A Reproductive Health Survey on Unintended Pregnancy in Yamagata, Japan: Feasibility of the Survey and Test-Retest Reliability and Validity of a Questionnaire

Aya Goto ^{1,2}, Seiji Yasumura ¹, and Akira Fukao,¹

We have designed a survey to investigate factors related to unintended pregnancy using a newly devised questionnaire. This pilot study was conducted to examine the feasibility of the study and the test-retest reliability and the validity of the questionnaire. Samples were 107 cervical and breast cancer screening participants aged 35-49 year-old in 1999 in Yamagata, Japan. The same questionnaires were mailed twice to examine the test-retest reliability. Women's medical records for cancer screening were used to examine the validity of the questionnaire. Ninety-six women agreed to participate in the study and 89.6% of them responded to the first survey. The agreements between two surveys were substantial to perfect for the nominal and ordinal data, and for the continuous data, the standard deviations (SDs) were less than 1 and the correlation coefficients were over 0.6. The comparison between medical record and questionnaire derived data showed perfect agreements for reproductive items except age at last birth (SD: 0.71, correlation coefficient: 0.97), and fair agreements for drinking and smoking habits. Obtaining information on unintended pregnancy by questionnaire is feasible, and the test-retest reliability and the validity of the questionnaire are satisfactory. Currently we are conducting a survey with a larger sample. *J Epidemiol*, 2000 ; 10 : 376-382

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INTRODUCTION

In Japan, the age-specific abortion rate for women under 20 years old is increasing and those for women in their thirties are as high as the rate for women in their twenties which is unique to the country ^{1,2}. The Ministry of Health and Welfare's (MHW) reproductive health research project presented recommendations in July 1999 in an attempt to reduce the number of induced abortions by half in the next ten years. For the development of effective family planning strategies, it is essential to collect data on reproductive health and to evaluate the quality of the obtained information. However, current abortion statistics are incomplete and the data on unintended pregnancies that lead to abortions are scarce in Japan.

There are only a few reports about unintended pregnancy, and a MHW's research project reported in 1996 that 26-34% of births were found to be unintended ³. According to the 11th

National Fertility Survey (NFS) in 1997, married women answered that they had planned to have a child only in 34% of the pregnancies after marriage ⁴. In addition, one previous study in Okinawa conducted in 1981 reported that 34% of women admitted having at least one unplanned pregnancy ⁵. Among available data, only the MHW's research projects used the standard demographic definition of unintended pregnancy ⁶, while the validity and reliability of previous questionnaires have not been fully examined.

We have designed a survey to examine the associations of the unintended pregnancy with the sociodemographic, reproductive and health behavioral factors. Proposed samples are 35-49 year-old women of target municipalities in Yamagata, Japan, who participate in cervical and breast cancer screenings during the study period. A reproductive health questionnaire including questions about unintended pregnancy was newly devised for the purpose of this study.

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¹ Yamagata University School of Medicine, Department of Public Health.

² Population Council, Vitenam.

Address for correspondence : Aya Goto, Tu Du Obstetrical and Gynecological Hospital, 284 Cong Quynh Street, District 1, Ho Chi Minh City, Vietnam.

Before carrying out a survey with a large sample, we conducted this pilot study to examine the feasibility of the study and the test-retest reliability and validity of the questionnaire. In developing the questionnaire, we used the standard demographic definitions of pregnancy intentions; *unintended pregnancy* consists of *mistimed pregnancy* which is wanted eventually but not until a later time and *unwanted pregnancy* which is not wanted at any time, and *intended pregnancy* is the one wanted at the time or sooner ^{7,8)}.

METHOD

1. Survey procedure of the pilot study

This pilot study was conducted using the same setting as designed for the main survey and the sub-sample of the main survey. The samples for this pilot study were all women aged 35-49 years old who resided in one of target municipalities for the main survey and who participated in the cervical and breast cancer screening at the cancer detection center in April of 1999. We explained about the study individually to all women and handed the questionnaires to those who agreed to participate in this pilot study. The self-administered questionnaires were collected either at the cancer detection center or by mail. Three cubicle areas where women could fill in the questionnaires in private were prepared at the center. We supplied reply pre-paid envelopes to those who brought the questionnaires home.

