研究参加時に担当医から月経カレンダーをお渡ししますので、お家で保管し、月経のあった日付がわかるように、カレンダー上にマークしてください（日付を〇で囲むなど）。日誌は年末（毎年１２月頃）に新しいものと交換しますので、年末が近付いたら担当医にお渡しください。月経カレンダーはこの研究に参加いただいてから２年間記載していただくようお願いします。

＊臨床情報の研究利用について

あなたには、治療に関する情報、およびその後の経過に関するフォローアップ情報をこのような研究に利用することの許可をお願いいたします。お預かりする個人情報の保護には細心の注意を払い、研究を行う場合は、研究事務局にて匿名化（個人を特定できない状態）された情報などを用います。

研究協力に同意していただいた方の質問票データ、治療情報、フォローアップ情報は、研究の実行委員会において保管されます。

なお、質問票データや治療情報は、研究期間終了後も保存し、将来、他の研究機関や医療機関との共同研究を含め、上記の研究以外の医学研究に活用させていただく可能性があります。その場合は、あらためて研究計画書が作られ、倫理審査委員会で、個人情報や人権の保護を含めて審査され、施設長の承認が得られた研究のみが行われます。

5. 研究に参加されなくても、治療上の不利益をこうむることはありません

研究への参加は、あなたご自身が決めることであり、あなたの自由です。研究への参加を拒否したら担当医師に悪いのではないだろうか、適切な治療が行われなくなるのではないだろうか、臨床試験に支障がでるのではないだろうかといった心配をされるかもしれませんが、決してそんなことはありません。たとえ研究への参加に同意しない場合でも、あなたの治療や看護の内容が変わるようなことはありません。あなたがゆっくりお考えになり、必要があればご家族とも話し合った上で自由にお決めいただいてかまいません。

6. 研究に参加することの利益と不利益

研究に参加することの、あなたの直接的な利益はほとんどありません。しかし、期待される研究成果として、将来の乳がんのよりよい再発予防・治療法の確立に貢献するということが挙げられます。

不利益として、手術前と１年目の質問票には多くの質問が盛り込まれているため、回答には時間がかかること、回答が負担になることが挙げられます（その他の質問票は短めになります）。すべてへのご回答をお願いしておりますが、体調がすぐれないなどの事情でどうしてもご回答いただけない場合は、無理をせず、可能な範囲でもかまいません。

質問の数は多いですが、本研究に含まれる質問は、すべて乳がんの方の生活習慣に関連していると考えられているものです。ご回答いただくことによって、あなたご自身の生活習慣を考えるきっかけにしていただければと思います。特に食事に関しましては、食品の摂取状況についておひとりずつ分析した結果を、担当医師を通じて、あるいは郵送により毎回ご返却させていただくことを予定しております。質問票に正しくご回答いただくことによって、ご自身の食生活やその変化などを把握することができますので、食生活の維持や改善への情報として、お役立てください。

その他の、予測されるあなたの危険や不利益は極めて小さいです。その理由は、①厳重な匿名化により個人のプライバシーが保護されていること、②この研究では通常どおり標準的な乳がんの治療を行いますので、この研究への参加による健康上の被害はないためです。

7. 研究の参加への同意について

この説明文書の内容を理解し、研究参加に同意してくださる場合は、「同意文書」にご自身でご署名ください。

ただし、いつでも研究協力をとりやめることが可能です。担当の医師や医療従事者にご連絡ください。もし、研究協力をとりやめる場合でも、それまでいただいた情報は研究に使わせてください。どうしても情報を破棄することを希望される場合は、申し出ていただければ、個人を特定できる情報、紙媒体で保管されている質問票、治療情報、フォローアップ情報についても、シュレッダー等で処理して廃棄し、デジタル化された情報があれば、それも消去します。

8. あなたのプライバシーを守ります

この研究では、あなたの健康状態やあなた自身に関するいろいろな情報が集められます。主なものは、質問票の回答、手術の結果や治療の情報、フォローアップ情報などです。

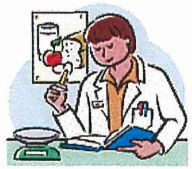
この研究は、文部科学省・厚生労働省の「疫学研究に関する倫理指針」に従い実施します。

食品の摂取状況の分析結果は、番号のみ記して厳封した封筒に入れてお返ししますので、内容を担当医師に知られることもありません。

この研究ではあなたのプライバシーを守るために細心の注意を払います。

最終的な研究結果は、学術雑誌や学会にて公表し、乳がん患者さんの支援や医学の発展に役立てていく予定ですが、公表する際にあなたのお名前や個人を特定できるような情報が使用されることはありません。また、ご希望の場合には、担当医師を通してご連絡いただければ、あなたにもその結果をお知らせします。

9. 解析結果をお知らせすることについて



この研究に参加いただき、質問票に回答いただいた患者さんには、食品の摂取状況についておひとりずつ分析した結果を、担当医師を通じて、あるいは郵送により毎回ご返却させていただくことを予定しております。ご自身の食生活やその変化などを把握することができますので、食生活の維持や改善への情報として、お役立てください。

この研究から得られた有益な情報は、可能な限り速やかにホームページ上などで公開しますが、個々の調査情報（食生活の分析を除く）は原則として、あなたを含め、誰にも解析結果をお知らせすることはありませんのでご了承ください。

10. 研究から生じる知的財産権の帰属

今回の研究の結果として、特許権などの知的財産権が生じる可能性、および、それをもととした経済的利益が生じる可能性がありますが、その権利は国、研究機関および研究遂行者などに属します。

11. 研究倫理のルールを守って研究を行います

この研究は、世界医師会が提唱する人間を対象とする医学研究の倫理的原則である「ヘルシンキ宣言」や、国（文部科学省および厚生労働省）の定めた「疫学研究に関する倫理指針」、を遵守して行います。また、各医療機関では倫理審査委員会の審査を受け、この研究が参加するみなさんの不利益にならないかということや、目的や方法が科学的に妥当であるか、結果として医学の発展に役立つ情報が得られるかどうかなどが確認され、承認を受けました。

12. 研究の責任者とお問い合わせ先

この研究は、NPO 法人瀬戸内乳腺事業包括的支援機構が主体となり実施し、法人内に「瀬戸内乳がんコホート研究実行委員会」を組織し、研究の運営にあたっています。岡山大学病院　乳腺・内分泌外科が研究事務局を担当し、研究責任者は平 成人（岡山大学病院　乳腺・内分泌外科）です。また、この研究は国立がん研究センターで実施中の「乳がん患者の多目的コホート研究 瀬戸内（プロジェクト名：希望の虹プロジェクト）」との共同研究として実施されます。共同研究の研究責任者は山本 精一郎、研究事務局は山本 精一郎、溝田 友里（国立がん研究センターがん対策情報センターがん情報提供研究部）です。

