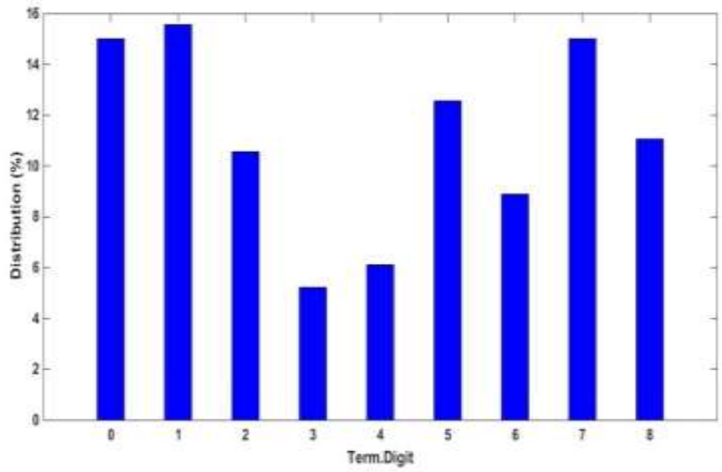

Figure 12. Graph of Percentage Distribution as a Function of the Terminal Digit

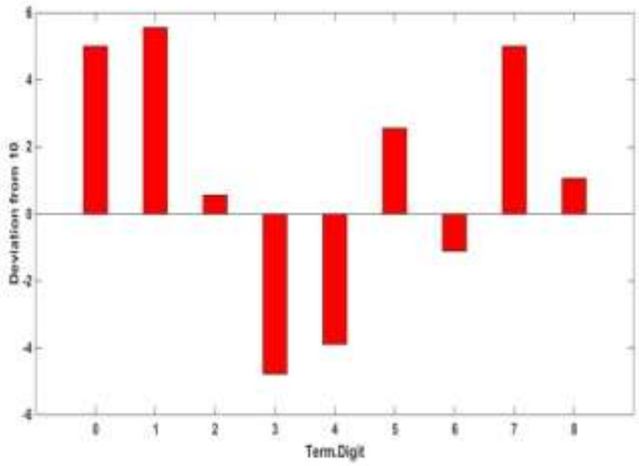

Figure 13. Plot of Percentage Deviations of the Combined Population along Each Terminal Number From 10

Whipple's index for terminal digits 5 and 0 was 49.7 and 62.1, respectively, as shown in Table 4. These indices demonstrate highly accurate reporting of ages. With a computed Whipple's index of 111.7 under UN standards for the combined age error effect, the reliability interpretation of the quality of the ages provided by breast cancer patients indicates that the ages are approximate. Table 5 for premenopausal women displays the Whipple's Index for ages ending in 5 and 0 as 67.1 and 65.4, respectively. These measures are highly accurate. The accuracy of the ages reported by breast cancer patients is assessed as either approximate or reliable, with a computed Whipple's Index of 132.6, according to UN standards for the combined impact of age errors. The Whipple's index for terminal digits 5 and 0 is 12.99 and 100.6, respectively, as shown in Table 6 for postmenopausal women. These metrics indicate that the reported ages are extremely accurate. With a computed Whipple's index of 113.6 under UN standards for the combined age error effect, the quality of the ages provided by breast cancer patients is interpreted as approximate or reliable. Table 7 shows the Whipple's Index for breast cancer patients who were not hospitalized for years ending in 5 and 0 as 53.3 and 58.1, respectively. These metrics demonstrate how correct the reported ages are. The accuracy of the ages reported by breast cancer patients is assessed as approximate or reliable, with a computed Whipple's Index of 111.4, according to UN criteria for the combined age error impact. For breast cancer patients who were hospitalized, the Whipple's index for years ending in 5 and 0 is 0 and 71.4, respectively, in Table 8. These metrics demonstrate the accuracy of the reported ages. The accuracy of the ages provided by breast cancer patients is considered to be high, with a computed Whipple's index of 71.4 under UN standards for the combined age error impact.