Basically the survey procedures were as same as those designed for the main survey except that the questionnaires were distributed twice in the pilot study to examine the test-retest reliability. The second questionnaires, which were exactly the same as the first ones, were sent to women who completed the first questionnaire with a 3-weeks interval. It was clearly explained to women that it was a pilot study to test the content of the questionnaire and the same questionnaire would be mailed for the second time. The questionnaires were not handed to women who did not agreed to the explanation of this pilot study.

The validity of the questionnaire especially for the past reproductive health events was difficult to assess. However, we examined the concurrent validity of selected items by comparing the data obtained from the first survey with that from women's medical records, which were presumably more accurate source considered to be the standard ^{9,10)}. The medical records were taken by nurses at the cancer detection center, and sociodemographic, reproductive and health behavioral items were abstracted along with women's ID numbers used at the center. Agreements of answers to the following common questions in our questionnaires and medical records were examined: current menstruation, current oral contraceptives (OC) and intrauterine device (IUD) usage, the number of live births, age at last birth, and smoking and drinking habits.

The women's ID numbers for cancer screening were used as survey numbers. This enabled us to send the second question-

naires to the respondents of the first survey and also to utilize the medical records derived data to examine the validity of the questionnaire. We obtained permission from both the target municipalities and the cancer detection center to obtain the list of women's ID numbers along with their names and addresses for the above purposes. The list was stored under lock and key separately from the collected questionnaires and destroyed at the end of this pilot study.

2. Questionnaire

The questionnaire requested sociodemographic, general health, and reproductive health information. Reproductive health items included information on all pregnancies that the women experienced and their current mode of contraceptive usage. Women were not asked to identify themselves in the questionnaires to ensure anonymity.

A question to assess the intention of each pregnancy was developed based on the definitions of intended, mistimed, and unwanted pregnancies used in the National Survey of Family Growth in the United States ⁸⁾. The response categories to the question of pregnancy intention were as follows: (1) the pregnancy was at the right time, (2) the pregnancy was too soon, (3) I wanted a child but the pregnancy was too late, (4) I did not want to have a (any more) child even in the future. We classified 1 and 3 as intended, 2 as mistimed, and 4 as unwanted.

We assumed that all currently married women were engaged in sexual relation with their husbands, and asked about the current contraceptive practice to married women who were premenopausal and did not plan to become pregnant. Women who used more than one method were classified according to the method known to be more effective in preventing pregnancy, using the following ranking - male sterilization; female sterilization; IUD; OC; condom, and spermicides, rhythm or withdrawal ¹⁰⁾.

3. Statistical Analysis

All data were entered into a computer and analyzed using the statistical software STATA version 6 for Macintosh. For the analysis of agreement between the first and the second questionnaire, the kappa statistics were calculated for the following nominal and ordinal data in addition to the percent agreement: marital status, education, occupation, annual income, experience of unintended pregnancies, menstruation, method of contraception, and health behaviors. Reports of those nominal and ordinal items formed simple dichotomies following the categorization that would be used for the analysis of factors related to unintended pregnancies in the main study ¹²⁾. To evaluate the kappa values, we adopted the criteria proposed by Lands and Koch: below 0.00 as poor, 0.00-0.20 as slight, 0.21-0.40 as fair, 0.41-0.61 as moderate, 0.61-0.80 as substantial, and 0.81 or higher as almost perfect ¹³⁾.

As for the continuous data, the means and the standard devi-

ations (SDs) of the differences between the first and the second answers were calculated in addition to the Spearman's rank correlation coefficients^{12, 14}. We calculated two types of percent agreements; exact agreement and agreement within one year difference, for ages at first marriage, menarche, sexual debut, and last birth. The exact agreement was not shown for ages of women and husbands at the time of survey, since one year difference could be observed for those whose birthdays came between the first and the second survey.

In addition to the analysis of test-retest reliability by individual women, discrepancies of intention status at the each pregnancy level between the first and the second survey were examined¹⁵. All pregnancies that women reported in their questionnaires were pooled and analyzed. We excluded pregnancies whose intention status were missing either / both in the two surveys from the analysis. The kappa statistics was calculated to see the test-retest reliability of the intention status at the pregnancy level. We also examined if the length of time since pregnancy differed between two groups of pregnancies with concordant and discordant intention status between the two surveys. The length of time since each pregnancy was calculated by subtracting age at the pregnancy from women's age at the time of survey, and the t test was used for the analysis.

