American Journal of Medicine and Public Health

Research Article
Published: 15 May, 2020

Opinions of Indigenous Health-Workers on Fertility Preservation among Female Cancer Patients in Nigeria: Pros and Cons

Ajayi Abayomi B[1], Afolabi Bamgboye M[2] and Ajayi Victor D[1]*

[1]Department of Fertility, Nordica Fertility Centre, Lagos, Nigeria

[2]Department of Women's Health; Health, Environment and Development Foundation, Lagos, Nigeria

Abstract

Introduction: Not withstanding verbal attention, there is little programmatic guidance as to how best to ensure that Nigerian women in reproductive age who have cancer have access to Fertility Preservation (FP) to support their reproductive goals after chemo- or radio-therapy that may be deleterious to their reproductive system.

Objective: The objective of this study was to assess the opinions of health-workers on FP in Nigeria.

Materials and Method: This quantitative study was to assess the opinions, knowledge and attitude of 119 health workers from different parts of Nigeria on FP among women in child-bearing age who were diagnosed with cancer. A semi-structured questionnaire was used to gather data on the possibility of FP and about factors that could support or limit FP in the country.

Results: The mean (± sd) age of the respondents was 47.8 (10.9) years, most of whom (41, 34.5%) had been in practice for 20 to 29 years. Though majority (110, 92.4%) have heard of FP there was no significant difference (r=1.10, 95% CI: -0.08, 0.28, P=0.26) in years of practice and awareness of FP. In all, 65 (54.6%) and 64 (53.8%) respectively knew of facilities that offer FP services in Nigeria and overseas. Those practicing for 10 to 19 years were 1.7 and 2.2 times respectively more likely to know of such facilities within (χ^2=1.54, P=0.20, OR=1.73, 95% CI: 0.74, 4.09) or outside (χ^2=3.26; P=0.07; OR=2.20; 95% CI: 0.93, 5.20) the country than other groups. Health-workers practicing for 20 to 29 years had seen the highest number (98, 35.1%) of female cancer patients. There was a significant difference (χ^2=10.37, P=0.03) in the proportion of health-workers' response that cancer is an indication for fertility preservation. Approximately 90% of the health-workers believed that cost would be an aggravating factor for FP in Nigeria. Few health-workers seeing cancer patients discussed FP with their clients.

Conclusion: Data from this study indicates that female cancer patients in child-bearing age do not receive adequate information or referral from their health-workers to a reproductive specialist for their fertility preservation.

Awareness of the possibility of fertility preservation among female (and even male) cancer patients should be raised.

Keywords: Fertility Preservation; Health-Workers; Female Cancer Patients; Nigeria

OPEN ACCESS

Correspondence:
Bamgboye Afolabi M, Department of Health, Environment and Development Foundation, Lagos, Nigeria, E-mail: bmafolabi@gmail.com

Received Date: *23 Apr 2020*
Accepted Date: *12 May 2020*
Published Date: *15 May 2020*

Citation:
Ajayi Abayomi B, Afolabi Bamgboye M, Ajayi Victor D. Opinions of Indigenous Health-Workers on Fertility Preservation among Female Cancer Patients in Nigeria: Pros and Cons. Am J Med Public Health. 2020; 1(1): 1001.

Introduction

Globally, the number of reported cancer cases is increasing annually but the probability of surviving cancer today is high and is continually improving [1]. Survivorship issues have therefore become highly relevant as well as quality of life encompassing all health aspects [1]. Studies have documented the dose-dependent gonadotoxic effects of cancer chemotherapy or radiotherapy [2-6]. Studies have also shown that radiotherapy may also damage the uterus [7,8]. For both sexes, the overall probability of developing cancer at some time during life is about 45% and 37%, respectively [9]. Cancer at younger, unmarried age, when the individual still wishes to start his or her family presents exceptional challenges because of problems such as induction of ovarian or testicular failure, sexual malfunction and impaired fertility by removal or damage of reproductive organs. Surgery for prostate, bladder, or colon cancer may impair nerves and influence potency or ejaculation. Partial orchidectomy may be performed to preserve hormone secretion and spermatogenesis among

patients with testicular cancer [1]. Though Cancer of the Cervix (CaCx) is the leading cancer in women in Sub-Saharan Africa (SSA) with an estimated 70,700 new cases occurring in 2002 (the total in the whole continent was 78,900 cases), cancer has received low priority for health care services in SSA due to the overwhelming burden of communicable diseases [10]. In East Africa, especially Zimbabwe (Bulawayo between 1963 and 1977) and Uganda (Kampala in the 1960s, 1970s, and 1990s), CaCx seemed to increase in incidence over time [11,12] but no increases were observed over time in Nigeria and South Africa [13]. According to Ferlay et al. [14], the major cancer types in SSA in both sexes and in all ages are cancer of Cervix uteri (13.3%), Kaposi's sarcoma (10.8%), liver cancer (9.2%), breast cancer (9.2%), prostate cancer (5.0%), non-Hodgkin's lymphoma (4.7%), esophageal cancer (4.2%), stomach cancer (4.1%), cancer of the colon/rectum, (3.4%) and others (36.1%). Despite these figures, facilities for providing treatment for cancer cases in most of Africa are minimal [15] and still rarer are facilities for providing fertility preservation in the continent. Studies have shown that women in general suffer from emotional distress during fertility management [9,16] and this could be more so when these are cancer survivors. It is likely that fertility preservation can improve emotional well-being of these patients.

