Knowledge, attitudes, and practices of Filipino clinical practitioners regarding fertility preservation in cancer patients

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ABSTRACT

Background: Treatments for cancer have negative impact on fertility. Presently, there are technologies available to preserve the fertility of cancer patients even before gonadotoxic treatment is given. Several clinical practice guidelines on fertility preservation interventions for cancer patients have already been released. Among developed countries, Oncofertility is already an established field of clinical practice.

Objectives: This study aims to determine the knowledge, attitudes, and practices of Filipino clinical practitioners on fertility preservation in cancer patients.

Methodology: This was a cross-sectional study carried out between June and September 2019 using a self- administered questionnaire. The questionnaires were sent to clinicians (medical oncologists, hematologists, surgical oncologists, and radiation oncologists) who were directly involved in the treatment patients with cancer.

Results: There were 213 respondents composed of 91 surgical oncologists (varied subspecialties), 81 medical oncologists, and 41 radiation oncologists. Most of the clinical practitioners, 58-85%, have not encountered patients who have availed of any fertility preservation method. In terms of knowledge, 53-73% of respondents were aware about some fertility preservation options, but had minimal knowledge. Ninety five percent of study participants acknowledged the need for more information on fertility preservation. Majority of clinicians (57%) have never referred to a fertility specialist; and only 38% have referred a patient for fertility preservation. The following factors were cited as barriers to discussion of fertility preservation: lack of knowledge of clinicians, poor success rates of fertility preservation, poor prognosis of patients, and prohibitive costs of treatment.

Conclusion: There is an acute need to increase knowledge and awareness about fertility preservation methods and international fertility preservation guidelines among Filipino health practitioners treating cancer patients.

Keywords: fertility preservation, oncofertility, comprehensive cancer care

INTRODUCTION

According to the 2018 Global Cancer Observatory, the prevalence of cancer in reproductive aged Filipinos (15-44 years old) is 54,184. In 2018 alone, 22,323 new cases of cancer would have been diagnosed in patients with reproductive potential. The top 5 cancer sites in this age range are: breast, thyroid, cervix, leukemia, and ovary.[1]

The global increase in cancer incidence is paralleled by an increase in cancer survival secondary to early detection and to the improvements in cancer treatments.[2,3] As survival rates increase and patients with cancer live longer, their lives are affected by long term sequalae of the disease and cancer-related treatments. The diminished reproductive potential and possibility of loss of fertility is one of the most important concerns of cancer survivors.[4-6]

The emerging field of Oncofertility focuses on reproductive technologies aimed at fertility preservation for patients diagnosed with cancer.[7] In 2018, The American Society of Clinical Oncologists released an update to the 2006 Clinical Practice Guidelines on Fertility Preservation in Patients with Cancer.[8]

However, even with the emerging interest in Oncofertility, studies on fertility preservation practices in different countries have shown that while oncology health care providers are aware of the effects of cancer

treatments on fertility, only half routinely discuss the deleterious effects on fertility and even fewer discuss the options for fertility preservation and make subsequent referrals to fertility specialists.[9-14]

This study aims to assess clinical oncologists' knowledge on oncofertility, their attitudes towards fertility preservation, and their practices in their clinics. The information from this study will be helpful in identifying baseline characteristics on fertility preservation in cancer patients in the country in order to recognize problems and propose solutions for the immediate and long-term period.

RESEARCH OBJECTIVES

General Objective: To determine the knowledge, attitudes, and practices of clinical practitioners on fertility preservation in cancer patients.

Specific Objectives:

1. Assess the knowledge of clinical practitioners involved in cancer care regarding the available options for fertility preservation.
2. Determine the attitudes of clinical practitioners towards fertility preservation in cancer patients.
3. Describe the current practice patterns of clinical practitioners on fertility preservation for cancer patients.
4. Determine the perceived barriers to provision of fertility sparing treatments to cancer patients.

METHODOLOGY

This was a prospective descriptive cross-sectional study that made use of a self-administered survey used by Adams et al.[15] in 2013 in the UK. The survey was distributed during departmental conferences, round table discussion, and society meetings of clinicians specialized in the field of medical oncology, surgical oncology (including all subspecialties), and radiation oncology. The required sample size for this study is 208 clinical practitioners dealing with cancer patients; and convenience sampling as used for this study.

The questionnaire was comprised of 34 items divided into two parts; the first on the demographics of the subjects and the second on their knowledge on fertility preservation modalities, factors they consider when making a decision about fertility preservation, and the difficulties they encounter in discussing fertility with cancer patients.