この研究は、NPO 法人瀬戸内乳腺事業包括的支援機構からの研究助成、文部科学省からの研究助成（平成 24 年文部科学省科学研究費助成　基盤 C、研究代表者：平　成人）、厚生労働省から研究助成（平成 22 年度厚生労働科学研究費補助金がん臨床研究事業、研究代表者：山本精一郎）等を受けて実施されます。この研究では、この他の特定の企業や団体等からの資金提供などは受けておりませんので、研究の結果に影響する可能性のあるような、金銭および個人の関係を含む利害関係（これを利益相反といいます）はありません。この研究および共同研究の利益相反は、各研究者の所属する施設で管理を行っています。

この研究に関するより詳しい説明や、この研究の途中経過、研究結果をご覧になりたい方は、下記までご連絡ください。また、ご不明な点や疑問、不安があるときなども、担当医師や、下記コールセンター、研究事務局にいつでもお気軽にご連絡ください。

○NPO 法人瀬戸内乳腺事業包括的支援機構

URL: http://setouchi-bp.com/index.html
（ホームページ上のお問い合わせフォームをご利用下さい）

○コールセンター　コホート瀬戸内担当

NPO 法人日本臨床研究支援ユニット（J-CRSU）内

電話：0120-717-411, 0120-711-595

住所：〒113-0034　東京都文京区湯島 1-2-12　ライオンズプラザお茶の水ビル

○瀬戸内乳がんコホート研究事務局

岡山大学病院　乳腺・内分泌外科
（担当：平　成人，万波　久代）

電話：086-225-9657

住所：〒700-8558 岡山大学病院　臨床研究棟９階　呼吸器・乳腺内分泌外科内
＊お問い合わせは平日 10 時～17 時でお願いします（祝祭日、年末年始を除く）

この研究についてご理解のうえ、ご協力いただける場合は、
同意書にご署名ください。
ぜひとも研究にご協力いただけますようよろしくお願い申し上げます。

「瀬戸内乳がんコホート研究」

協力の同意文書

病院長　殿

私は、「瀬戸内乳がんコホート研究」について、下記に記した説明者により説明文書を用いて説明を受け、以下の項目について十分理解しましたので、本研究に参加します。

【説明を受け理解した項目】

1. 研究の目的
2. 研究を行う背景・理由
3. 研究施設と研究の対象者
4. あなたにお願いすること・研究の方法
5. 研究に参加されなくても、治療上の不利益をこうむることはありません
6. 研究に参加することの利益と不利益
7. 研究の参加への同意について
8. あなたのプライバシーを守ります
9. 解析結果をお知らせすることについて
10. 研究から生じる知的財産権の帰属
11. 研究倫理のルールを守って研究を行います
12. 研究の責任者とお問い合わせ先

患者さんご自身でご記入ください

同意日：　　年　　月　　日

氏名（自署）：

説明者が記入

説明日：　　年　　月　　日

氏名（自署）：

「瀬戸内乳がんコホート研究」

協力の同意文書

病院長　殿

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同意日：　　年　　月　　日

氏名（自署）：

説明者が記入

説明日：　　年　　月　　日

氏名（自署）：

Ⅳ．研究成果の刊行に関する一覧表

研究成果の刊行に関する一覧表

雑誌

発表者名	論文タイトル名	発表誌名	巻号	ページ	出版年
Mizota Y, Yamamoto S.	Prevalence of Breast Cancer Risk Factors in Japan.	Jpn J Clin Oncol	42(11)	1008-12	2012
Shimizu C, Bando H, Kato T, Mizota Y, Yamamoto S, Fujiwara Y.	Physicians' knowledge, attitude, and behavior regarding fertility issues for young breast cancer patients: a national survey for breast care specialists.	Breast Cancer	20(3)	230-40	2013
Nozawa K, Shimizu C, Kakimoto M, Mizota Y, Yamamoto S, Takahashi Y, Ito A, Izumi H, Fujiwara Y.	Quantitative assessment of appearance changes and related distress in cancer patients.	Psychooncology	in press		2013
Itoh H, Iwasaki M, Sawada N, Takachi R, Kasuga Y, Yokoyama S, Onuma H, Nishimura H, Kusama R, Yokoyama K, Tsugane S.	Dietary cadmium intake and breast cancer risk in Japanese women: A case-control study.	International journal of hygiene and environmental health	in press		2013
Sawaki M, Mukai H, Tokudome N, Nakayama T, Taira N, Mizuno T, Yamamoto Y, Horio A, Watanabe T, Uemura Y, Ohashi Y.	Safety of Adjuvant Trastuzumab for HER2-overexpressing Elderly Breast Cancer Patients: A multicenter cohort study.	Breast Cancer	19	253-8	2012
溝田友里, 山本精一郎	がん患者コホート研究：予後改善へのエビデンス	医学のあゆみ	241(5)	384-90	2012
溝田友里, 山本精一郎	日本における乳がんの疫学的動向	日本臨牀	70(増刊号7)	37-41	2012
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書籍

著者氏名	論文タイトル名	書籍全体の編集者名	書籍名	出版社名	出版地	出版年	ページ
山本精一郎, 平成人, 岩崎基（作成委員）		日本乳癌学会	患者さんのための乳がん診療ガイドライン2012年版.	金原出版	東京	2012	
山本精一郎, 溝田友里	わが国の乳癌リスクファクターの推移.	園尾博司（監修）	これからの乳癌診療2012～2013	金原出版	東京	2012	111-7

Ⅴ．研究成果の刊行物・別刷

Japanese Journal of Clinical Oncology Advance Access published September 17, 2012

JJCO Japanese Journal of Clinical Oncology

Jpn J Clin Oncol 2012
doi:10.1093/jjco/hys144

Original Article

Prevalence of Breast Cancer Risk Factors in Japan

Yuri Mizota* and Seiichiro Yamamoto

Cancer Information Service Division, Center for Cancer Control and Information Services, National Cancer Center, Tokyo, Japan

*For reprints and all correspondence: Yuri Mizota, Cancer Information Service Division, Center for Cancer Control and Information Services, National Cancer Center, Tsukiji 5-1-1, Chuo-ku, Tokyo 104-0045, Japan. E-mail: ymizota@ncc.go.jp

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Objective: Breast cancer is the most common type of cancer in women worldwide. Although the incidence of breast cancer is still on an increasing trend, there are few studies concerning breast cancer risk factors in Japan. Therefore, we conducted an Internet survey investigating the prevalence of risk factors for breast cancer.
Methods: We conducted an Internet survey using opt-in panels in women aged from 20 to 70 years. The survey items consisted of potential and proven risk factors for breast cancer such as age at menarche, menopausal status, premenopausal use of oral contraceptives, postmenopausal use of hormones, parity, height, alcohol consumption and family history of breast cancer.
Results: Subjects comprised 2002 persons who were matched for sex, age and residential area with the National Census in 2005. Statistically significant trends were observed for most factors: age at menarche is becoming lower, age at first birth is higher, height is higher, the proportion of women who have given birth is smaller and the proportion of women who drink alcohol is larger.
Conclusions: We showed a clear increase in the prevalence of risk factors for breast cancer. Based on the results, the incidence of breast cancer in Japan may be increasing for at least a few decades.