Oncofertility care in SSA is very rare. South Africa has a few clinics, under the South African Society of Reproductive Medicine and Gynecological Endoscopy (SASREG) that are associated with Oncofertility Consortium, in Chicago [16]. Data on fertility preservation among cancer and non-cancer patients in Africa is very rare. The objective of this study was to assess the opinions of health workers on fertility preservation in Nigeria.

Methodology

This questionnaire-based study took place during the annual meeting of Association of Fertility and Reproductive Health (AFRH) 2018 conference in Lagos, Nigeria. Prior to the conference, the Nordica Fertility Center Research team met to discuss and plan the questionnaire to be served. It was agreed that the questionnaire should be semi-structured and not more than two pages. This decision was arrived at solely because (i) those participating in the conference would have little time for responding to questionnaire (ii) the organizers of the conference did not include answering of questionnaires in their program (iii) the conference was of short duration. Because of these, three persons were trained specifically on how to serve and retrieve the questionnaires and how to get consent from respondents before sessions started. A local Ethics Committee approved this study.

Study population

The questionnaire was distributed to all 147 Nigerian health workers practicing within the country, who attended the AFRH conference in 2018. Foreign health workers within or from outside the country and non-health workers were excluded from the study. Of the 147 respondents, 15 (10.2%) questionnaires were uncompleted and were excluded from analysis and 13 (8.8%) were not returned, leaving 119 (81.0%) questionnaires that were fully answered and analyzed. Of these 119, 51 (42.9%) were from the host state Lagos which may reflect the survey range of the study while the remaining 68 (57.1%) were from different parts of the country.

Sample size estimation

Based on records of previous attendees at AFRH conferences, approximately 500 health workers, mainly gynecologists, were estimated to participate in the conference among whom 30 were expected to be Nigerians practicing outside of Africa, 20 were expected to be Europeans, Americans, and Australians practicing in their respective countries and 100 from African countries such as Ghana, Kenya, South Africa etc. The number of Nigerian health workers expected to participate in the conference was 350 among whom 200 (57.1%) were expected to come from Lagos and other cities in Southwest zone and the rest from other zonal parts of Nigeria such as South east, South-south, North-central, North-west except Northeast zone of the country. Based on this, 200 questionnaires were prepared for participating Nigerian health workers though only 147 (73.5%) of the expected number participated.

Content of the questionnaire

The 2-page questionnaire had administrative section consisting of date when questionnaire was served, time the questionnaire was served and time it was returned, name of the questionnaire administrator and questionnaire identification number. The questionnaire also contained section for the socio-demographic and professional information of respondents such as age, marital status, and years of practice as a health-worker and awareness of Fertility Preservation. This was followed by the section on socio-demographic profile of female cancer patients these health-workers had seen in the year prior to the study. The health-workers were then asked a series of questions including, indication for fertility preservation, body tissues that can be preserved in FP, knowledge of facilities providing FP services within and outside the country, factors that can function against FP in the country and whether the health-worker health workers contemplate FP when female cancer patients consult, whether they discuss FP with such patients and whether they refer these patients for FP. Health-workers were asked to recall the approximate age and the marital status of the female cancer patients they saw within one year prior to the study.

Data management

The research team went over the retrieved questionnaires and where possible called, within 24 h, any respondent to clarify response to some questions, though this was in very few cases. All questionnaires that were completed were entered into Excel sheet in a laptop, cleaned, and coded before conducting statistical analysis. Ages of respondents were categorized into 5 groups (i) 20-29.9, (ii) 30-39.9 (iii) 40-49.9, (iv) 50-59.9 and (v) ≥ 60 years. Duration of practice as a health-worker was stratified into <10, 10-19, 20-29, 30-39 and ≥ 40 years. Ages of female cancer were categorized into 4 groups (i) <20 (ii) 20-29 (iii) 30-39 (iv) and (iv) ≥ 40 years. The data was exported into STATA 13 (StataCorp, Texas 77845, USA) statistical software for analysis. Descriptive analysis and Pearson's correlation coefficient (r) were used to analyze association between different variables. $P<0.05$ was taken as statistically significant. Data were presented as Tables, Pie charts and Bar charts.

Results

A total of 119 health workers (Gynecologists =111, 93.3%, Urologists =2, 1.7%, General Practitioners =3, 2.5%, Public Health Physicians =3, 2.5%) with a mean (± sd, range) age 47.8 (10.9, 26-70) years, participated in this study of whom 115 (96.4%) were married. The mean (± sd) time it took to respond to the questionnaire was 14.2 (3.1) minutes. The mean (± sd) years of practice as health-workers was 19.5 (10.0) with a range of 1 to 44 years, most (41.34.5%) of whom have been practicing for 20 years to 29 years. Almost all study participants (110, 92.4%) have heard of Fertility Preservation (FP),

Table 1: Socio-demographic profiles and awareness of fertility preservation among study participants.