Inclusion Criteria

The study population included:

1. Fellows in training and practicing clinical oncologists in the field of medical oncology, surgical oncology (including all subspecialties), radiation oncology, hematology, and pediatric hema-oncology.
2. Age 25 years old and above

Exclusion Criteria

Physicians who are not currently involved in the care of cancer patients were excluded from the study.

Ethical Considerations

The protocol of this study adheres to the ethical considerations and principles set out in relevant guidelines, including the Declaration of Helsinki, WHO guidelines, International Conference on Harmonization-Good Clinical Practice, Data Privacy Act of 2012, and National Ethics Guidelines for Health Research 2017. This study was approved by the UP Manila Research Ethics Board Panel 4.

Data Processing and Analysis

Descriptive statistics was used to summarize the general and clinical characteristics of the participants. Frequency and proportion were used for nominal variables, median and range for ordinal variables, and mean and standard deviation for interval/ratio variables.

All valid data was included in the analysis. Missing variables was neither replaced nor estimated. Null hypothesis was rejected at 0.05α-level of significance. STATA 15.0 was used for data analysis.

RESULTS

Participants

Two hundred thirteen clinical practitioners from Metro Manila answered the questionnaire during the three-month data collection period. Majority of those who answered were 31-35 years old (35%) and have been dealing with cancer care for less than 5 years. A significant number of those 31-35 years old were fellows-in-training and newly graduated consultants.

There were 91 surgical oncologists (from different subspecialties), 81 medical oncologists (including hematologists and pediatric oncologists), and 41 radiation oncologists who participated in the study. Majority did not specialize in a specific body site (usually general medical oncologists and radiation oncologists); but among those sampled a significant percentage represented breast (16%) and head and neck specialists (16%). Forty-seven percent were faculty-consultants in public teaching hospitals, and most of the respondents practice in Manila. The characteristics of the clinicians who took part in the survey are detailed in Tables 1 and 2.

Table 1. Socio-demographic characteristics of oncologists (n = 213)

	Frequency (%)
Age (years) [n=212]	
<25	3 (1.42)
25-30	38 (17.92)
31-35	75 (35.38)
36-40	41 (19.34)
41-45	11 (5.19)
46-50	23 (10.85)
51-55	11 (5.19)
56-60	3 (1.42)
>60	7 (3.30)
Sex [n=212]	
Male	116 (54.72)
Female	96 (45.28)
Marital status [n=212]	
Single	121 (57.08)
Married	88 (41.51)
Widowed	1 (0.47)
Separated	2 (0.94)
Religion [n=212]	
None	3 (1.42)
Roman Catholic	177 (83.49)
Christian	23 (10.85)
Muslim	3 (1.42)
Others	6 (2.83)
With children [n=212]	77 (36.32)
With close family member who had cancer [n=212]	140 (66.04)

Table 2. Medical background information (n = 213)

	Frequency (%); Mean ± SD; Median (Range)
Years of practice	
<5	134 (62.91)
5 - 10	33 (15.49)
>10	46 (21.60)
Current level of practice	
Fellow-in-training	77 (36.15)
Consultant	109 (51.17)
Others	27 (12.68)
Specialty	
Surgical oncology	91 (42.72)
Medical oncology	81 (38.03)
Radiation oncology	41 (19.25)
Cancer type specialization	
Breast	35 (16.43)
Head and neck	34 (15.96)
Gynecological	33 (15.49)
Gastrointestinal	23 (10.80)
Hematologic	18 (8.45)
Pediatric	14 (6.57)
Urological	10 (4.69)
Sacroma/soft tissue	7 (3.29)
Lungs	4 (1.88)
Hepatobiliary	4 (1.88)
Palliative care	4 (1.88)
CNS	0
No specialization	93 (43.66)
Medical practice	
Public university affiliated teaching hospital	102 (47.89)
Private university affiliated teaching hospital	65 (30.52)
Public non-university affiliated hospital	62 (29.11)
Private non-university affiliated hospital	72 (33.80)
Primary place of practice	
Manila	120 (56.34)
Quezon	33 (15.49)
Taguig	15 (7.04)
Makati	9 (4.23)
Muntinlupa	9 (4.23)
Pasig	8 (3.76)
San Juan	5 (2.35)
Parañaque	4 (1.88)
Marikina	3 (1.41)
Las Piñas	3 (1.41)
Caloocan	2 (0.94)
Pasay	1 (0.47)
Mandaluyong	1 (0.47)