Key words: breast cancer – incidence – risk factors – Japan – Asia

INTRODUCTION

Breast cancer is the most common type of cancer in women worldwide. According to the International Agency for Research on Cancer, an estimated 1 150 000 patients were newly diagnosed with breast cancer in 2002. Furthermore, breast cancer has the highest cancer-related mortality rate among women. In 2002, 410 000 women died of breast cancer (1). In Japan, 11 918 women died of breast cancer in 2009, leading to an age-adjusted mortality rate of 11.8 per 100 000 population. In 2006, the age-adjusted incidence rate of female breast cancer in Japan was estimated as 60.3 per 100 000 population, second highest to colorectal cancer. The age-adjusted incidence rate of breast cancer has markedly increased in Japan (2).

A number of risk factors for breast cancer have been identified, including hereditary predispositions such as a family history of breast cancer and *BRCA1/BRCA2* mutations, endocrine environmental factors regarding menarche and menopause, socio-environmental factors such as parity and lactation, and lifestyle-related factors such as obesity, physical activity level and alcohol consumption. The evidences for various lifestyle-related risk factors in breast cancer were reviewed by the World Cancer Research Fund and the American Institute for Cancer Research and those relevant for Japanese women by Japanese researchers (3,4).

Unfortunately, however, few studies have evaluated the prevalence of risk factors for breast cancer in Japanese

women and how they change over time. The JNHS is a large-scale epidemiological cohort study involving female Japanese nurses (5) which investigated risk factors for breast cancer, including menstruation, parity and the use of hormones. However, nurse-specific factors such as the use of hormones and night duty were frequent; the subjects are not entirely representative of the general population of Japanese women. Furthermore, the height and alcohol intake of Japanese women have been investigated every year by the Ministry of Health, Labour and Welfare through the National Health and Nutrition Survey (6). It involves ~6 000 households and household members in 300 areas throughout Japan in accordance with the Health Promotion Law, which mandates the collection of data regarding the national physical state, nutritional intake and lifestyle-related factors in order to comprehensively promote national health. However, no data on other risk factors for breast cancer have been collected in that survey.

Recently, the widespread use of the Internet has facilitated the sampling of subjects representative of the Japanese population with respect to geographical and age distributions. However, it is necessary to examine whether or not these subjects are truly representative of the Japanese population because they are limited to persons who can access the Internet. If there is no association between Internet usage and the prevalence of risk factors, Internet surveys can provide representative data.

Among potential and proven risk factors for breast cancer, risk factors such as age at menarche, age at menopause, age at first birth, number of children and height became unchanged once a woman has reached a specific age. Therefore, the prevalence of these factors at or above this age in a cross-sectional survey can be considered to represent cohort effects rather than age effects. Future trends in the incidence of breast cancer can be predicted to some extent by investigating the trends involving these risk factors. As for variables such as nutrient intake and body weight, which may change with age, their prevalence reflects both cohort and age effects. Therefore, it is difficult to use data from cross-sectional surveys for future prediction of breast cancer incidence, but it is still useful to calculate the risk of breast cancer at the time of a cross-sectional survey using prediction models such as the Gail model (7). Using these risk scores, the size of a population at high risk for breast cancer can be identified.

Therefore, in order to clarify the prevalence of risk factors for breast cancer in Japanese women, we conducted a study investigating the distribution of potential and proven risk factors using a cross-sectional Internet survey.

PATIENTS AND METHODS

Data Collection

We conducted an Internet survey in which the subjects were women between the ages of 20 and 70 who participated in opt-in (registered by the subjects themselves) panels. It has been pointed out that Internet surveys have problems associated with duplicated answers and socioeconomic bias (8–11). In Japan, an age bias has been reported (12). However, the opt-in panels used in this study verify the survey logic, so duplicated answers can be avoided (13,14). Among the panels, 2002 people were recruited until sex, age and residential area distribution were the same as the National Census in 2005. The survey was conducted between 15 and 20 February 2008.

Survey Items

The survey consisted of potential and proven risk factors for breast cancer such as age at menarche, menopause status, premenopausal use of oral contraceptives, postmenopausal use of hormones, parity, height, alcohol consumption and family history of breast cancer. Data of other potential risk factors such as dietary factors were also collected, but they were not reported here since their evidence concerning associations with breast cancer incidence are still limited (3,4).

Statistical Analysis

Trends of the prevalence of risk factors over birth year were examined using ANOVA for continuous variables and the Cochran–Mantel–Haenszel test for categorical variables. Two-sided value of $P < 0.05$ was considered statistically significant. All statistical analyses were performed using SAS software 9.2 (SAS Institute, Cary, NC, USA).

RESULTS

The background characteristics of the subjects are shown in Table 1. The proportion of smoker and that of full-time worker were higher in younger age groups. Younger age groups had higher educational background.

The most frequent age at menarche was 12 years. Women who experienced menarche between the ages of 12–14 years accounted for ~70% of the sample (Table 2). The age at menarche was 11 years or younger in <20% of the subjects. With respect to age, the mean age at menarche was ~14 years in women who were born in or around 1938 (age at the time of the survey, 70 years). It was ~12 years in those who were born in or around 1988; the appearance of menarche was earlier in younger subjects (*P* value for trend <0.001).

Postmenopausal women accounted for 65% of the subjects aged 50–59 years (Table 2). In ~10% of those aged 50 years or older, menopause was surgically induced. There was no clear trend between age at menopause and birth year (*P* value for trend 0.18).