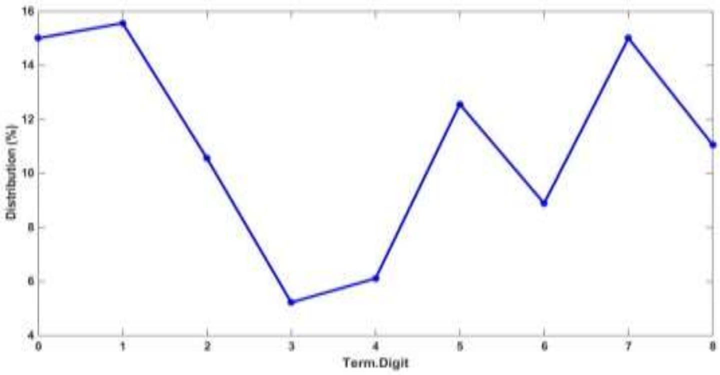

Figure 14. Distribution Pattern of Terminal Digit Percentages

Table 4. Whipple's Index for Overall breast Cancer Patients

Age	No. of BC Incidence	**Age**	No. of BC Incidence
23	3	25	2
24	0	30	6
25-29	17	35	17
30-34	39	40	18
35-39	70	45	21
40-44	67	50	15
45-49	87	55	4
50-54	81	60	16
55-59	55	**TOTAL**	**99**
60	16	**Whipple's index for terminal index of 5 (44/((1/5)*443))*100= 49.7**	
61	1	**Whipple's index for terminal digit of 0 (55/((1/5)*443))*100=62.1**	
62	7	**summary preference for digits of 0 and 5 (99/((1/5)*443))*100=111.7**	
TOTAL	**443**		

When breast cancer (BC) incidence is plotted by age, Figure 15 displays the Whipple Index for overall patient characteristics. Figures 15 and 16 illustrate the trend of breast cancer, showing that the illness is most severe or prevalent in individuals aged 45 to 49. According to the Whipples Index criteria, breast cancer incidence has been observed in individuals between the ages of 23 and 62. The trend indicates that the incidence of breast cancer in Ghana tends to peak at 45 years of age, and then decline until 55 years of age, and then spike again at higher ages.

Similar trends are observed in Figures 17 and 18 and are supported by the overall case. Premenopausal patients, however, experience decreased incidences up to roughly age 50. Beyond the age of 55, there are no occurrences, according to the trend plot in Figure 18. Figures 19 and 20 depict the significant symptoms experienced by postmenopausal patients between the ages of 50 and 59, with a decrease in symptoms as they age. Figures 21 and 22 illustrate that patients with breast cancer who have not been hospitalized exhibit an incidence that spans across ages, starting at 23 years old, showing an increasing trend up until about 45 years old, and then decreasing in its impact at older ages. Figures 23 and 24 indicate that breast cancer patients are admitted to hospitals at older ages. Hospitalization rates tend to start increasing around the age of 45, peak around the age of 50, and then fluctuate with a downward trend.

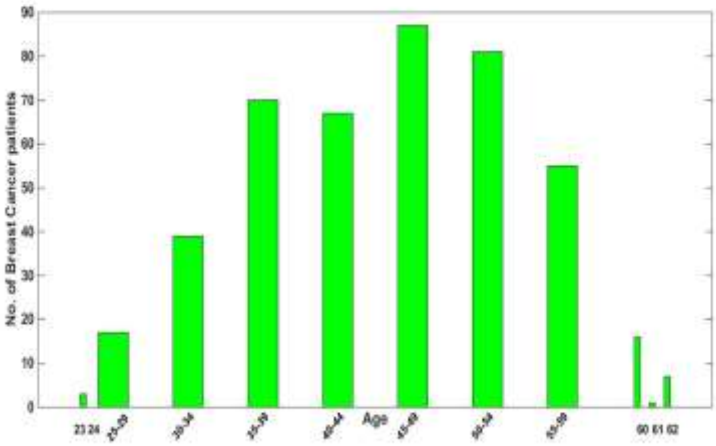

Figure 15. Graph of BC Incidence by Age (overall)