Variable	Sub-variable			Freq.	%	Mean	± sd	Min-Max
Age	All			119	100.0	47.8	10.9	26-70
	20-29.9			6	5.0	28.2	1.3	26-29
	30-39.9			26	21.9	35.7	2.6	30-39
	40-49.9			33	27.7	44.3	2.9	40-49
	50-59			35	29.4	54.4	2.5	50-59
	≥ 60			19	16.0	64.2	3.7	60-70
Marital status	Single			4	3.4	-	-	-
	Ever married			115	96.4	-	-	-
Years of practice	All			119	100.0	19.8	10.0	1-44
	<10			22	18.5	5.6	2.2	1-9
	10-19			31	26.0	13.8	2.3.	10-18
	20-29.9			41	34.5	23.4	3.0	20-29
	30-39.9			22	18.5	32.5	2.6	30-37
	≥ 40			3	2.5	42.0	1.7	41-44
Have you ever heard of Fertility preservation	Yes	All		110	92.4	-	-	-
		Years of practice	<10	19	17.3	-	-	-
			10-19	30	27.3	-	-	-
			20-29.9	39	35.4	-	-	-
			30-39.9	21	19.1	-	-	-
			≥ 40	1	0.9	-	-	-
	No	All		9	7.6	-	-	-
		Years of practice	<10	3	33.3	-	-	-
			10-19	1	11.1	-	-	-
			20-29.9	2	22.2	-	-	-
			30-39.9	1	11.1	-	-	-
			≥ 40	2	22.2	-	-	-
	r, (95% CI), (P-value)			0.105, (-0.08, 0.28), (0.26)				

especially those who had been health-workers for 20 years to 29 years (39, 35.4%) and least among those who had been practicing for ≥ 40 years (1, 0.9%) (Table 1).

Majority (63, 52.9%) of the female cancer patients who consulted with study health-workers were aged 30 years to 39 years with only 1 (0.8%) aged <20 years. In all 76, (63.9%) were married, 4 (3.3%) were single and 39 (32.8%) were divorced (Table 2). A total of 279 (100.0%) female cancer patients consulted with the study health-workers one year prior to the study and most of these (n=98, 35.1%; mean =2.4 ± 1.0) were seen by health-workers practicing for 20 years to 29 years (Table 3).

There was a significant difference (χ^2=10.37, P=0.03) in the proportion of health-workers' response that cancer is an indication for fertility preservation as all (100.0%) of those practicing for <10 years, 97% of those practicing for 10-19 years, 98%, 86% and only 66.7% years of those practicing for 20 years to 29 years, 30 years to 39 years and ≥40 years respectively mentioned cancer. A lower proportion of health-workers practicing for <10 years (77%), 10-19 (84%), 20-29 (85%), 30-39 (81%) and ≥ 40 years (33%) respectively agreed that risk of premature ovarian failure is an indication for FP. A further lower proportion of health-workers practicing for <10 years (73%), 10-19 (77%), 20-29 (78%), 30-39 (59%) and ≥ 40 years (33%) respectively agreed that endometriosis is an indication for FP (Figure 1) with no significant difference in these proportions.

Table 2: Some socio-demographic characteristics of female cancer patients seen by health-workers.

Variable	Sub-variable	Freq.	%
Age	All	119	100.0
	<20	1	0.8
	20-29	24	20.2
	30-39	63	52.9
	≥ 40	31	26.1
Marital Status	Single	4	3.3
	Married	76	63.9
	Divorced	39	32.8

The highest proportion of health workers who agreed that egg freezing is essential for FP were those practicing for 30-39 years (22, 100.0%), followed by those practicing for 20-29 years (39, 95.1%), <10 years (20, 90.9%), 10-19 years (28, 90.3%) and finally those practicing for ≥ 40 years (2, 66.7%). Sperm cells were identified as tissues to be preserved by 82%, 87%, 88%, 95% and 67% of those who had been practicing for <10, 10-19, 20-29, 30-39, and ≥ 40 years. The highest

Table 3: Profiles of cancer patients seen by years of practice of health-workers.

Variable	Years of practice					
	All	<10	10-19	20-29	30-39	≥ 40
Number of female cancer patients seen	279	49	67	98	58	7
Percentage of female cancer patients seen	100.0	17.6	24.0	35.1	20.8	2.5
Mean (± sd) number of female cancer patients seen	2.3 (1.1)	2.2 (1.2)	2.2 (1.0)	2.4 (1.0)	2.6 (1.2)	2.3 (1.5)

Table 4: Knowledge of facilities practicing fertility preservation within and outside the country.