Of all responders, 70% had given birth (Table 2). In ~50% of women who have given birth, the age at first birth ranged from 25 to 29 years. It was 30 years or older in 17.1% of the respondents. Among subjects who were born

Table 1. Background characteristics of the subjects

	Total ($n = 2002$)	≤1938 (age ≥70) ($n = 86$)	1939–1948 (age 60–69) ($n = 677$)	1949–1958 (age 50–59) ($n = 344$)	1959–1968 (age 40–49) ($n = 292$)	1969–1978 (age 30–39) ($n = 337$)	1979–1988 (age 20–29) ($n = 266$)
Smoking (%)							
Smoker	309	2 (2.3)	69 (10.2)	67 (19.5)	59 (20.2)	63 (18.7)	49 (18.4)
Quitter	257	5 (5.8)	79 (11.7)	37 (10.8)	39 (13.4)	54 (16.0)	43 (16.2)
Nonsmoker	1436	79 (91.9)	529 (78.1)	240 (69.8)	194 (66.4)	220 (65.3)	174 (65.4)
Education (%)							
Junior high school	44	8 (9.3)	21 (3.1)	2 (0.6)	3 (1.0)	5 (1.5)	5 (1.9)
High school	669	21 (24.4)	190 (28.1)	138 (40.1)	120 (41.1)	134 (39.8)	66 (24.8)
Junior college	733	39 (45.4)	325 (48.0)	108 (31.4)	99 (33.9)	97 (28.8)	65 (24.4)
University	500	9 (10.5)	128 (18.9)	89 (25.9)	65 (22.3)	95 (28.2)	114 (42.9)
Graduate school	26	0 (0.0)	6 (0.9)	3 (0.9)	4 (1.4)	3 (0.9)	10 (3.8)
Other	30	9 (10.5)	7 (1.0)	4 (1.2)	1 (0.3)	3 (0.9)	6 (2.3)
Occupation (%)							
Full time	407	3 (3.5)	57 (8.4)	74 (21.5)	78 (26.7)	100 (29.7)	95 (35.7)
Part time	408	4 (4.7)	82 (12.1)	90 (26.2)	95 (32.5)	72 (21.4)	65 (24.4)
Housewife	833	53 (61.6)	381 (56.3)	136 (39.5)	86 (29.5)	133 (39.5)	44 (16.5)
Self-employed	108	5 (5.8)	44 (6.5)	25 (7.3)	19 (6.5)	13 (3.9)	2 (0.8)
Unemployed/ student	192	19 (22.1)	91 (13.4)	4 (1.2)	6 (2.1)	13 (3.9)	59 (22.2)
Other	54	2 (2.3)	22 (3.3)	15 (4.4)	8 (2.7)	6 (1.8)	1 (0.4)
Family income per year (%)	2002.0						
<1 000 000 yen	49	5 (5.8)	23 (3.4)	3 (0.9)	2 (0.7)	4 (1.2)	12 (4.5)
<3 000 000 yen	332	28 (32.6)	120 (17.7)	40 (11.6)	36 (12.3)	50 (14.8)	58 (21.8)
<6 000 000 yen	767	38 (44.2)	261 (38.6)	104 (30.2)	96 (32.9)	171 (50.7)	97 (36.5)
<9 000 000 yen	442	9 (10.5)	134 (19.8)	84 (24.4)	96 (32.9)	72 (21.4)	47 (17.7)
<12 000 000 yen	260	4 (4.7)	83 (12.3)	71 (20.6)	42 (14.4)	30 (8.9)	30 (11.3)
≥12 000 000 yen	152	2 (2.3)	56 (8.3)	42 (12.2)	20 (6.9)	10 (3.0)	22 (8.3)

Age is calculated at the end of 2008.

Table 2. Prevalence of breast cancer risk factors by birth year in Japanese women

	Total			≤1938 (age ≥70)			1939–1948 (age 60–69)			1949–1958 (age 50–59)			1959–1968 (age 40–49)			1969–1978 (age 30–39)			1979–1988 (age 20–29)			Trend
	n	Mean	SE	*n*	Mean	SE	*n*	Mean	SE	*n*	Mean	SE	*n*	Mean	SE	*n*	Mean	SE	*n*	Mean	SE	
Age at menarche	2002	12.9	1.5	86	14.1	1.7	677	13.4	1.5	344	12.8	1.3	292	12.4	1.4	337	12.4	1.4	266	12.2	1.5	<0.001
Age at menopause	879	51.4	3.5	80	50.9	4.3	576	51.7	3.5	223	50.9	2.8	—			—			—			0.18
Age at first birth	1178	26.4	3.5	82	26.3	3.8	606	26.1	3.4	283	26.5	3.4	207	27.0	3.9							0.003
Height	2002	156.5	5.5	86	151.8	5.5	677	154.6	4.8	344	156.4	5.0	292	158.4	5.3	337	158.9	5.5	266	158.0	5.6	<0.001

Age is calculated at the end of 2008.

in or before 1968, the age at first birth was higher than in younger subjects. In addition, the parity was lower in younger subjects.

The mean height of subjects who were born in or around 1938 was ~152 cm (Table 2). For subjects who were born in or around 1984, the mean height was ~158 cm. Height

was greater in younger subjects but this trend reaches a plateau.

In each age group, ~10% of the subjects reported the premenopausal use of oral contraceptives (Table 3). The percentage was slightly higher in subjects who were born between 1959 and 1988 compared with older age groups. More than 40% of the subjects who used oral contraceptives used them for 3 months or less. However, 8.6% used oral contraceptives for 3 years or more. More than 10% of postmenopausal subjects aged 50 years or older reported the postmenopausal use of hormones.

Alcohol consumption was investigated using the three-status method: present, previously present (current status: abstention from alcohol) and absent. Of the subjects, 50.7% reported currently consuming alcohol. The proportion of subjects consuming alcohol was higher in younger subjects (*P* value for trend <0.001) (Table 3).

Concerning family history, the proportion of subjects with a one relative with breast cancer is <10% for all ages. The proportion of subjects with two or more relatives diagnosed with breast cancer is very low and the proportion was not increasing with respect to birth year (Table 3).

DISCUSSION

This study showed the prevalence of breast cancer risk factors in Japan. With respect to age, in younger subjects, the age at menarche was lower, the age at the first delivery was higher, the parity was lower, the proportion of subjects utilizing hormones before menopause was slightly higher, the height was higher and the proportion of subjects consuming alcohol was higher. Although the proportion of persons with a family history of breast cancer is still low, it will increase along with a rise in breast cancer incidence in the near future. In addition to that, the younger age group will have more chance to have a family history in her future.