Knowledge of Fertility Preservation

Majority of clinicians have not encountered patients who availed of fertility preserving treatments. Among those encountered, pretreatment with GnRH agonists is the more commonly encountered form of fertility preservation; oocyte cryopreservation and sperm cryopreservation have also been seen by 12-14% of clinicians sampled. (Table 3.1)

Clinicians claimed to be aware of the existence of fertility preservation options but admitted that they did not know much about the options. Fifteen to 38% claimed to have no knowledge about any fertility preservation option; testicular tissue cryopreservation and ovarian tissue cryopreservation being the options most clinicians are least familiar with. Twenty-seven percent of participants claimed to be knowledgeable of pretreatment with GnRH agonists. Only 8-15% of the subjects were knowledgeable of the other options such as oocyte cryopreservation, embryo cryopreservation, sperm cryopreservation, ovarian tissue cryopreservation, and testicular tissue cryopreservation. (Table 3.2)

The apparent lack of knowledge among clinicians is accompanied by an openness to more information about these fertility sparing treatments. In fact, 95% of clinicians stated that they needed more information about fertility preservation options. (Table 3.3)

Table 3.1. Frequency of contact with fertility preservation options

	Never	Rarely	Sometimes	Often
	Frequency (%)			
Ovarian tissue cryopreservation	**189 (88.73)**	22 (10.33)	2 (0.94)	0
Oocyte cryopreservation	**177 (83.10)**	27 (12.68)	8 (3.76)	1 (0.47)
Embryo cryopreservation	**186 (87.32)**	21 (9.86)	5 (2.35)	1 (0.47)
Sperm cryopreservation	**173 (81.22)**	30 (14.08)	9 (4.23)	1 (0.47)
Testicular tissue cryopreservation	**185 (86.85)**	24 (11.27)	4 (1.88)	0
Pretreatment with GNRH agonists (such as depot leurprolide acetate)	**124 (58.22)**	49 (23)	33 (15.49)	7 (3.29)

Table 3.2. Knowledge of fertility preservation options

	Not at all	Aware but do not know much about	Knowledgeable	Very knowledgeable
	Frequency (%)			
Ovarian tissue cryopreservation	**70 (32.86)**	**127 (59.62)**	16 (7.51)	0
Oocyte cryopreservation	31 (14.55)	**155 (72.77)**	27 (12.68)	0
Embryo cryopreservation	55 (25.82)	**135 (63.38)**	23 (10.80)	0
Sperm cryopreservation	32 (15.02)	**148 (69.48)**	32 (15.02)	1 (0.47)
Testicular tissue cryopreservation	**82 (38.50)**	**115 (53.99)**	16 (7.51)	0
Pretreatment with GNRH agonists (such as depot leurprolide acetate)	52 (24.41)	100 (46.95)	**59 (27.70)**	2 (0.94)

Table 3.3. Fertility preservation options

	Frequency (%)
Need for more information regarding fertility preservation options	
Yes	11 (5.16)
No	**202 (94.84)**

Attitudes towards fertility preservation for cancer patients

Sixty-eight percent of participants agreed that fertility is a high priority issue that needs to be discussed with patients newly diagnosed with cancer; however, 83% think that treating the primary cancer is more important that fertility preservation and that 69% would be unwilling to provide a less effective cancer treatment in order to attempt to preserve a patient's fertility. (Table 4.1)

The upper threshold age for which clinicians would initiate a discussion on fertility preservation was 40 years old for female patients and there was no age limit for males. (Table 5.1)

When asked about the factors that would influence the discussion on fertility preservation options, around 88% also stated that their limited knowledge about the options available is a barrier to discussion with patients. Around 80% claimed that the poor success rates of fertility preservation greatly influenced their decision to avoid discussion of fertility preservation with patients. Eighty-five percent of participants said that a discussion on fertility preservation is an added burden to patients and that it also influences whether or not they discuss it with them. Other factors that influence the discussion include: the patient being too ill, inability of the patient to afford fertility preservation, poor prognosis, and patient already having a child. (Table 4.2)

Current Practice on Fertility Preservation

Clinicians were asked how often they checked on the importance of fertility is to their pattients', and majority discussed the impact of treatment on patient's future fertility. Around 83% of clinicians considered the desire of patients for future fertility in their treatment plan. (Table 5.3)