Lastly, for the analysis of agreement between the data obtained from women's medical records and the questionnaires, the same statistical methods as in the analysis of test-retest reliability were used. In addition to the percent agreement, we calculated the kappa statistics for nominal items. For continuous items, the Spearman's rank correlation coefficients and the means and SDs for differences between the data in medical records and questionnaires were calculated.

RESULTS

1. Response rate for the first survey

We explained about the study to 107 women. Eleven women (10.3%) refused from the start to participate in the study, so we handed the questionnaires to the remaining 96 women. The number of respondents was 86 and the response rate for the first survey was 89.6% (86 / 96). Among those respondents, 72.1% filled the questionnaire at the cancer detection center.

2. Test-retest reliability

Sixty-six out of 86 respondents (76.7%) to the first questionnaire responded to the second questionnaire and their data were used to examine the test-retest reliability. The percent agreements, kappa values, the means and the SDs for the differences between the two answers, and correlation coefficients are shown in Table 1. The number of pairs of answers for each item differs because of missing data in either the first or the second questionnaire.

The percent agreements for most items were over 85%. Although the percents of exact agreement were under 80% for

age at menarche, sexual debut, and last birth, that for agreement within one year of difference was higher than 90%. The SDs for the continuous data were less than 1, which meant that those items could be reproduced within the difference of 2 years or 2 pregnancies in 95% of the cases. The correlation coefficients were over 0.6 for all continuous items. The kappa values for nominal and ordinal items showed a substantial to perfect agreement.

To understand the further extent of the discrepancy of the pregnancy intention between the two surveys, the issue was examined at the each pregnancy level by comparing answers for 150 pregnancies whose intention status was reported both in the first and the second questionnaire. The detailed distribution of the intention status for each pregnancy in the first and the second questionnaire is shown in Table 2. The percent agreement of the intention status of each pregnancy (intended, mistimed or unwanted) was 86.0% and the kappa was 0.72 indicating a substantial agreement.

It was noted that the intention status of 15 pregnancies moved between the unintended and intended categories. We found that 10 out of those 15 discordant pairs (66.7%) ended in live births. In comparison, the proportion of pregnancies resulted in live births was 35.7% for pregnancies whose intention status were both unintended in the first and the second survey. The proportion was 93.3% for those whose intention status was intended in two surveys. In addition, the length of the time since pregnancy did not differ between discordant and concordant pairs; the mean was 19.2 years for discordant and 20.3 years for concordant pairs ($p = 0.41$).

3. Validity

The data obtained from the medical records and the questionnaires were compared for 86 respondents of the first survey. The percent agreements, kappa values, the means and the SDs of the differences between the two data, and correlation coefficients are shown in Table 3. The number of pairs for each item differs because of missing data in either the medical record or the questionnaire.

Current menstruation, OC or IUD usage, and the number of live births had perfect agreements. Although the percent of exact agreement was 54.4% for age at last birth, that of agreement within one year of difference was 93.7%, and the SD and the correlation coefficient were 0.71 and 0.97, respectively. The agreements for drinking and smoking habits were relatively low among studied items and the kappa statistics showed fair agreements.

DISCUSSION

We have shown the feasibility of this reproductive health survey on unintended pregnancy. The study has further provided new evidence on the test-retest reliability and the validity of a questionnaire including questions about pregnancy intention,

Table 1. Test-retest reliability of the questionnaire.