In this study, an Internet survey was employed for the following reasons: nationwide data are available, and subjects do not hesitate to answer questions regarding delicate issues including reproductive health because of its anonymous nature. If the validity of Internet surveys is confirmed, changes in the prevalence of risk factors and scores can be investigated longitudinally via serial surveys. To examine the validity and the reproducibility of the results, the results for height and alcohol consumption were compared with those from the National Health and Nutrition Survey conducted in the same fiscal year (15). The mean height and its trend across age groups were very similar to those from the National Health and Nutrition Survey: 157.9 cm for age 20–29, 158.0 cm for age 30–39, 157.5 cm for age 40–49, 154.5 cm for age 50–59, 151.9 cm for age 60–69 and 147.4 cm for age 70 and over. As for alcohol consumption, proportions of present drinker (more than or equal to once a month) are 46.1% for age 20–29, 43.2% for age 30–39, 47.4% for age 40–49, 36.2% for age 50–59, 24.5% for age 60–69 and 14.7% for age 70 and over in that survey and these figures were lower than ours but trend across age groups was very similar. The National Health and Nutrition survey was conducted using different sampling scheme from ours; the sample size for female subjects was 4140, twice as large as our study and the response rate was 59.1% from stratified random-sampled areas. The consistency of the

Table 3. Prevalence of breast cancer risk factors by birth year in Japanese women

	Total ($n = 2002$)	≤1938 (age ≥70) ($n = 86$)	1939–1948 (age 60–69) ($n = 677$)	1949–1958 (age 50–59) ($n = 344$)	1959–1968 (age 40–49) ($n = 292$)	1969–1978 (age 30–39) ($n = 337$)	1979–1988 (age 20–29) ($n = 266$)	*P* for trend
Parity >0 (%)	1423 (71.1)	82 (95.3)	606 (89.5)	283 (82.3)	207 (70.9)	190 (56.4)	55 (20.7)	<0.001
Oral contraceptives use (%)	243 (12.1)	1 (1.2)	69 (10.2)	36 (10.5)	41 (14.0)	57 (16.9)	39 (14.7)	<0.001
Postmenopausal hormone replacement therapy (%)[a]	122 (12.0)	3 (3.5)	89 (13.3)	30 (11.6)	—	—	—	0.28
Alcohol consumption (%)								
Present	1015 (50.7)	30 (34.9)	312 (46.1)	185 (53.8)	162 (55.5)	177 (52.5)	149 (56.0)	<0.001
Previously present	83 (4.1)	3 (3.5)	23 (3.4)	10 (2.9)	9 (3.1)	20 (5.9)	18 (6.8)	
Absent	904 (45.2)	53 (61.6)	342 (50.5)	149 (43.3)	121 (41.4)	140 (41.5)	99 (37.2)	
No. of relatives who have family history of breast cancer (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
0	1956 (97.7)	83 (96.5)	650 (96.0)	335 (97.4)	287 (98.3)	336 (99.7)	265 (99.6)	<0.001
1	39 (1.9)	3 (3.5)	21 (3.1)	8 (2.3)	5 (1.7)	1 (0.3)	1 (0.4)	
2	6 (0.3)	0 (0.0)	5 (0.7)	1 (0.3)	0 (0.0)	0 (0.0)	0 (0.0)	
>2	1 (0.0)	0 (0.0)	1 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	

[a]Denominator of percent subjects for postmenopausal hormone replacement therapy is 1013 for total, 86 for age 70, 669 for age 60–69 and 258 for age 50–59. Data are not shown for age 20–49 due to small numbers. Age is calculated at the end of 2008.

results, especially trends across age groups, from studies with different sampling schemes was the supportive evidence of the reproducibility of the results, although the subjects in both studies were not sampled randomly from the population. If the risk of breast cancer in Internet users was higher than in non-Internet users, for example, due to an advanced education level and delayed initial childbirth, the risk factor trends observed in this study can be generalized if higher risk of Internet users is observed regardless of age (no interaction with cohort effect). More extremely, if the interaction existed, where Internet users tended to have delayed initial childbirth related to higher education in the older age group but no difference in the younger age group, this selection bias would work toward diminishing trends across age groups. We might observe stronger trends if no selection bias existed.

Since the study was a cross-sectional questionnaire survey, trend across age groups may not be a cohort effect but an age effect. For example, recall of past hormone use or age at menarche may be different by age. In this study, the inability to recall old memories may cause non-differential misclassification rather than differential misclassification. In other words, errors may be related to precision not related to accuracy. In that case, trend across age would diminish and the observed trend may not be caused by the recall bias. The factors not observed trend across age groups such as past hormone use and age at menopause may show trend if more precise measurements were used.

Based on the results, the number of women with each risk factor for breast cancer has increased, so that the incidence of breast cancer in Japanese women may be increasing over the next few decades. However, most of these factors are impossible to modify. High-risk females should more actively adopt strategies to prevent breast cancer and undergo screening. Furthermore, alcohol consumption can be modified; therefore, abstention from alcohol may be more prominently included in efforts to prevent breast cancer.

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Conflict of interest statement

None declared.

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ORIGINAL ARTICLE

Physicians' knowledge, attitude, and behavior regarding fertility issues for young breast cancer patients: a national survey for breast care specialists

Chikako Shimizu · Hiroko Bando · Tomoyasu Kato · Yuri Mizota · Seiichiro Yamamoto · Yasuhiro Fujiwara

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Abstract
Background Fertility is one of the key aspects of quality of life for breast cancer patients of childbearing age. The objective of this study was to describe fertility-related practice for young breast cancer patients in Japan and to identify healthcare provider factors that contribute to physicians' behavior towards fertility preservation.
Methods A cross-sectional survey was developed in order for Japanese breast cancer specialists ($n = 843$) to self-evaluate their knowledge, attitude, and behavior regarding fertility preservation. Survey items included questions regarding knowledge of and attitude toward fertility issues in cancer patients, fertility-related practice, potential barriers for the discussion of fertility with patients, and responding physicians' socio-demographic background.
Results Four hundred and thirty-four (52%) breast oncologists responded to the survey. Female and younger oncologists (age less than 50 years) had significantly higher probability of referring patients to reproductive specialists. Physicians who had better knowledge score and positive attitudes toward fertility preservation were more likely to discuss potential fertility issues with cancer patients. This was significantly associated with consultation and referral to reproduction specialists when encountering fertility issues with cancer patients. Risk of recurrence, lack of collaborating reproductive specialists, and time constraints in the clinic were identified as major barriers to discussion of fertility preservation with breast cancer patients.
Conclusion Female and younger physicians as well as physicians working in a multidisciplinary environment had positive attitudes and behavior towards fertility preservation in breast cancer patients. The development of comprehensive and interdisciplinary programs for healthcare providers is necessary to meet the expectations and fertility needs of breast cancer patients.