Although a huge majority of clinicians claimed to consider the future fertility of their patients, they

Table 4.1. Attitudes towards fertility preservation

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	Frequency (%)				
Fertility preservation is a high priority for me to discuss with newly diagnosed cancer patients.	5 (2.35)	14 (6.57)	48 (22.54)	110 (51.64)	36 (16.90)
Treating the primary cancer is more important than fertility preservation.	3 (1.41)	7 (3.29)	24 (11.27)	99 (46.48)	80 (37.56)
The success rates of fertility preservation are not yet good enough to make it a viable option.	11 (5.16)	57 (26.76)	95 (44.60)	45 (21.13)	5 (2.35)
I feel comfortable discussing fertility preservation with my patients.	6 (2.82)	23 (10.80)	47 (22.07)	103 (48.36)	34 (15.96)
I am willing to provide a less effective cancer treatment regimen in order to attempt to preserve a patient's fertility	63 (29.58)	82 (38.50)	36 (16.90)	29 (13.62)	3 (1.41)

Table 4.2. Factors that will influence discussion of fertility preservation

	Not at all	To some extent	To a large extent
	Frequency (%)		
Poor success rates of fertility preservation options	45 (21.13)	126 (59.15)	42 (19.72)
Lack of fertility services in the area	43 (20.19)	98 (46.01)	72 (33.80)
My limited knowledge in fertility preservation options	27 (12.68)	123 (57.75)	63 (29.58)
Burden to patients	33 (15.49)	130 (61.03)	50 (23.47)
Someone else within my practice discusses fertility preservation with my patients	48 (22.54)	105 (49.30)	60 (28.17)
The patient…			
… is too ill to delay treatment to pursue fertility preservation	13 (6.10)	88 (41.31)	112 (52.58)
… cannot afford fertility preservation	16 (7.51)	75 (35.21)	122 (57.28)
… has a hormonally sensitive malignancy	25 (11.74)	90 (42.25)	98 (46.01)
… does not want to discuss fertility preservation	33 (15.49)	90 (42.25)	90 (42.25)
… has a poor prognosis	39 (18.31)	82 (38.50)	92 (43.19)
… is single	63 (29.58)	100 (46.95)	50 (23.47)
… is homosexual	69 (32.39)	101 (47.42)	43 (20.19)
… already has a child or children	19 (8.92)	166 (77.93)	28 (13.15)

Table 4.3. Attitude towards fertility preservation

Importance of patients attached to their future fertility	
Gender	188 (88.26)
Men	8 (3.76)
Women	104 (48.83)
Both equally	101 (47.42)
Socio-economic status	194 (91.08)
Higher	154 (72.30)
Lower	4 (1.88)
Both equally	55 (25.82)
Educational attainment	189 (88.73)
Primary	3 (1.41)
Secondary	8 (3.76)
College	80 (37.56)
Postgraduate	61 (28.64)
All levels	61 (28.64)
Cultural background	190 (89.20)

Table 5.1. Current practices

	Frequency (%); Median (Range)
Caseload	
Age of patients, years	
0 - 17	0 (0 – 50)
18 – 45	15 (0 – 200)
≥46	20 (0 – 200)
Sex distribution of patients aged 18-45, %	
Male	40 (0 – 100)
Female	60 (0 – 100)
Upper threshold for women	
No limit	10 (4.69)
35	74 (34.74)
40	77 (36.15)
45	37 (17.37)
50	13 (6.10)
55	1 (0.47)
60	1 (0.47)
Upper threshold for men	
No limit	80 (37.56)
35	25 (11.74)
40	20 (9.39)
45	19 (8.92)
50	34 (15.96)
55	13 (6.10)
60	22 (10.33)