Years of practicing	Response	Do you know facilities that have Fertility Preservation services in Nigeria		Do you know facilities that have Fertility Preservation services abroad		Is Fertility Preservation possible at all		Is Fertility Preservation worthwhile		Is Fertility Preservation possible in Nigeria	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
<10	Yes	9	40.9	10	45.4	20	90.9	22	100.0	22	100.0
	No	13	59.1	12	54.6	0	0.0	0	0.0	0	0.0
	Don't know	-	-	-	-	2	9.1	0	0.0	0	0.0
χ^2; P-value; OR; 95% CI		2.03; 0.15; 0.51; 0.20,1.30		0.75; 0.39; 0.66; 0.26, 1.68		0.24; 0.89; -; -		0.85; 0.65; -; -		0.23; 0.63; -; -	
10-19	Yes	20	64.5	21	67.7	29	93.5	30	96.8	31	100.0
	No	11	35.5	10	32.3	0	0.0	0	0.0	0	0.0
	Don't know	-	-	-	-	2	6.5	1	3.2	0	0.0
χ^2; P-value; OR; 95% CI		1.54; 0.20; 1.73; 0.74, 4.09		3.26; 0.07; 2.20; 0.93, 5.20		0.58; 0.75; -; -		1.95; 0.38; -; -		0.36; 0.55; -; -	
20-29	Yes	22	53.7	17	41.5	37	90.2	41	100.0	41	100.0
	No	19	46.3	24	58.5	1	7.3	0	0.0	0	0.0
	Don't know	-	-	-	-	3	2.5	0	0.0	0	0.0
χ^2; P-value; OR; 95% CI		0.02; 0.88; 0.94; 0.44, 2.01		3.79; 0.05; 0.47; 0.22, 1.01		1.99; 0.37; -; -		2.18; 0.34; -; -		0.53; 0.47; -; -	
30-39	Yes	13	59.1	15	68.2	20	90.9	21	95.4	22	100.0
	No	9	40.9	7	31.8	0	0.0	1	4.6	0	0.0
	Don't know	-	-	-	-	2	9.1	0	0.0	0	0.0
χ^2; P-value; OR; 95% CI		0.22; 0.64; 1.25; 0.49, 3.20		2.23; 0.14; 2.10; 0.79, 5.60		0.24; 0.89; -; -		1.78; 0.41; -; -		0.23; 0.63; -; -	
≥ 40	Yes	1	33.3	1	33.3	2	66.7	1	33.3	2	66.7
	No	2	66.7	2	66.7	0	0.0	1	33.3	0	0.0
	Don't know	-	-	-	-	1	33.3	1	33.3	1	33.3
χ^2; P-value; OR; 95% CI		0.03; 0.87; 0.41; 0.04, 4.61*		0.03; 0.87; 0.41; 0.04, 4.61*		2.50; 0.29; -; -		38.0; 0.0001; -; -		39.0; 0.0001; -; -	
Total	Yes	65	54.6	64	53.8	108	90.8	115	96.6	118	99.2
	No	54	45.4	55	46.2	1	0.8	2	1.7	0	0.0
	Don't know	-	-	-	-	10	8.4	2	1.7	1	0.8

proportion of health-worker who responded that embryo could be preserved was observed among those practicing <10 years while the lowest was observed among those practicing for ≥ 40 years. Also, the highest and the lowest proportions of those who ascertained that ovarian tissue and testicular tissue could be preserved were those practicing for 30 to 39 years (77%, 73%) and ≥ 40 years (33%, 33%) (Figure 2).

The highest in proportion of Health-workers (20, 64.5.0%) who knew of facilities rendering FP services in Nigeria were those practicing for 10-19 years who were 1.7 times more likely to know of such facilities than other groups (χ^2=1.54, P=0.20, OR=1.73, 95% CI: 0.74, 4.09). The lowest was observed among those practicing for ≥ 40 years. Although the highest proportion (15, 68.2%) that knew of facilities providing FP services overseas was among those practicing for 30-39 years, those practicing for 10-19 years were about twice as likely to know of such facilities. The lowest proportion was still among those practicing for ≥ 40 years. Of the 108 (90.8%) who agreed that FP is a possibility, 29 (93.5%) have been health-worker for 10-19 years while 1 (33.3%) has been practicing for ≥ 40 years. Almost all (118, 99.2%) participants except those practicing for ≥ 40 years (66.7%) agreed that FP is possible in Nigeria (Table 4).

The next theme was factors that could limit FP in Nigeria of which 106 (89.1%) of the study participants agreed that cost of FP could be an issue that clients may be anxious about (Figure 3). The highest proportion (30, 96.8%) of those that considered cost as a limiting factor was those practicing for 10-19 years and the lowest proportion (2/3, 66.7%) have been practicing for ≥ 40 years. In all, 64 (53.8%), 59 (49.6%) and 49 (41.2%) believed that electricity supply, personnel and equipment respectively would be limiting factors against FP in Nigeria. Only 3 (2.5%) considered other issues such as government unwillingness, bottleneck from regulation body as well as cultural and religious beliefs as factors that could worsen the process and utilization of FP in the country (Table 5).

Figure 4a illustrates contemplation of FP during consultation

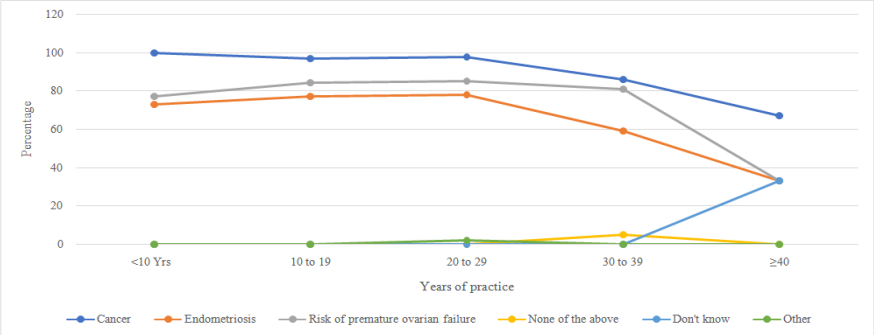

Figure 1: Indications for Fertility Preservation by years of practice.
There was a significant difference (χ^2=10.37, P-value = 0.03) in the proportion of health-workers' response that cancer is an indication for fertility preservation.