Keywords Fertility preservation · Breast cancer · Survivorship

C. Shimizu (✉) · Y. Fujiwara
Breast and Medical Oncology Division, National Cancer Center Hospital, 5-1-1 Tsukiji, Chuo-ku, Tokyo 104-0045, Japan
e-mail: cshimizu@ncc.go.jp

H. Bando
Breast and Endocrine Surgery, Graduate School of Comprehensive Human Sciences, University of Tsukuba, Tsukuba, Japan

T. Kato
Division of Gynecology, National Cancer Center Hospital, Tokyo, Japan

Y. Mizota · S. Yamamoto
Center for Cancer Control and Information Services, National Cancer Hospital, Tokyo, Japan

Introduction

With improvement of cancer prognosis, fertility has become one of the key aspects of quality of life for breast cancer patients of childbearing age. Distress about interrupted childbearing is likely to persist in long-term female cancer survivors [1]. The American Society of Clinical Oncology (ASCO) has developed guidance for oncologists regarding available fertility preservation methods and related issues [2]: oncologists should address the possibility of infertility with patients during their reproductive years and be prepared to discuss possible fertility preservation options or refer appropriate and interested patients to

reproductive specialists as early as possible during treatment planning.

However, previous studies have shown that only 23% of the patients younger than 40 years of age were informed of potential infertility after cancer treatment in a single institution in Japan and less than half of oncologists were following the ASCO guideline in the USA [3, 4]. The practice of oncologists regarding fertility preservation in cancer patients of reproductive age may depend on multiple factors: the patient's medical and psychosocial condition [5, 6], the patient's knowledge [7], and physicians' knowledge about fertility preservation [8].

We have previously analyzed the decision-making process for adjuvant treatment in young breast cancer patients of reproductive age [3]. Significantly less patients expressed interest in fertility when they had children or advanced disease. Less aggressive treatment (without chemotherapy) was recommended by oncologists for patients who voluntarily expressed an interest in preserving fertility [3]. Nearly one-third of the patients who expressed an interest in fertility selected a different adjuvant treatment from the primary recommendation of the oncologist because of their concern for preserving fertility, whereas the majority of patients who did not express an interest in preserving fertility followed the oncologists' primary recommendation [3].

The awareness and attitude of patients in the clinic might reflect the ability of healthcare providers to provide an environment in which patients could bring up fertility issues. The objectives of this study include describing fertility-related practice for breast cancer patients in a variety of clinical settings in Japan and identifying healthcare provider factors that contribute to physicians' behavior regarding fertility preservation in young breast cancer patients.

Methods

Selection of participant

A cross-sectional survey was developed in order for board-certified breast oncologists of the Japanese Breast Cancer Society (JBCS), who are the main physicians treating breast cancer patients in Japan, to self-evaluate their knowledge, perception, and behavior regarding fertility issues in young breast cancer patients.

Measures

The survey consisted of 49 items including questions regarding knowledge of and attitudes towards fertility in cancer patients, practice behavior of fertility-related discussions with patients, potential barriers for these discussions, and demographic background of the practitioners (Table 1). Survey items were derived from existing literature and multidisciplinary discussion. Physicians were asked to evaluate their agreement with the statements using a five-grade system (1, strongly agree; 2, agree; 3, cannot decide; 4, disagree; 5, strongly disagree).

1. Knowledge about fertility issues in breast cancer patients

To evaluate the accuracy of knowledge about fertility issues in breast cancer patients, the statements were developed from the latest JBCS treatment guideline [5]. For statements A-1 and A-4, the respondents were considered to have more accurate knowledge when the score was lower. For statements A-2 and A-3, the respondents were considered to have more accurate knowledge when the score was higher. Then the sum of (5 − "score for A-1") + ("score for A-2") + ("score for A-3) + (5 − "score for A-4") was calculated. The respondents with a higher sum were considered to have more accurate overall knowledge. A-5 was not used to evaluate the accuracy of knowledge because of lack of definite evidence, but correlated with the use of LHRH agonist for fertility preservation.

2. Practice behavior for breast cancer patients of reproductive age

Practice behavior statements consisted of 13 items including statements used in the US oncologist survey with some modifications to adapt to Japanese practice setting. The statements "I discuss the impact of cancer treatment on future fertility with my patients", "I consult reproductive specialists with questions about fertility issues in my patients", and "I refer patients who have questions about fertility to reproductive specialists" were considered the most important behavior according to the ASCO guideline [2].

3. Potential barriers for discussing fertility issues with breast cancer patients

Among seven potential barriers asked in the questionnaire, four were similar to statements used in the US survey [4]. We put three additional statements (patients' voluntary expression of interest, existence of spouse/partner, and support from co-medical staff) that were created by findings from our previous study [2] and by considering Japanese culture. In addition, we asked the participant to describe the greatest difficulty in discussing fertility in an open question.

4. Attitude towards fertility preservation of cancer patients

Five statements were selected from the US survey [4]. Because the hereditary aspect of breast cancer was considered to be not genuinely linked with perception of

Table 1 Questionnaire statements

A. Knowledge about fertility issues of breast cancer patients
1. Total dose of alkylating agents are related to infertility
2. Pregnancy after breast cancer increases risk of recurrence
3. Pregnancy after chemotherapy increases risk of deformity of the child
4. Pregnancy should be avoided during tamoxifen treatment
5. Luteinizing hormone releasing hormone (LHRH) analogue reduces the risk of chemotherapy-induced amenorrhea
B. Practice behavior
1. Patients voluntarily bring up the fertility issues in the clinic
2. I discuss the impact of cancer treatment to future fertility with my patients
3. I do not feel comfortable to discuss fertility issue with my patients
4. I take into account the history of childbirth when I discuss fertility issue with my patient
5. I take into account whether she has a spouse/partner when I discuss fertility issue with my patient
6. I take into account economical status of the patient when I discuss fertility issue with my patient
7. I discuss fertility issues with breast cancer patients with high risk of recurrence
8. Patients talk to co-medical staff about their concern about fertility
9. I ask co-medical staff if a patient has an interest in fertility
10. I provide my patients with educational material about fertility preservation
11. I use LHRH analogue to preserve fertility
12. I consult a reproductive specialist with questions about fertility issues in my patients
13. I refer patients who have questions about fertility to reproductive specialists
C. Barriers for discussing fertility issues
1. The patient does not express their interest in fertility
2. The patient has high risk of recurrence
3. The patient has economic problems
4. The patient does not have a spouse/partner
5. There is no place/person to refer my patients to for fertility preservation
6. Time constraints affect my ability to discuss fertility preservation
7. There is no support from co-medical staff
8. What is the greatest difficulty in discussing fertility issues with young breast cancer patients?
D. Attitude toward fertility preservation
1. Patients with poor prognosis should not pursue fertility preservation
2. Posthumous parenting is troublesome for bereaved family
3. Losing mothers will negatively affect bereaved children
4. I fear passing hereditary cancer to a biological child
5. Treating cancer is more important than fertility preservation
E. Demographics and medical backgrounds
1. What is your gender?
2. What is your age?
3. What is your religious background?
4. When did you graduate from medical school?
5. What is your specialty?
6. Where is your primary practice located?
7. What kind of institution do you practice in?
8. Is your institution a community-base hospital for cancer care?
9. How many physicians are in your practice setting including you?
10. Are there any female physicians in your practice setting?
11. Are there any medical oncologists in your practice setting?
12. Are there any breast cancer specialized nurses in your practice setting?
13. Are there any cancer-specialized pharmacists in your practice setting?
14. Is there a genetic counseling clinic in your practice setting?
15. In a typical week, how many breast cancer surgeries are performed in your practice setting?
16. In a typical week, how many breast cancer patients under 40 years of age do you see?
17. Do you have a spouse/partner?
18. Do you have children?
19. Do you have relatives or close friends who passed away leaving behind minor children?