Table 5.2. Current practices and barriers

	Frequency (%)
Sources of written information provided	
Does not provide written information to patients	154 (72.30)
Hospital's own information	49 (23)
Others	10 (4.69)
Number of patients referred to a fertility specialist	
0	121 (56.81)
1 - 5	80 (37.56)
6 - 10	6 (2.82)
>10	6 (2.82)
Number of patients who had fertility treatment	
0	168 (78.87)
1 - 5	39 (18.31)
6 - 10	1 (0.47)
>10	5 (2.35)
Consulted any local/international guidelines for guidance on fertility issues	75 (
Have not consulted any guidelines	138 (64.79)
Local hospital guidelines	8 (3.76)
NICE fertility guidelines CG11 (2004)	8 (3.76) 0
American Society of Clinical Oncologists: Fertility preservation in patients with cancer: ASCO clinical practice guideline update (2018)	
Others	48 (22.54)
Availability of fertility preservation in local area	
Yes	107 (50.23)
No	36 (16.90)
Depends on the case	12 (5.63)
Don't know	58 (27.23)
Proximity to nearest referral point for reproductive medicine	
Within the same hospital	101 (47.42)
Within the same city	48 (22.54)
Within 25 km	25 (11.74)
Within 50 km	3 (1.41)
Don't know	36 (16.90)
Consultation for guidance on fertility issues/best describes professional links with the reproductive medicine	
Very good	37 (17.37)
Good	87 (40.85)
Not very good	21 (9.86)
Don't know	68 (31.92)

rarely or never referred to a fertility specialist for questions on fertility preservation. In fact, only 43% of clinicians have actually referred a patient to a fertility specialist within the last year. More than half of the clinicians have never referred their cancer patients to reproductive medicine specialist. (Table 5.2)

Although 23% claimed to have read the latest American Society of Clinic Oncologists guidelines on fertility preservation; majority of participants have not consulted any guidelines on fertility preservation. Most of clinicians (72%) did not provide any written information to their patients regarding fertility preservation options. (Table 5.2)

DISCUSSION

The advent of cancer control programs, more efficient screening modalities, earlier detection and treatment, and advances in cancer related therapies have decreased the mortality rate for cancer patients. The five-year survival rates of cancers have increased over the past decades; as more cancer survivors make it to remission, possibly increasing the possibility of these patients who want to conceive after treatment.[16]

Several studies have established that fertility is a significant concern among cancer patients. In young breast cancer survivors, fertility was shown to be a major concern in 57%; and 29% of respondents said infertility concerns influenced treatment decisions.[4] Breast cancer patients younger than 40 years old, those still without

Table 5.3. Current practices – fertility preservation advice giving

	Never	Rarely	Sometimes	Often
	Frequency (%)			
I check with the patient how important their future fertility is for them.	15 (7.04)	32 (15.02)	80 (37.56)	86 (40.38)
When I plan the patient's treatment regimen, I take into account their desire for future fertility.	9 (4.23)	26 (12.21)	65 (30.52)	113 (53.05)
I discuss the impact of a patient's condition and/or treatment may have on their future fertility.	11 (5.16)	17 (7.98)	69 (32.39)	116 (54.46)
I provide my patients with written information about fertility preservation.	105 (49.30)	56 (26.29)	26 (12.21)	26 (12.21)
I consult a fertility specialist or reproductive endocrinologist with questions about potential fertility issues in my patients.	68 (31.92)	79 (37.09)	42 (19.72)	24 (11.27)
I refer patients who have questions about fertility to a fertility specialist or reproductive endocrinologist	36 (16.90)	61 (28.64)	65 (30.52)	51 (23.94)

children, and those who were single were more likely to be concerned with future fertility.[17] In another survey, the Ability to Have Children was rated as a significant source of distress; and this was the same for both male and female patients.[18]

It has been established that cancer treatments have a negative impact on fertility. Presently, there are available strategies to preserve the fertility of cancer patients. Several clinical practice guidelines on fertility preservation for cancer patients have already been released[8,19,20]. In some developed countries, oncofertility is an established field of practice.

Fertility Preservation

In 2006, the American Society of Clinical Oncologists released the first Clinical Practice Guidelines on Fertility Preservation for Patients with Cancer, it was stated that the possibility of infertility must be discussed with patients who will be treated during their reproductive years (or with parents or guardians of children). Oncologists should be prepared to discuss fertility preservation options and to refer all potential patients to appropriate reproductive medicine specialists.[21]

Oncofertility in the Philippines

In the Philippines, the establishment of the Philippine Society for Fertility Preservation earlier this year shows that there is already growing interest in the field, although mostly from reproductive medicine specialists. This study provides a general overview on the current local oncologists' knowledge, attitudes, and practices on fertility preservation in cancer patients and aims to determine how the practice of fertility preservation for cancer patients can be further streamlined in the Philippines.

Knowledge on fertility preservation options

The state of infancy of oncofertility in the country is evident in the lack of encounter of oncologists with patients who have availed of fertility preservation services. More than 80% of clinicians sampled have not seen patients who have availed of any fertility preservation methods, and the only method which clinicians seemed to encounter albeit rarely, is pretreatment with GnRH agonists which has already been noted to be less successful than other methods.