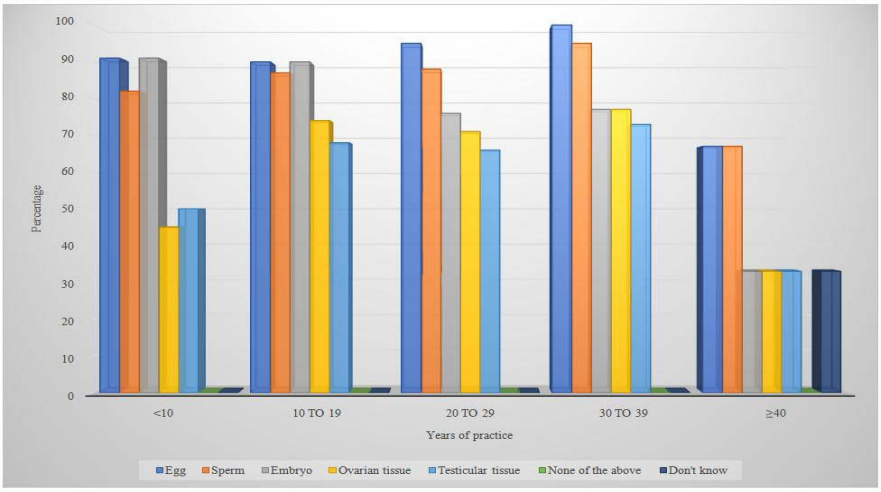

Figure 2: Response to body tissues that can be preserved relative to years of practice.

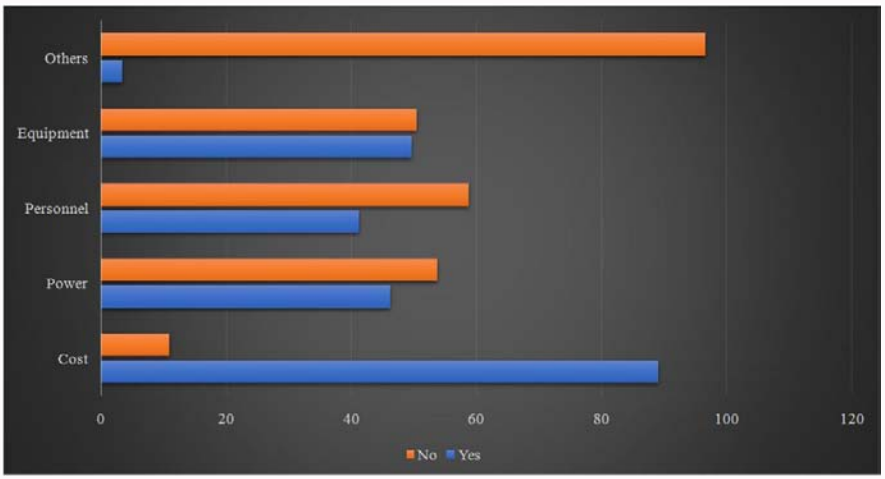

Figure 3: Factors that can function against Fertility Planning in Nigeria.

with female cancer patients in Nigeria with the understanding that the need and requirement for fertility preservation may be different in patients with different kinds of tumors. Only 41 (34.4%) of health-workers admitted always thinking of FP when female cancer patients consult while 12 (10.1%) sometimes and 43 (36.1%) never think of FP at such times. Figure 4b indicates that 35 (29.4%) of health-workers always, 31 (26.1%) sometimes and 26 (21.9%) never discussed FP with female cancer patients. The question was not relevant to 27 (22.7%) health-workers. Figure 4c shows that only 28 (23.5%) of health-workers ever referred female cancer patients for FP while 87 (73.1%) had never referred a female cancer patient for FP.

The highest proportion (15, 36.6%) of those who admitted always thinking of FP during consultation with a female cancer patient was the group practicing for 10 years to 19 years while the highest

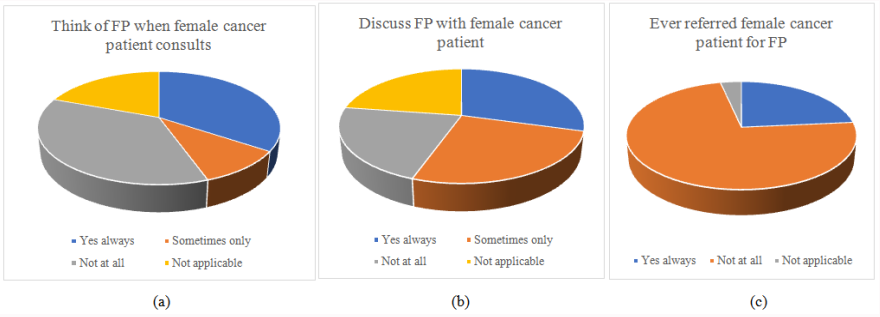

Figure 4a-4c: Contemplation of FP and referral during consultation with a female Cancer patient.