fertility preservation, the item was not included in our analysis. Participants were considered to be positive toward fertility preservation if the sum of scores was higher than 3. The sum of scores for statements from D-1 through D-5 was calculated and the respondents with higher total score were considered as physicians with a "positive attitude" towards fertility preservation.

5. Individual and institutional background

The items included physicians' gender, age, religious background, length of professional career, and specialty. We also asked for a description of the practicing institution: the number of breast surgeries, the number of young breast cancer patients, presence of female colleagues in the team, the presence of one or more medical oncologist(s), breast cancer certified clinical nurse specialist (CNS), and board-certified pharmacists in the institution.

Procedures

The study was carried out according to the National Guideline for Epidemiological Studies. The names of study participants and the institutions of breast oncologists were obtained from the JBCS website. After confirmation of each physician's affiliation, anonymous paper surveys were sent out to all 843 breast oncologists by mail with a return

postage-paid envelope. The survey was sent out on 28 May 2010 and the mailed surveys postmarked by 31 July were included in the analysis. The consent from the participants was waived because of the anonymity of the survey. No honorarium was offered for completing the survey.

Data analysis

All analyses were conducted using IBM SPSS statistics version 18. Accuracy of knowledge about fertility was scored on the basis of four questions (A-1, 2, 3, 4, Table 1) concerning the standard knowledge about chemotherapy and the effect of chemotherapy on fertility. Respondents with appropriate knowledge were considered "accurate". Four questions (D-1, 2, 3, 5, Table 1) concerning the perspective and opinion about the fertility preservation were asked and scored as attitude score. Respondents were divided into "positive attitude group" and "negative attitude group" depending on the attitude score. Chi-square test was applied for correlation analysis between physician knowledge, attitude, and background. Physicians' background demographics, knowledge, and attitude regarding fertility issues were associated with physicians' practice behavior regarding fertility issues. Odds ratios (OR) and their 95% confidence interval (CI) were estimated to compare physician background factors, knowledge, and attitude with physician practice pattern, using simple and multivariable logistic regression models. All p values are two sided, and the statistical significance level was set at $p < 0.05$. No adjustments for multiple comparisons were considered because of the exploratory nature of this study.

Results

Response rate

The response rate was calculated as the number of breast oncologists completing the survey ($n = 434$) divided by the initial sample size minus undeliverable ($843 - 8 = 835$): this yielded a 52% response rate. This is higher than the previous survey on fertility preservation referral targeting oncology specialists in the USA [4].

Demographic and characteristics of responding breast oncologists

The background of respondents is shown in Table 2. A total of 16.6% of the respondents were female. More than 95% of the respondents were experienced physicians reflecting the requirement of basic board certification in general medicine, surgery, radiation oncology, or pathology in order to obtain JBCS Breast Oncologists certification. The majority was surgeons. Less than half responded that they have medical oncologists in their institutions. About 70% were the institutions in which they operated on less than five breast cancer patients per week (less than approximately 200 cases per year).

Association between knowledge, attitude, and physician background

Two hundred and seventy-nine (64%) respondents were considered to have accurate knowledge. Accuracy of knowledge about fertility was correlated with the number of young breast cancer patients treated ($p = 0.006$), presence of children of the physician ($p = 0.01$), age of the physician ($p = 0.019$), and the presence of female colleagues ($p = 0.019$).

The existence of a spouse/partner ($p = 0.011$), age ($p = 0.032$), and gender ($p = 0.023$) of the physician were the factors significantly correlated with a positive attitude toward fertility considerations of breast cancer patients. Physicians who have a spouse/partner, physicians who are younger than 50 years, and female physicians had more positive attitudes toward fertility issues for breast cancer patients.

Practice of fertility issues among breast oncologists

A total of 83% of the participants responded that they were positive in discussing fertility issues with young breast cancer patients.

Twenty-one percent responded that patients voluntarily bring up fertility issues in the clinic. Physicians who treat two or more young patients per week perceived that patients voluntarily express their concern in the clinic compared to physicians who treat fewer (OR 1.84, 95% CI 1.13–3.00, $p = 0.008$). Physicians who treat two or more young patients per week (OR 1.30, 95% CI 1.05–2.45, $p = 0.023$), who have board-certified nurse colleagues (OR 1.55, 1.19–2.03, $p < 0.001$) and have more than six breast surgeries per week (OR 1.20, 1.02–1.41, $p = 0.014$) responded that they perceived that patients talk to co-medical staff about their concerns about fertility. A total of 24% of the respondents consulted reproductive specialists when they encountered fertility problems in their patients and 42% referred patients to reproductive specialists when patients expressed concerns regarding fertility.

The association between physicians' behavior related to fertility issues and their knowledge, attitude, and background demographics are shown in Table 3. Fair knowledge had the strongest impact on physicians' positive behavior towards discussing fertility issue with patients. Positive attitude, presence of breast cancer-specialized CNS, young age, and female gender were also significant

Table 2 Demographic background of the responding physicians

	n	%
Total	434	100
Gender		
Female	72	16.6
Male	357	82.3
Unknown	5	1.2
Age		
20–29	1	0.2
30–39	52	12.0
40–49	183	42.2
50–59	148	34.1
60–69	41	9.4
70–	4	0.9
Unknown	5	1.2
Religion		
Buddhist	144	33.2
Christian	9	2.1
No special religion	276	63.5
Others	5	1.2
Year graduated from medical school		
–1994	347	80.0
1995–2000	76	17.5
2001–2005	6	1.4
Unknown	5	1.2
Specialty		
Surgery	412	94.9
Medical oncology	6	1.4
Radiation oncology	9	2.1
Gynecology	1	0.2
Others	6	1.4
Type of affiliation		
Cancer center	40	9.2
General hospital	190	43.8
University hospital	122	28.1
Private clinic	74	17.1
Unknown	8	1.8
Number of physicians		
1–3	164	37.8
4–7	137	31.8
8–	125	28.8
Unknown	8	1.8
Female physician colleague		
Present	276	63.6
Absent	150	34.6
Unknown	8	1.8
Medical oncologist		
Present	172	39.6
Absent	255	58.8
Unknown	7	1.6
Breast cancer specialized nurse		
Present	202	46.5
Absent	225	51.8
Unknown	7	1.6
Board-certified pharmacists		
Present	227	52.3
Absent	196	45.2
Unknown	11	2.5
Number of breast surgeries (per week)		
0–5	310	71.4
5–10	85	19.5
11–15	14	3.2
16–20	3	0.7
20–	14	3.2
Unknown	8	1.8
Number of patients aged <40 (per week)		
0–1	122	28.1
2–4	202	46.5
5–	103	23.7
Partner/spouse		
Present	401	92.4
Absent	25	5.8
Unknown	8	1.8
Children		
Present	351	80.9
Absent	64	14.7
Unknown	19	4.4