This study also shows the lack of knowledge of clinicians on the different fertility preserving methods currently available. In fact, more than 30% of participants did not know anything about ovarian tissue and testicular tissue cryopreservation; and 15-25% admitted to not know anything about the other more established methods. Majority of those sampled (50-70%) were aware of the fertility preservation options, but admitted to not know much about these options either. These findings are consistent with previous studies in other countries when the oncofertility movement was just starting.[10,14,15] The unsatisfactory knowledge of oncologists is an important finding because it may be a barrier to initiation of discussion on fertility preservation.

This study also shows that Filipino oncologists are interested to improve their knowledge on fertility preservation options. In fact 95% of respondents acknowledged the need for more information regarding fertility preservation options. The lack of knowledge on fertility preservation paired with an apparent interest to learn more about it presents an opportunity to the proponents of oncofertility in the country to engage oncologists in dialogues, lectures, and seminars that would aim to increase their knowledge on fertility preservation options.

Attitudes towards fertility preservation

The attitudes of clinicians often translates to their practices and this is why it is important to note the prevailing attitudes of Filipino oncologists when it comes to fertility preservation. Based on this study, fertility preservation is a high priority for oncologists to discuss with their patients; however, 83% believe that treating the primary cancer is more important and 68% are not willing to give a less effective treatment or to delay treatment to allow for fertility preservation. This is understandable because the orientation of oncologists is really to treat the cancer and these results are also consistent with initial surveys from other countries.[10,14,15,22] The challenge then is to not let these attitude towards fertility preservation and cancer treatment hinder the discussion of fertility preservation, and to encourage oncologists to let the patients decide for themselves.[23] Furthermore, an important goal of fertility preservation campaigns is to inform oncologists that these treatments prioritize cancer treatments over fertility strategies and should never delay the primary treatment.

This study also highlights the different factors that influence or deter clinicians from discussing fertility preservation with their patients. The following factors have been shown to greatly influence whether or not a discussion on fertility preservation is started: necessity of treatment initiation, inability to afford fertility preservation, and diagnosis of hormonally sensitive cancers. The following factors have been shown to affect the discussions to some extent: poor success rates of fertility preservation, clinicians limited knowledge on fertility preservation options, the belief that there are other clinicians who are better equipped to discuss fertility preservation options, poor prognosis, homosexuality, a previous child, and patients who refuses fertility preservation discussion.

The main factors being considered prior to initiating a discussion about fertility preservation can be grouped into those that are part of the clinical aspects of each case (such as a perception that the prognosis is poor or the necessity of immediate initiation of treatment) or personal characteristics of patients, such as their financial capacity, sexual orientation, and parity, which may reflect the clinicians' personal attitudes and clinical judgment.[15]

One respondent stated that a referral is made to a reproductive medicine specialist only when the patient specifically requests for a referral to a reproductive specialist. Such a response brings out several issues including the need for doctors to initiate certain important issues even without patient initiating the discussion.

Current practices on fertility preservation

The results of the study indicate that around 80% of oncologists routinely discuss the effects of treatment on future fertility and consider the desire for future fertility when initiating a treatment plan; however, only 20% provide patients with information about fertility preservation and only 30% consult a fertility specialist when they have questions. Even more disconcerting is the fact that more than half of respondents have never referred appropriate patients to a fertility specialist after the diagnosis of cancer. In 2010, in the USA, more than 80% routinely referred to a fertility specialist[10], and in the UK in 2013, 67% have referred to reproductive medicine specialists.[15] The results of this study only come to show that in terms of current practices, the country is way behind the developed countries even when they were just starting with fertility preservation. This lag in fertility preservation practices may also be a reflection of the state of cancer diagnosis in the country, with most of them being diagnosed at later stages with poorer prognosis or when treatment should already be initiated promptly.

There is an apparent disconnect between fertility discussion and referral behavior and this was also seen in other earlier studies[9-11,15,24]; it might be due to patients prioritizing treatment for the primary cancer and foregoing fertility preservation referrals, or it can present a lack of awareness from clinicians that they can refer for fertility preservation.

Majority of respondents have never consulted any guidelines for guidance on fertility preservation and most do not provide written information. A significant number of respondents (30%) also were unaware of a center that offers fertility preservation services; and only 57% of oncologists claimed to have professional links with reproductive specialists to whom they can refer. This issue presents an opportunity for reproductive specialists to reach out to oncologists to increase their awareness about fertility preservation so that patients can be referred to fertility specialists prior to cancer treatment.