Table 5: Factors that can limit Fertility Preservation in Nigeria relative to years of practice of health-workers.

Years of practicing	Response	Cost		Electricity power supply		Personnel		Equipment		Others	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
<10	Yes	21	95.4	10	45.4	10	45.4	10	45.4	0	0.0
	No	1	4.6	12	54.6	12	54.6	12	54.6	22	100.0
10-19	Yes	30	96.8	16	51.6	8	25.8	13	58.1	0	0.0
	No	1	3.2	15	48.4	23	74.3	18	41.9	31	100.0
20-29	Yes	34	82.9	22	53.7	17	54.8	21	51.2	1	2.4
	No	7	17.1	19	46.3	24	45.2	20	48.8	40	97.6
30-39	Yes	19	86.4	14	63.6	12	54.5	13	59.1	0	0.0
	No	3	13.6	8	36.4	10	45.5	9	40.9	22	100.0
≥ 40	Yes	2	66.7	2	66.7	2	66.7	2	66.7	0	0.0
	No	1	33.3	1	33.3	1	33.3	1	33.3	3	100.0
Total	Yes	106	89.1	64	53.8	49	41.2	59	49.6	3	2.5
	No	13	10.9	55	46.2	70	58.8	60	50.4	116	97.5

proportion (7, 58.3%) of those who admitted never thinking of FP during consultation with a female cancer patient was the group practicing for 30-39 years. Those practicing 10 years to 19 years were the highest proportion (14, 45.1%; 13, 41.9% respectively) that always discussed FP with and ever referred female cancer patients (Table 6).

Discussion

Limited prior studies have examined fertility preservation among male and/or female cancer patients in SSA, especially in Nigeria. Part of the reasons is that identifying new cases of cancer has been an uphill task and a major challenge for most economically underdeveloped populations in this part of the world. More fundamentally, this scarcity of information probably reflects socio-cultural assumptions that cancer is rare among indigenous Black African population. Unlike in the developed countries, cancer registration is a difficult task for many reasons in Africa because cases are only found when they report, often late, at health facilities, such as hospitals, health centers and clinics [13]. Although Health-workers who have been practicing for 20 years to 29 years were in the highest proportion in this study, the mean number of years of practice as a health-worker was highest (32.5 ± 2.6) among those who have been practicing for 30 years to 39 years. As such those within the ages of 20 to 39 years are expected to be more exposed to seeing female cancer patients in the child-bearing age group and probably more aware of fertility preservation while those practicing for 10 to 19 years are relatively young or new in the field and are more informed on modern techniques such as Fertility Preservation. However, when taken together, there was no significant difference in the proportion of health-workers who have heard of fertility preservation. This is probably because FP is a new concept and older health-workers or those who had been practicing for over 40 years are fixed in their mind set and may not be able to quite grasp the new technology involved in preserving fertility among cancer patients. According to the National Cancer Institute, the overall risk of developing cancer at some time during life is about 45% for men and 37% for women. Majority of the female cancer patients seen by health-workers in this study were aged 30 to 39 years, which represents the peak of their child-bearing age. Since modern SSAn women adjourns childbearing till later age because of professional duties, more cases of cancer are expected among those who have not yet started their families.

As expected, those practicing for 20 to 29 years had seen more female cancer patients within the previous one year than others, though those practicing 30 to 39 years had a higher mean number of cancer patients seen per clinician. This is probably because Nigerian women are now more educated, more exposed and have travelled far and wide. They also have more access to print and electronic media and are given health education on how to examine breast for lumps. There are also organizations that provide Papanicolaou test for cancer of the cervix even in remote villages [17].

That the highest proportion of those who mentioned cancer as an indication for fertility preservation occurred among those practicing for less than 10 years was a surprise. Whereas older health-workers who have been practicing for over 40 years are less likely to see cancer patients, younger health-worker are more likely to be the consultants attending to patients and reporting to the older health-workers.

Table 6: Contemplation of FP and referral during consultation with a female Cancer patient relative to years of practice.

Years of practicing	Response	Think of FP when female cancer patient consults		Discuss FP with female cancer patient		Ever referred female cancer patient for FP	
		Freq.	%	Freq.	%	Freq.	%
<10	Always	5	22.7	3	13.6	3	13.6
	Sometimes	2	9.1	7	31.8	0	0.0
	Never	9	40.9	4	18.2	18	81.8
	NA	6	27.3	8	36.4	1	4.5
10-19	Always	15	48.4	14	45.1	13	41.9
	Sometimes	1	3.2	3	9.7	0	0.0
	Never	9	29.0	7	22.6	18	58.1
	NA	6	19.4	7	22.6	0	0.0
20-29	Always	12	29.3	10	24.4	7	17.1
	Sometimes	7	17.1	17	41.5	0	0.0
	Never	18	43.9	9	21.9	33	80.5
	NA	4	9.7	5	12.2	1	2.4
30-39	Always	8	36.4	7	31.8	5	22.7
	Sometimes	1	4.5	4	18.2	0	0.0
	Never	8	36.4	6	27.3	15	68.2
	NA	5	22.7	5	22.7	2	9.1
≥ 40	Always	1	33.3	1	33.3	0	0.0
	Sometimes	0	0.0	0	0.0	0	0.0
	Never	0	0.0	0	0.0	3	100.0
	NA	2	66.7	2	66.7	0	0.0
Total	Always	41	34.5	35	29.4	28	23.5
	Sometimes	12	10.1	31	26.1	0	0.0
	Never	43	36.1	26	21.8	87	73.1
	NA	23	19.3	27	22.7	4	3.4