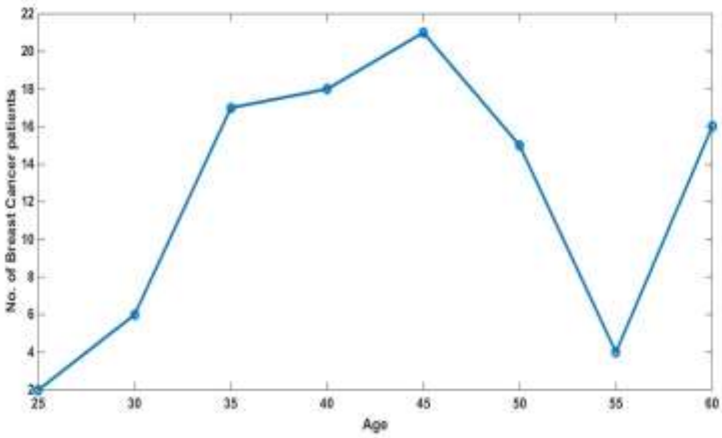

Figure 16. Trend plot of BC Incidence by Age

Table 5. Whipple's Index for Premenopausal Women

Age	No. of BC incidence	Age	No. of BC incidence
23	3	25	2

24	0	30	6
25-29	17	35	17
30-34	39	40	18
35-39	70	45	21
40-44	67	50	15
45-49	87	55	0
50-54	15	60	0
55-59	0	**TOTAL**	**79**
60	0	**Whipple's index for terminal index of 5 (40/((1/5)*298))*100= 67.1**	
61	0	**Whipple's index for terminal digit of 0 (39/((1/5)*298))*100=65.4**	
62	0	**summary preference for digits of 0 and 5 (79/((1/5)*298))*100= 132.6**	
TOTAL	**298**		

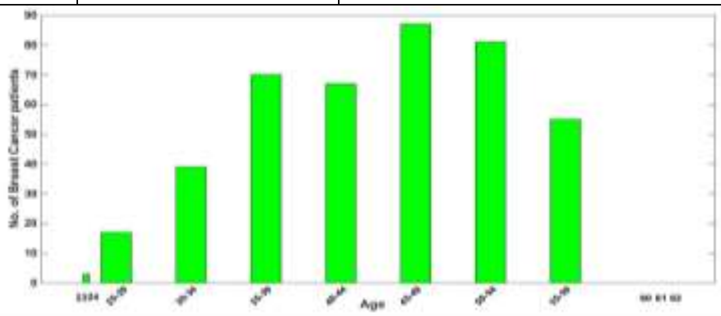

Figure 17 Graph of Number of BC Incidence by Age (Premenopausal Women)

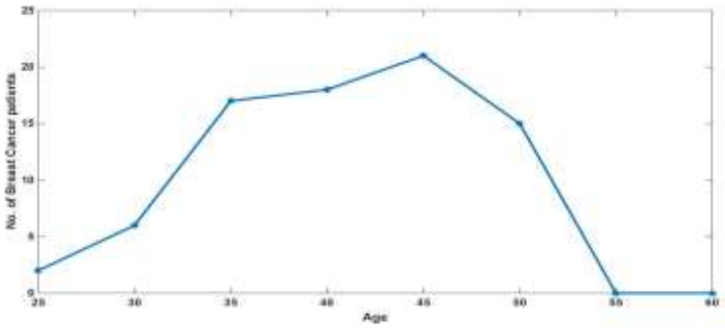

Figure 18. Trend plot of Number of BC Incidence by Age (Premenopausal)

Table 6. Whipple's for Postmenopausal Women

Age	No. of BC incidence	Age	No. of BC incidence
23	0	25	0
24	0	30	0

25-29	0	35	0
30-34	0	40	0
35-39	0	45	0
40-44	0	50	15
45-49	0	55	4
50-54	66	60	16
55-59	64	**TOTAL**	**35**
60	16	**Whipple's index for terminal digit of 5 (4/((1/5)*154))*100= 12.99**	
61	1	**Whipple's index for terminal digit of 0 (31/((1/5)*154))*100=100.6**	
62	7	**summary preference for digits of 0 and 5 (35/((1/5)*154))*100= 113.6**	
TOTAL	**154**		