The future of fertility preservation in the country

With the National Integrated Cancer Control Act being signed into law in February 2019 and the inclusion of fertility preservation in the list of essential services and referrals that should be made for appropriate newly diagnosed cancer cases, the future of fertility preservation for cancer patients in the Philippines seems promising. This study also presents an overall encouraging picture of the current attitudes of clinical oncologists in the country. Although the knowledge domain of oncologists is

presently insufficient, it presents an opportunity for the movers of oncofertility to educate other clinicians so that their awareness and knowledge of fertility preservation services can increase and translate to better referral patterns. Fertility preservation advocates can set-up round table discussions with the heads of the different oncologic societies, participate in different hospital ground rounds, deliver lectures during annual conventions, and reach out to the fellows-in-training of the different subspecialties. It is the current fellows-in-training (40% of respondents) and early career consultants, who will be practicing in the near future, and they are the population which seemed to show the most interest in the topic given their high response rate for this study.

The establishment of formal societies and health circuit networks that promote fertility preservation for cancer patients has been instrumental in increasing the utilization of these services. Much has been written about their experience, and hopefully our local fertility preservation practitioners apply some of the strategies that have been shown to work.[7,25] There also appears to be a need to introduce international practice guidelines to oncologists so that they may be made aware of the prevailing standard of care when it comes to fertility of cancer patients. In 2009, when the Oncofertility Consortium in the United States was in infancy, a study showed than only 47% of oncologists routinely refer their patients to an reproductive medicine specialist due to lack of knowledge among oncologists and the inability to delay treatment for very aggressive cancers.[10] The establishment of referral procedures and patient navigators were critical to ensuring that fertility preservation services are offered to more patients. In the University of Miami-Miller School of Medicine, the establishment if a formal Oncofertility Program increased the sperm banking nearly 6-fold after only 2 years of the program.[2]

Limitations

The study represents a percentage of oncologists from Metro Manila and may not necessarily be representative of the oncologists from other regions in the country. Majority of the participants were affiliated with university affiliated teaching hospitals (both public and private) and this could contribute to self-bias since they are more willing to participate in research studies; furthermore, those who answered the questionnaire may be the ones who are more interested in the topic of fertility preservation and the results might not be fully representative of physicians who deal with cancer care. The results are only reflective of the knowledge, opinions, and experiences of Filipino oncologists at a specific time point.

Lastly, most of the participants were either fellows-in-training or early career consultants, and their answers may not be representative of all practicing oncologists. Although a limitation of this study, this also presents an opportunity. It is these young consultants and fellows-in-training who have expressed some interest in the topic by participating in the survey, and this is the population that could be a targeted by proponents of Oncofertility in the country to increase its utilization.

CONCLUSION

There is an acute need to increase knowledge and awareness about fertility preservation methods among Filipino health practitioners treating cancer patients. Similar studies can be done in provinces and rural areas, to have a more accurate representation of Filipino oncologists knowledge, attitudes, and practices on fertility preservation for cancer patients. The results of this study presents an opportunity for proponents of fertility preservation in the Philippines to engage in campaigns that would inform oncologists on the different fertility preservation options available for patients. ■

REFERENCES

1. Ferlay J, Shin HR, Bray F, Forman D, Mathers C PD. GLOBOCAN 2018, Cancer Incidence and Mortality Worldwide: IARC CancerBase [Internet]. 2018 [cited 2018 Dec 26]. Available from: http://gco.iarc.fr/

2. Lopategui DM, Ibrahim E, Aballa TC, Brackett NL, Yechieli R, Barredo JC, et al. Effect of a formal oncofertility program on fertility preservation rates—first year experience. Transl Androl Urol [Internet]. 2018;7(S3):S271-5. Available from: http://tau.amegroups.com/article/view/19630/20192.

3. Miller KD, Siegel RL, Lin CC, Mariotto AB, Kramer JL, Rowland JH, et al. Cancer treatment and survivorship statistics, 2016. *CA Cancer J Clin*. 2016.

4. Ganz PA, Greendale GA, Petersen L, Kahn B, Bower JE. Breast cancer in younger women: Reproductive and late health effects of treatment. *J Clin Oncol*. 2003.

5. Bloom JR, Stewart SL, Chang S, Banks PJ. Then and now: Quality of life of young breast cancer survivors. *Psychooncology*. 2004.

6. 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.