Further, availability and access to medical facilities determine easy identification of female cancer patients [10]. Studies have shown that, in both sexes, radiotherapy has negative effects on the gonads depending on the dose, fractionation schedule, and irradiation field [1,18]. The proportions of health-workers that mentioned risk of premature ovarian failure and endometriosis were higher among those who had been practicing for longer time but not those practicing for 40 years or more. This is probably because the incidence of premature ovarian failure and the diagnosis of endometriosis are low and hence younger health-workers may not have seen many cases. Studies have shown that, possibilities of fertility preservation abound in most western countries [19-21] but not in SSA. Currently established cryopreservation methods - sperm bank for males and embryo/oocyte bank for females - may be considered as a necessary technique of fertility preservation prior to radiotherapy or chemotherapy for male or female cancer patients. Only a third of health-workers acknowledged thinking of fertility preservation when female cancer patient consults, less (29.4%) discussed fertility preservation with their patients and even less (23.5%) ever referred female cancer patients for fertility preservation. According to Rodriguez-Wallberg and Oktay [1], timely and complete information on the impact of cancer treatment on fertility and fertility preservation options should be presented to all patients when a cancer treatment is planned.

Conclusion

Studies have shown evidence that surviving cancer patients, especially females, who experienced fertility loss, also go through psychologic distress and impaired quality of life [22-25] and most of them in child-producing age group do not receive adequate information or referral to a reproductive specialist for fertility preservation [20,26-28]. Further, to estimate the size of the population that may be interested in fertility preservation is difficult. This study has documented health-workers' opinion on fertility preservation especially among female cancer patients in sub-Sahara African setting. Most of the health-workers who responded had been practicing for 20 to 29 years and most have heard of fertility preservation, but few knew of facilities within the country that offer such services to this cohort of patients. Cancer was the dominant indication for fertility preservation by the study health-workers and almost all believed that cost of the procedure would be problematic for cancer patients. Finally, few health-workers think of fertility preservation when female cancer patient consults, fewer discuss fertility preservation with female cancer patients and even fewer still ever referred a female cancer patient for fertility preservation. Additionally, more data collection and research are needed on the type of cancer seen in male and female patients, patients' preference for fertility preservation and biophysical profile of the cancer patients. Further fertility preservation data should be collected from other health workers such as oncologists, radiologists, surgeons and pharmacists. Such data should be used to convince decision makers to support, by funding and by policy, the establishment of public and private fertility preservation centers for cancer and non-

cancer patients in the country. Aggressive awareness, through health education, print and electronic media, communication agencies and other agencies, should be launched to correct the lack of knowledge on this issue in the public. Measures needed to be taken, based on the survey results, to improve the awareness of fertility preservation among health workers and patients include (i) incorporation of FP into the curriculum of medical students, (ii) broad health educational activities on the effects of cancer treatment on fertility potentials of male or female patients (iii) provision of resources on FP for health workers and patients (iv) giving cancer patients opportunity to make informed decisions regarding their reproductive potential [1].

Study Limitations

Health-workers interviewed in this paper were mainly gynecologists, but it is a well-known fact that management of cancer also involves oncologists, clinicians, surgeons, andrologists, radiotherapists, nurses, and other categories of health workers. The view expressed in this paper may not necessarily apply to that of other categories of health workers. Also, gender of respondents was not considered in reporting the findings in this study, thus the views and perception of female and male health-workers on fertility preservation may be divergent. Furthermore, only the views of health professionals were aired in this study which would have been more robust had female cancer patients been interviewed. Finally, this study did not consider the type of cancer that the female patients had or their quality of life or even their preference for fertility preservation. Future studies are expected to address these and other salient issues.

Ethical Approval

The study was approved by local ethics committee. All study participants were informed about the study and the purpose for it and all gave verbal approval for their data to be used in the study. All patients were assured of data confidentiality, non-use of names of subjects and safe keeping of the information they supplied.