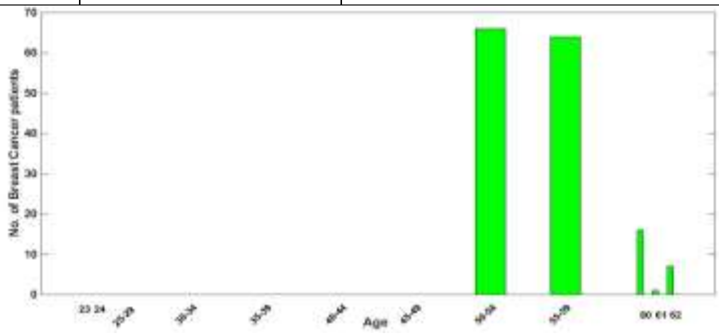

Figure 19 Graph of Number of Breast Cancer Patients by Age (Post-Menopausal Period)

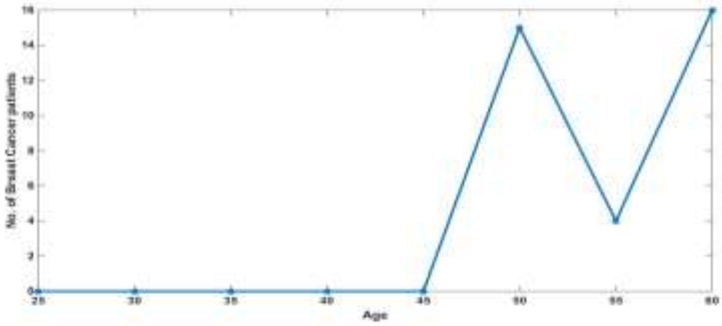

Figure 20 Plot of Number of Breast Cancer Patients by Age (Post-Menopausal Period)

Table 7. Whipple's for Breast Cancer Women with Hospitalisation

Age	No. of BC incidence	Age	No. of BC incidence
23	3	25	2
24	0	30	6
25-29	17	35	17
30-34	39	40	18
35-39	70	45	21
40-44	67	50	11

45-49	80	55	4
50-54	66	60	13
55-59	52	**TOTAL**	**92**
60	13	**Whipple's index for terminal digit of 5 (44/((1/5)*413))*100=53.3**	
61	0	**Whipple's index for terminal digit of 0 (48/((1/5)*298))*100=58.1**	
62	6	**summary preference for digits of 0 and 5 (92/((1/5)*413))*100= 111.4**	
TOTAL	**413**		

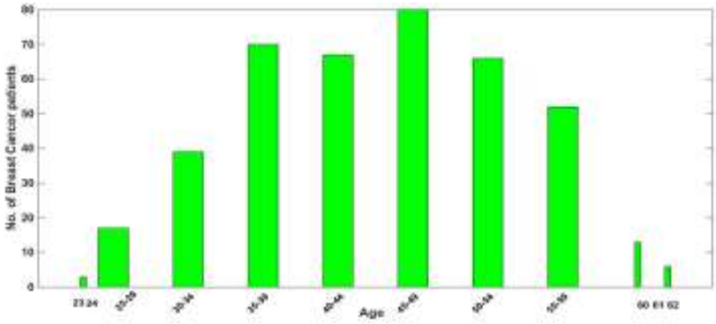

Figure 21 Graph of Number of BC Incidence by Age (with Hospitalisation)

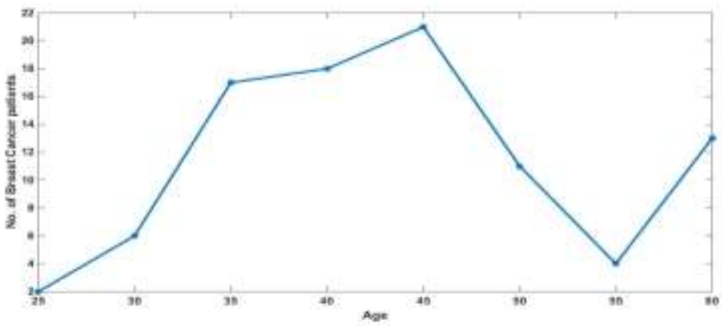

Figure 22 Plot of trend of Number of BC Incidence by Age (with Hospitalisation)

Table 8. Whipple's for Breast Cancer Women with no Hospitalisation

Age	HOSPI (YES)	Age	No. of Breast Cancer patients
23	0	25	0
24	0	30	0
25-29	0	35	0
30-34	0	40	0
35-39	0	45	0
40-44	0	50	4
45-49	7	55	0
50-54	15	60	3