7. Melan K, Amant F, Veronique-Baudin J, Joachim C, Janky E. Fertility preservation healthcare circuit and networks in cancer patients worldwide: What are the issues? *BMC Cancer.* 2018; 18(1):1-9.

8. Oktay K, Harvey BE, Partridge AH, Quinn GP, Reinecke J, Taylor HS, et al. Fertility preservation in patients with cancer: ASCO clinical practice guideline update. *J Clin Oncol*. 2018.

9. Köhler TS, Kondapalli LA, Shah A, Chan S, Woodruff TK, Brannigan RE. Results from the survey for preservation of adolescent reproduction (SPARE) study: Gender disparity in delivery of fertility preservation message to adolescents with cancer. *J Assist Reprod Genet*. 2011; 28(3):269-77.

10. Forman EJ, Anders CK, Behera MA. A nationwide survey of oncologists regarding treatment-related infertility and fertility preservation in female cancer patients. Fertil Steril [Internet]. 2010; 94(5):1652-6. Available from: http://dx.doi.org/10.1016/j.fertnstert.2009.10.008.

11. Yee S, Buckett W, Campbell S, Yanofsky R, Barr RD. A National Study of the Provision of Oncofertility Services to Female Patients in Canada. J Obstet Gynaecol Canada [Internet]. 2012;34(9):849-58. Available from: http://dx.doi.org/10.1016/S1701-2163(16)35384-1

12. Preaubert L, Poggi P, Pibarot M, Delotte J, Thibault E, Saias-Magnan J, et al. [Fertility preservation among patients with cancer: report of a French regional practical experience]. *J Gynecol Obs Biol Reprod*. 2013.

13. Mahajan N, Patil M, Kaur S, Kaur S, Naidu P. The role of Indian gynecologists in oncofertility care and counselling. *J Hum Reprod Sci*. 2016.

14. Chung JPW, Lao TTH, Li TC. Evaluation of the awareness of, attitude to, and knowledge about fertility preservation in cancer patients among clinical practitioners in Hong Kong. *Hong Kong Med J*. 2017.

15. Adams E, Hill E, Watson E. Fertility preservation in cancer survivors: A national survey of oncologists' current knowledge, practice and attitudes. Br J Cancer [Internet]. 2013;108(8):1602-15. Available from: http://dx.doi.org/10.1038/bjc.2013.139.

16. Redig AJ, Brannigan R, Stryker SJ, Woodruff TK, Jeruss JS. Incorporating fertility preservation into the care of young oncology patients. *Cancer*. 2011.

17. Thewes B, Meiser B, Taylor A, Phillips KA, Pendlebury S, Capp A, et al. Fertility- and menopause-related information needs of younger women with a diagnosis of early breast cancer. *J Clin Oncol*. 2005.

18. Loscalzo MJ, Clark KL. The Psychosocial Context of Cancer-Related Infertility. In: Oncofertility: Fertility Preservation for Cancer Survivors. 2007.

19. Suzuki N. Clinical Practice Guidelines for Fertility Preservation in Pediatric, Adolescent, and Young Adults with Cancer. *Int J Clin Oncol* [Internet]. 2018;(0123456789):1-8. Available from: https://doi.org/10.1007/s10147-018-1269-4.

20. Rodriguez-Wallberg KA, Oktay K. Fertility preservation during cancer treatment: Clinical guidelines. *Cancer Management and Research*. 2014.

21. Loren AW, Mangu PB, Beck LN, Brennan L, Magdalinski AJ, Partridge AH, et al. Fertility preservation for patients with cancer: American Society of Clinical Oncology clinical practice guideline update. *Journal of Clinical Oncology*. 2013.

22. Vesali S, Navid B, Mohammadi M, Karimi E, Omani-Samani R. Little information about fertility preservation is provided for cancer patients: A survey of oncologists' knowledge, attitude and current practice. *Eur J Cancer Care (Engl)*. 2019.

23. Alexandroni H, Shoham G, Levy-Toledano R, Nagler A, Mohty M, Duarte R, et al. Fertility preservation from the point of view of hematopoietic cell transplant specialists – a worldwide-web-based survey analysis. *Bone Marrow Transplant*. 2019.

24. Préaubert L, Poggi P, Pibarot M, Delotte J, Thibault E, Saias-Magnan J, et al. Fertility preservation among patients with cancer: Report of a French regional practical experience. *J Gynecol Obstet Biol la Reprod*. 2013.