Item	N	Percent agreement	Kappa statistics ^a		Difference ^b		Correlation coefficient ^c
			Kappa	95%CI	Mean	SD	
Sociodemographic items							
Age:							
exact agreement ^d	63	—			-0.05	0.38	0.99
agreement within one year of difference	63	98.4					
Marital status (married / divorced)	66	100.0	1.00	0.76 – 1.24			
Age at first marriage							
exact agreement	65	89.2			-0.05	0.33	0.99
agreement within one year of difference	65	100.0					
Education (up to high school / higher)	64	96.9	0.93	0.69 – 1.17			
Occupation (working / not working)	64	95.3	0.88	0.64 – 1.12			
Annual income (<3 million yen / higher ^e)	39	97.4	0.87	0.56 – 1.18			
Soiodemographic items of husband							
Age:							
exact agreement ^e	64	—			-0.06	0.47	0.98
agreement within one year of difference	64	98.4					
Education (up to high school / higher)	63	96.8	0.91	0.66 – 1.16			
Occupation	63	93.7	0.84	0.59 – 1.09			
(professional or managerial / others)							
Annual income (<5 million yen / higher ^e)	57	86.0	0.71	0.46 – 0.96			
Reproductive health items							
Age at menarche:							
exact agreement	59	78.0			-0.02	0.57	0.89
agreement within one year of difference	59	91.5					
Age at sexual debut:							
exact agreement	63	71.4			-0.17	0.91	0.94
agreement within one year of difference	63	98.4					
Total number of pregnancies	64	92.2			0.02	0.28	0.95
Number of live births	64	100.0			0.00	0.00	1.00
Number of miscarriages or still births	64	100.0			0.00	0.00	1.00
Number of abortions	64	92.2			0.02	0.28	0.88
Age at last birth:							
exact agreement	55	76.4			-0.04	0.72	0.97
agreement within one year of difference	55	98.2					
Experience of unintended pregnancies (yes / no)	56	87.5	0.75	0.50 – 1.00			
Number of mistimed pregnancies	53	86.8			-0.04	0.44	0.78
Number of unwanted pregnancies	53	88.7			-0.08	0.51	0.63
Total number of unintended pregnancies	53	81.1			-0.04	0.59	0.79
Menstruation (pre- / post-menopause or no menstruation for other reasons)	65	95.4	0.82	0.58 – 1.06			
Present usage of contraception (yes / no)	50	92.0	0.77	0.50 – 1.04			
Present method of contraception (traditional / modern method ^f)	37	97.3	0.84	0.53 – 1.15			
Health behavioural items							
Subjective health (excellent or good / fair or poor)	65	98.5	0.90	0.66 – 1.14			
Smoking habit (current or ex- / non-smoker)	66	98.5	0.91	0.67 – 1.15			
Drinking habit (everyday or sometimes / seldom)	65	93.9	0.87	0.63 – 1.11			
Visit gynaecologists without hesitation when needed (yes / no)	65	95.4	0.87	0.63 – 1.11			

a. P=0.0. CI : confidence interval

b. First minus second answer.

c. P=0.0. Spearman's rank correlation coefficients are shown.

d. The exact agreement is not shown because their birthdays may have come between the first and the second survey causing one year difference.

e. This item was asked only to those who had jobs.

f. This item was asked only to married pre-menopausal women. The traditional method includes rhythm method, basal body temperature method and coitus interrupt. The modern method includes condom, OC, IUD, and female / male sterilization.

which have seldom been studied before in Japan.

Nearly 90% of women agreed to participate in the study, and the response rate was also as high as 90%. Considerable efforts were made to maximize the acceptance of the survey because of a concern that women might find detailed reproductive history questions offensive and refuse to participate. Cervical and breast cancer screening participants were selected as samples because they were used to give reproductive health information for cancer screening and their level of resistance to our survey was thought to be lower than community samples. We employed a self-administered questionnaire which was likely to yield accurate data on sensitive topics¹⁶⁾, ensured women's anonymity, and explained about the survey individually. Among previous studies on unintended pregnancy in Japan, the one conducted in Okinawa showed the highest response rate (92%), and they collected self-administered questionnaires right at the place where those had been distributed⁹⁾. Thus, we prepared the cubicle areas for women to fill in the questionnaire at the cancer detection center. The response rate obtained in this pilot study was higher than those in two mail surveys conducted by the MHW's research groups (76% and 67%) and close to that in the Okinawa study^{3, 5)}.

A common criticism for surveys including sensitive items is

a volunteer bias, which affects the generalizability of the obtained data. Several sexuality studies reported that volunteers were more sexually experienced, and one study reported that women with a history of higher number of live births were included in non-respondents^{17, 18, 19)}. One study by Nagata C. and colleagues examined the non-response bias to a mail survey in Japan and reported that significantly less smokers and drinkers were included in the respondent group²⁰⁾. Those differences between respondents and non-respondents might possibly been seen in our study. A study to assess a volunteer bias in a reproductive health survey like ours is recommended in future studies.

There have been many studies on the test-retest reliability of the dietary, drinking and smoking habits^{21, 22)}, but a little attention has been paid to that of the reproductive health survey in Japan. In the present study, we demonstrated a high reproducibility for reproductive health items as well as for sociodemographic and health behavioral items.