55-59	12	**TOTAL**	7
60	13	**Whipple's index for terminal digit of 5 (0/((1/5)*49))*100= 0**	
61	1	**Whipple's index for terminal digit of 0 (7/((1/5)*49))*100=71.4**	
62	1	**The digit preference of 0 and 5 (7/((1/5)*49))*100= 71.4**	
TOTAL	49		

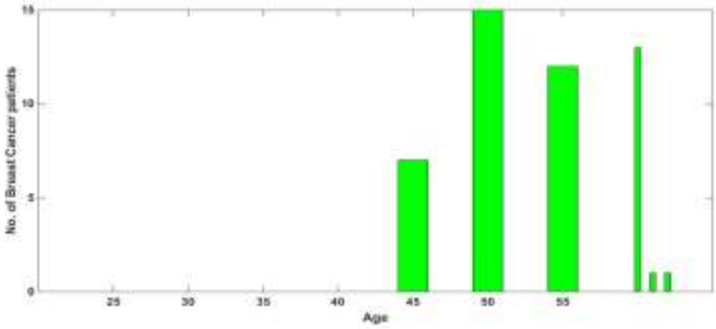

Figure 23 Graph of Number of BC incidence by Age (without Hospitalisation)

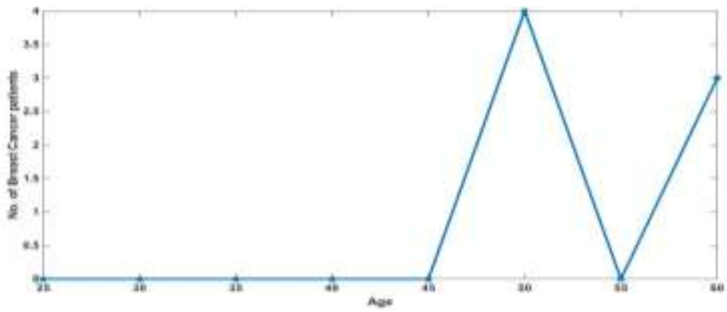

Figure 24 Graph of Number of incidence by Age (without Hospitalisation)

Conclusion

To analyze the age data of 559 BC patients diagnosed in Ghana, this study utilized Whipple's and Myer's indices. When stratified by hospitalization, menopausal, or postmenopausal statuses and analyzed without stratification (using the entire dataset), the computed Whipple's Index indicated that the reported ages of breast cancer patients were highly accurate, with a reliable combined effect. In each instance of stratifying by menopause status and when no stratification was taken into account, the Myer's index was very close to zero. This proves that the patients' reported ages were accurate. Our study reveals that the accuracy of age reporting among breast cancer patients is high, consistent with recent studies that have found a significant relationship between the patients' socioeconomic status (SES), income, and education. This suggests that they are more likely to report their ages accurately. This study has revealed that breast cancer patients typically report their ages accurately. This finding contrasts with recent studies in Ghana, which have demonstrated age reporting inaccuracies among both insured and uninsured patients [5–6, 20]. Therefore, it is recommended to conduct further studies in Ghana to assess the accuracy of the ages reported by patients for other diseases.

Implication for Further Research

It is recommended that additional study be conducted in Ghana to determine the quality of the ages reported by patients for other diseases.