factors associated with positivity towards the discussion. Female oncologists and medical oncologists were more likely to take into account patients' social backgrounds such as history of childbirth, presence of a spouse/partner, and patients' economic status when discussing fertility issues.

Physicians with a positive attitude, physicians younger than 50 years, and female physicians were more likely to discuss fertility issues with patients with poorer prognoses. Positive attitude was the strongest factor related to consultation and referral to reproductive specialists.

Barriers for discussion with patients

High risk of disease recurrence (51%), lack of reproductive specialists or infertility clinic for referral (45%), and time constraints in the clinic (45%) were regarded as major barriers for discussing fertility issues. When only physicians who were negative in discussing fertility issues ($n = 69$) were analyzed, high risk of recurrence (57%), no signal of interest in fertility from patients (49%), and lack

Table 3 Factors associated with fertility-related practice behavior

	I discuss the impact of cancer treatment on future fertility with my patients				I do not feel comfortable discussing fertility issues with my patients				I take into account the history of childbirth when I discuss fertility issues with my patients			
	p	OR	95% CI		*p*	OR	95% CI		*p*	OR	95% CI	
			Min	Max			Min	Max			Min	Max
Knowledge												
Fair	0.000	1.717	1.321	2.231	0.063				0.799			
Not fair		1.000										
Attitude												
Conservative	0.012	1.000			0.180				0.697			
Aggressive		1.542	1.145	2.079								
Gender												
Female	0.005	1.166	1.080	1.258	0.807				0.022	1.130	1.041	1.227
Male		1.000								1.000		
Age												
<50	0.000	1.584	1.280	1.959	0.203				0.625			
>50		1.000										
Specialty												
Surgery	1.000				0.625				0.756			
Others												
Affiliation												
University hospital/cancer center	0.032	1.235	1.047	1.457	0.147				0.900			
General hospital/private hospital		1.000										
Female physician colleague												
Present	0.079				1.000				1.000			
Absent												
Medical oncologist colleague												
Present	0.432				0.366				0.043	1.190	1.003	1.141
Absent												
Breast cancer-specialized nurse												
Present	0.606				0.480				0.327			
Absent												
Board-certified cancer pharmacist												
Present	0.001	1.510	1.220	1.868	0.721				0.324			
Absent		1.000										
Number of breast surgeries per week												
1–5	0.884				0.692				0.495			
6–												
Number of young patients per week												
0–1	0.474				0.113				0.500			
2–												
Partner/spouse												
Present	0.281				0.008	1.000			0.193			
Absent						1.158	0.989	1.355				
Children												
Present	0.074				0.088				0.740			
Absent												

Table 3 continued

	I take into account whether she has a spouse/partner when I discuss fertility issues with my patients				I take into account economical status of the patient when I discuss fertility issues with my patients				I discuss fertility issues with breast cancer patients with high risk of recurrence			
	p	OR	95% CI		*p*	OR	95% CI		*p*	OR	95% CI	
			Min	Max			Min	Max			Min	Max
Knowledge												
Fair	0.839				0.609				0.910			
Not fair												
Attitude												
Conservative	0.601				0.694				0.001	1.000		
Aggressive										1.640	1.250	2.150
Gender												
Female	0.033	1.089	1.002	1.185	0.622				0.047	1.089	1.000	1.185
Male										1.000		
Age												
<50	0.326				0.267				0.003	1.391	1.131	1.712
>50												
Specialty												
Surgery	0.225				0.343				0.273			
Others												
Affiliation												
University hospital/cancer center	0.364				1.000				0.219			
General hospital/private hospital												
Female physician colleague												
Present	0.412				0.194				0.649			
Absent												
Medical oncologist colleague												
Present	0.022	1.206	1.032	1.408	0.043	1.261	0.996	1.596	1.000			
Absent		1.000				1.000						
Breast cancer specialized nurse												
Present	0.434				1.000				0.588			
Absent												
Board-certified cancer pharmacist												
Present	0.694				0.136				0.745			
Absent												
Number of breast surgeries per week												
1–5	0.125				0.262				0.903			
6–												
Number of young patients per week												
0–1	0.746				0.273				0.810			
2–												
Partner/spouse												
Present	0.299				0.192				1.000			
Absent												
Children												
Present	0.183				1.000				0.025	1.116	1.029	1.211
Absent										1.000		

Table 3 continued

	I ask co-medical staff if a patient has an interest in fertility				I provide my patients with educational material about fertility preservation				I use LHRH analogue to preserve fertility			
	p	OR	95% CI		*p*	OR	95% CI		*p*	OR	95% CI	
			Min	Max			Min	Max			Min	Max
Knowledge												
Fair	0.242				0.125				0.653			
Not fair												
Attitude												
Conservative	0.895				0.100				0.248			
Aggressive												
Gender												
Female	0.133				0.047	1.183	0.973	1.440	0.399			
Male												
Age												
<50	0.262				0.416				0.914			
>50												
Specialty												
Surgery	0.105				0.066				0.057			
Others												
Affiliation												
University hospital/cancer center	0.795				0.046	1.000			0.656			
General hospital/private hospital						1.671	0.959	2.911				
Female physician colleague												
Present	0.793				0.026	1.919	1.014	3.632	0.259			
Absent						1.000						
Medical oncologist colleague												
Present	0.443				0.407				0.381			
Absent												
Breast cancer-specialized nurse												
Present	0.316				0.871				0.516			
Absent												
Board-certified cancer pharmacist												
Present	0.900				0.325				0.663			
Absent												
Number of breast surgeries per week												
1–5	1.000				0.273				0.402			
6–												
Number of young patients per week												
0–1	0.583				0.721				1.000			
2–												
Partner/spouse												
Present	0.192				1.000				0.828			
Absent												
Children												
Present	0.614				1.000				0.156			
Absent												