Among the examined reproductive health items, relatively lower agreement was observed for women's experience of unintended pregnancy and the number of mistimed and unwanted pregnancies. This could be explained in two ways. Firstly, the demographic conceptualization of intendedness of pregnancy is based on the ideas of anticipated pregnancy timing and may differ from women's complex mixed feelings²³⁾. Especially in a country like Japan, where only one third of pregnancies are estimated to be planned ones⁴⁾, women might be unfamiliar with the idea of the pregnancy planning. Secondly, many of the pregnancies that moved between the intended and the unwanted / mistimed categories were live births. It is possible that some women may try to rationalize unintended pregnancies as intended ones once the children are born²⁴⁾. We further examined that if a longer length of time since pregnancy caused women to give discordant answers to the pregnancy intention question in the first and the second sur-

Table 2. Agreement of pregnancy intention between the first and second survey.

First survey	Second survey			Total
	Intended	Mistimed	Unwanted	
Intended	<i>107^a</i>	7	2	116
Mistimed	2	<i>19</i>	0	21
Unwanted	4	1	<i>8</i>	13
Total	113	27	10	150

a. The numbers of concordant pairs whose intention status was intended and unintended in both surveys are indicated in italics.

Table 3. Agreement between the medical record and the questionnaire.

	N	Percent agreement	Kappa statistics ^a		Difference ^b		Correlation coefficient ^c
			Kappa	95%CI	Mean	SD	
Reproductive health items							
Current menstrual (pre / post-menopause)	86	100.0	1.00	0.78 – 1.22			
Current OC or IUD usage (yes / no)	52	100.0	1.00	0.73 – 1.27			
Number of live births	85	100.0			0.00	0.00	1.00
Age at last birth:							
exact agreement	79	54.4			0.46	0.71	0.97
agreement within one year of difference	79	93.7					
Health behavioural items							
Current drinking habit (yes / no)	86	72.9	0.39	0.19 – 0.59			
Current or past smoking habit (yes / no)	85	91.9	0.21	0.07 – 0.35			

a. P=0.0. CI : confidence interval.

b. Medical record minus questionnaire derived data.

c. P=0.0. Spearman's rank correlation coefficients are shown.

vey. However, the time since pregnancy did not differ between two groups of pregnancies with concordant and discordant intention status.

Another item that showed relatively lower agreement was the husband's annual income. Some women mentioned that they were not exactly sure about their husbands' income when filling the questionnaire. As for the health behavioral items, one previous self-administered survey in Japan showed that the percent agreements for drinking and smoking habit were 82% and 99%, respectively, for females, and our results were comparable to these data ²¹.

We assumed that accurate information was reported in the medical record and examined the validity of our questionnaire by analyzing the agreements between the medical record and questionnaire derived data. As mentioned before, the data in women's medical records were self-reported and past events like the reproductive history especially were collected retrospectively. Thus, it should be noted that the medical records were not a perfect source of information. Agreements were good for reproductive items: current menstruation, current OC or IUD usage, number of births, and age at last birth. Previous similar studies also reported a high agreement for the number of live births ^{25, 26}. One study compared women's recall with prenatal records and proved that the number of births and age at births were recalled with accuracy even over extended periods of time ²⁷.

The relatively lower agreements for smoking and drinking were due to the higher proportions of women who reported drinking and smoking habits in our questionnaires. One possible reason is that occasional drinkers and smokers did not report their habits in medical records because health effects of those intermittent habits were perceived to be lower ²⁸. One survey on smoking and drinking habit during pregnancy found that higher proportion of women reported those habits in postal questionnaires than in medical records. They concluded that the anonymity of the postal questionnaires might have provided higher estimates ²⁹, and the same explanation might stand for our study.

This is the first survey conducted in Japan to examine the test-retest reliability and the validity of a questionnaire in a reproductive health survey including pregnancy intention questions. In summary, obtaining information on unintended pregnancy by questionnaire is feasible, and the test-retest reliability and the validity of the questionnaire are satisfactory. Currently we are conducting a survey with a larger sample using this examined questionnaire.

Only in 1999 did Japan approve the low-dose OC ⁴, copper-bearing IUD, and female condom. Whether those approvals will reduce the rate of unintended pregnancies remains to be seen. This will depend in part on whether health policy and planning are based on analysis and on recognition of women's health needs. The results of our on-going study will reveal the factors related to unintended pregnancy and contribute to the

development of effective strategies to help women become more aware of their fertility.

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