References

1. Rodriguez-Wallberg KA, Oktay K. Fertility preservation during cancer treatment: Clinical guidelines. Cancer Manag Res. 2014;6:105-17.
2. Burstein HJ, Winer EP. Primary care for survivors of breast cancer. N Engl J Med. 2000;343(15):1086-94.
3. Goodwin PJ, Ennis M, Pritchard KI, Trudeau M, Hood N. Risk of menopause during the first year after breast cancer diagnosis. J Clin Oncol. 1999;17(8):2365-70.
4. Grigg A. The impact of conventional and high-dose therapy for lymphoma on fertility. Clin Lymphoma. 2004;5(2):84-88.
5. Howell SJ, Shalet SM. Spermatogenesis after cancer treatment: damage and recovery. J Natl Cancer Inst Monogr. 2005;34:12-17.
6. Wallace WH, Thomson AB, Kelsey TW. The radiosensitivity of the human oocyte. Hum Reprod. 2003;18(1):117-21.
7. Wo JY, Viswanathan AN. Impact of radiotherapy on fertility, pregnancy, and neonatal outcomes in female cancer patients. Int J Radiat Oncol Biol Phys. 2009;73(5):1304-12.
8. Wallberg KA, Keros V, Hovatta O. Clinical aspects of fertility preservation in female patients. Pediatr Blood Cancer. 2009;53(2):254-60.
9. National Cancer Institute SEER Cancer Statistics Review 1975–2007. [Accessed April 8, 2203].
10. Sitas F, Parkin M, Chirenje Z, Stein L, Mqoqi N, Wabinga H. Cancers. In: Jamison DT, Feachem RG, Makgoba MW, editors. Disease and Mortality in SSA. Chapter 20. 2nd ed. Washington (DC): The International Bank for Reconstruction and Development/The World Bank; 2006.
11. Skinner MEG, Parkin DM, Vizcaino AP, Ndhlovu A. Cancer in the African Population of Bulawayo, Zimbabwe, 1963–1977. IARC Technical Report 15, 1993. Lyons: IARC Press.
12. Wabinga HR, Parkin DM, Wabwire-Mangen F, Nambooze S. Trends in Cancer Incidence in Kyadondo County, Uganda, 1960-1997. Br J Cancer. 2000;82:1585-92.
13. Parkin DM, Ferlay J, Hamdi-Cherif M, Sitas F, Thomas JO, Wabinga H, et al. Cancer in Africa-Epidemiology and Prevention. IARC Scientific Publications. 2003;153:1-144.
14. Ferlay J, Bray F, Pisani P, Parkin DM. "GLOBOCAN 2002: Cancer Incidence, Mortality and Prevalence Worldwide." Version 2.0, IARC Cancer Base 5, 2004. Lyons: IARC Press.
15. Levin CV, El-Gueddari B, Meghzifene A. Radiation therapy in Africa: Distribution and equipment. Radiotherapy Oncology. 1999;52(1):79-84.
16. Venter C. Oncology Buddies. Oncofertility care in South Africa (Assessed on April 8, 2020).
17. Biobaku O, Fatusi A, Afolabi BM. Perception, Source of Information and Utilization of Papanicolaou (PAP) Smear for the Cervical Cancer screening among Female Nurses in Southwest Nigeria. Part 1. J Prev Infection Control. 2015;1(1):5
18. Gosden RG, Wade JC, Fraser HM, Sandow J, Faddy MJ. Impact of congenital or experimental hypogonadotrophism on the radiation sensitivity of the mouse ovary. Hum Reprod. 1997;12(11):2483-8.
19. Quinn GP, Vadaparampil ST, Bell-Ellison BA, Gwede CK, Albrecht TL. Patient-physician communication barriers regarding fertility preservation among newly diagnosed cancer patients. Soc Sci Med. 2008;66(3):784-9.
20. Armuand GM, Rodriguez-Wallberg KA, Wettergren L, Ahlgren J, Enblad G, Höglund M, et al. Sex differences in fertility-related information received by young adult cancer survivors. J Clin Oncol. 2012;30(17):2147-53.
21. Letourneau JM, Smith JF, Ebbel EE, Craig A, Katz PP, Cedars MI, et al. Racial, socioeconomic, and demographic disparities in access to fertility preservation in young women diagnosed with cancer. Cancer. 2012;118(18):4579-88.
22. Rosen A, Rodriguez-Wallberg KA, Rosenzweig L. Psychosocial distress in young cancer survivors. Semin Oncol Nurs. 2009;25(4):268-77.
23. Skinner R, Wallace WH, Levitt GA; UK Children's Cancer Study Group Late Effects Group. Long-term follow-up of people who have survived cancer during childhood. Lancet Oncol. 2006;7(6):489-98.
24. Byrne J, Fears TR, Steinhorn SC, Mulvihill JJ, Connelly. RR, Austin DF, et al. Marriage and divorce after childhood and adolescent cancer. JAMA. 1989;262(19):2693-9.
25. Partridge AH, Gelber S, Peppercorn J, Sampson E, Knudsen K, Laufer M, et al. Web-based survey of fertility issues in young women with breast cancer. J Clin Oncol. 2004;22(20):4174-83.
26. Pacey AA, Eiser C. Banking sperm is only the first of many decisions for men: What health care professionals and men need to know. Hum Fertil (Camb). 2011;14(4):208-17.
27. Forman EJ, Anders CK, Behera MA. Pilot survey of oncologists regarding treatment-related infertility and fertility preservation in female cancer patients. J Reprod Med. 2009;54(4):203-7.
28. Merrick H, Wright E, Pacey AA, Eiser C. Finding out about sperm banking: What information is available online for men diagnosed with cancer? Hum Fertil (Camb). 2012;15(3):121-8.