Bibliography

1. Glas, N. A., Mandy, K. and Vandenbroucke, J.P. (2016), "Performing Survival Analyses in the presence of Competing Risks: A clinical Example in Older Breast Cancer patients", Journal of the National Cancer Institute, Vol. 108, No.5.
2. Arani, M. D., Abadi, A., Yavari, A., Bashiri, Y., Liley, M., and Bajdik, C. (2018), "Evaluation of risk factors in patients with breast cancer III and IV: Comparison of Cox and Fine-Grey competing risk regression models", Biomedical Research and Therapy Journal, Vol. 5, No. 2, pp. 2022-2033.
3. Bosson-Amedenu, S., Acquah, J., Nyarko, C.C. and Ouerfelli, N., (2022)a, "A Comparison between Accelerated Failure Time Models in Analyzing the Survival of Breast Cancer Patients", Journal of Cancer and Tumor International, Vol. 12, No. 1, pp. 16-28.
4. Bosson-Amedenu, S., Acquah, J., Nyarko, C. C. and Ouerfelli, N., (2022)b, "A Novel Three Parameter Modified Cox Frailty Model for Noncompeting Risk Patients with Breast Cancer Malignality", Mathematical Theory and Modeling, Vol. 12, No. 1, pp. 1-15.
5. Eyiah-Bediako F., Bosson-Amedenu S., Borbor Bridget S.2019), "Statistical Analysis of Age Reporting Errors by Insured andUninsured Patients in Cape Coast Teaching Hospital of Ghana", Biomedical Statistics and Informatics, Vol. 4, No. 2, 2019, pp. 15-21.
6. Bosson-Amedenu, S.*, Oduro-Okyireh, T., and Osei-Asibey E., "Detection of Errors in Age data of National Health Insurance Scheme Registrants in Ghana: Demographic Indexes " Approach / Journal: International Journal of Mathematical Archive ,Vol.10, No. 3.
7. Bekele S. (2006). "Analysis on the quality of age and sex data collected in two population and housing censuses of Ethiopia", Ethiop Journal of Science, 29 (2): 123-132, 2006. ISSN: 0379-2897.
8. Pardeshi, G. S. (2010), "Age heaping and accuracy of age data collected during a community survey in the Yavatmal district, Maharashtra", Indian J Community Med, 35 (3) 391-395 .
9. Bello Y., (2012), "Error Detection in Outpatients' Age Data Using Demographic Techniques. International Journal of Pure and Applied Sciences and Technology", Int. J. Pure Appl. Sci.Technol., Vol.10, No.1, pp. 27-36.)
10. Bwalya B. B, Phiri M. and Mwansa C. (2015), "Digit Preference And Its Implications On Population Projections In Zambia: Evidence From The

Census Data“, International Journal of Current Advanced Research, Vol. 4, Issue 5, pp 92-97.

11. Tetteh D.A, Faulkner S.L.(2016), “Sociocultural Factors and Breast Cancer in Sub-Saharan Africa: Implications for Diagnosis and Management“, Women’s Health. Vol. 12, No. 1, pp.147-156.
12. Mdondolo, N,, de Villiers L, Ehlers V.J.(2004), “Cultural factors associated with management of breast lumps amongst Xhosa women: research“, Health SA, Gesondheid , 8(3), 86–97 (2004).
13. Adesunkanmi, A.R.K, Lawal O.O, Adelusola KA, et al(2006), “The severity, outcome and challenge of breast cancer in Nigeria“, Breast Vol. 15, pp. 399–409.
14. Anyanwu, S.N.C, Egwuonwu O.A, Ihekwoaba E.C(2011), “ Acceptance and adherence to treatment among breast cancer patients in Eastern Nigeria“, Breast Vol. 20, S51–S53
15. Schlebusch, L., Van, Oers H.,(1999), “Psychological stress adjustment and cross-cultural considerations in breast cancer patients“, S. Afr. J. Psy. Vol. 29,pp. 30–35 .
16. Wright S.V. I1997), “An investigation into the causes of absconding among black African breast cancer patients“, S. Afr. Med. J. vol.87, pp.1540–1543.
17. Clegg-Lamptey, J.N.A, Hodasi, W.M.(2007), “ A study of breast cancer in Korle Bu Teaching Hospital: assessing the impact of health education“, Gh. Med. J. Vol. 14, No.2, pp. 72–77 (2007).
18. Opoku S.Y, Benwell M, Yarney J(2012), “ Knowledge, attitudes, beliefs, behaviour and breast cancer screening practices in Ghana, West Africa“, Pan Afr. Med. J. Vol. 11, No. 28.
19. Molina, Y., Thompson, B., Espinoza, N., Ceballos, R., (2013), “Breast cancer interventions serving US-based Latinas: current approaches and directions“, Women's Health, Vol. 9,No. 4, pp. 335–350.
20. Borbor, B.S, Bosson-Amedenu S., Gbormittah D., (2019), “Statistical Analysis of Health Insurance and Cash and Carry Systemsin Cape Coast Teaching Hospital of Ghana“, Science Journal of Applied Mathematics and Statistics, Vol. 7, No. 3, pp. 36-44.