Reproducibility of an Interview Questionnaire on Sexual Behavior in Japanese Middle-aged or Elderly Males

Kazuya MIKAMI^{*1}, Shuichi NAKAGAWA^{*1}, Hiroki WATANABE^{*1},
Kotaro OZASA^{*2} and Yoshiyuki WATANABE^{*2}

^{*} Department of Urology, Kyoto Prefectural University of Medicine, Kyoto

^{**} Department of Preventive Medicine, Kyoto Prefectural University of Medicine, Kyoto

Abstract

The reproducibility of an interview questionnaire on sexual behavior in Japanese males was estimated with the use of Spearman's rank correlation coefficient (r) and kappa coefficient. The subjects were 151 males aged 50 years or older (mean age = 63.6 years old) in a rural town of Hokkaido Prefecture, Japan, who participated in a consecutive mass screening for prostatic diseases at a one-year interval after their first participation during the period 1988-1993. They were individually interviewed about their sexual behavior by well-trained urologists who were supervised by one of the authors.

A remarkably good reproducibility level at the one-year interval was shown among the questions about age at first marriage ($r = 0.92$), age at which first sexual intercourse was experienced ($r = 0.80$), and age at which sexual intercourse was no longer practiced ($r = 0.87$). The reproducibility of the questions about frequency of sexual intercourse when they were in their 30s, 40s and 50s was fair ($r = 0.2-0.6$), and that of the questions regarding the frequency in their 60s was poor ($r < 0.2$). However, there were rare extreme differences in answers of this frequency between the two interviews. In conclusion, the reproducibility of the questionnaire on sexual behavior in Japanese middle-aged or elderly males was considered to be satisfactory.

Key words: Sexual behavior, Interview questionnaire, Reproducibility, Reliability.

Introduction

Several authors have reported aspects of engaging in sexual behavior contribute to the risk of developing prostatic diseases.¹⁻⁵⁾ A case-control study for prostatic cancer using an interview questionnaire by our group²⁾ showed that risk factors related to sexual behavior were as follows: 1) having first sexual intercourse in younger age (relative risk (RR) = 2.50), 2) having relatively frequent sexual intercourse at 15-20 years of age (RR = 2.19), and 3) having relatively infrequent sexual intercourse at 60-69 years of age (RR = 2.17) or at 70-79 years of age (RR = 4.00). A case-control study for benign prostatic hypertrophy³⁾ also showed that having relatively frequent sexual intercourse was a possible risk factor (RR = 1.37 among subjects aged 30-39 years old, RR = 1.42 among 40-49, RR = 1.58 among 60-69, RR = 1.35 among 70-79, but all were not significant). The meta-analysis of the association of prostatic cancer with sexual behavior conducted by Key⁴⁾ supported these findings.

We have been conducting a mass screening for prostatic diseases since 1981⁶⁾, and all of the data were collected through an interview questionnaire. Questions for the present study were selected from the original 111 items which were used in our previous case-control study for prostatic cancer.²⁾ The questions consisted of an item on job, an item on past medical history, 2 items on smoking and drinking habits, 4 items on diet, and 7 items on sexual behavior. Another case-control study for benign prostatic hypertrophy (BPH) was conducted using these data,⁷⁾ and those results showed that possible risk factors for BPH were as follows: 1) having first sexual intercourse at a young age (RR = 1.16), 2) first marriage at a young age (RR = 1.18), and 3) having relatively frequent sexual intercourse (RR = 1.10 among subjects aged 30-39 years old, RR = 1.16 among 50-59, RR = 1.46 among 60-69).

In addition to studies of urological diseases, sexual behavior among males has recently been measured for studies concerning acquired immunodeficiency syndrome (AIDS)⁸⁾ in Western countries.

It is very important and also difficult to evaluate the reliability of sexual behavior information surveyed in such studies because most subjects appear not to want the details about their sexual behavior to be known. There have been few studies evaluating the reliability of such information, including that obtained in the

Reprint requests to: Kazuya Mikami
Department of Urology, Kyoto Prefectural University of Medicine
Kawaramachi Hirokoji Kamigyo-ku, Kyoto 602, Japan

recent studies for AIDS. Reliability is often evaluated as an aspect of reproducibility measured by the test-retest method.⁹⁾ Therefore, we evaluated the reproducibility of male sexual behavior by comparing the data of two interviews conducted at a one-year interval as part of a mass screening.

Materials and Methods

An annual mass screening for prostatic diseases was performed for men aged 50 years or older in a rural town of Hokkaido Prefecture, Japan, from 1988 to 1993. A total of 701 men first visited the screening during this period, and 151 of them participated again in the next-year screening. The present study subjects were these 151 males who participated in the consecutive screening at a one-year interval after their first visit. The distribution of the ages of the subjects varies from 50 to 86 years old (mean age = 63.6 years old, Table 1).

An interview about sexual behavior and other lifestyle parameters was conducted prior to the prostatic examination in each screening. The interviewers were nine well-trained urologists, supervised by one of the authors (S.N.) who also conducted interviews throughout the screening period. The subjects were interviewed individually for 5 to 10 minutes. The interview covered job information, past medical history, smoking and drinking habits, dietary habits, and sexual behavior including the items listed in Appendix. If the subjects described the frequency of sexual intercourse in terms of per week or day, the frequency was converted to times per month. For example, an answer that the subject had engaged in sexual intercourse every day was recorded as 30 times per month.

For evaluating reproducibility, the Wilcoxon signed-rank test and Spearman's rank correlation coefficient¹⁰⁾ were used for the variables "age at first marriage," "age at which first sexual intercourse was experienced," and "age at which sexual intercourse was no longer practiced." The frequency of sexual intercourse was divided into quintiles (0-4/month, 5-8/month, 9-16/month, 17-28/month, and 29+/month), and then Spearman's rank correlation coefficient and kappa coefficient¹¹⁾ were calculated. Spearman's rank correlation coefficient was used because the data of age and frequency are least-order variables and are not under a normal distribution. The kappa coefficient can compensate for the inadequacy of Spearman's coefficient when the distribution of subjects is extremely biased. For example, in the case of extreme misclassification of the sexual intercourse frequency, some respondents answered 0-4/month at the first interview and 17-28 or 29+/month at the second, or vice versa.

Results

The average "age at first marriage" and "age at which first sexual intercourse was experienced" were 27.2 years of age (S.D. = 2.7) and 24.2 years (S.D. = 3.5), respectively at the first interview (Table 2). At the second interview, they were 27.3 years (S.D. = 2.8) and 24.0 years (S.D. = 3.4), respectively. "Age at which sexual intercourse was no longer practiced" was evaluated only for the 21 subjects who answered at the first interview that sexual intercourse was no longer practiced. The average age was 60.3 years (S.D. = 7.4) at the first interview and 60.8 years (S.D. = 10.7) at the second. There were no significant differences between answers at the two interviews for all of these variables. Spearman's rank correlation coefficient for "age at first marriage" between the two interviews was 0.92 ($p < 0.01$), and that for "age at which first sexual intercourse was experienced" was 0.80 ($p < 0.01$), while that for "age at which sexual intercourse was no longer practiced" was 0.87 (n.s.; not significant). Breaking down the subjects into age-specific groups of the respondents (50-59, 60-69, 70+ years old at the first interview), the coefficient for "age at first marriage" was the highest among respondents in the 50s, but the coefficient for "age at which first sexual intercourse was experienced" was the lowest in this age group.

The age-specific distribution of the frequency of sexual intercourse per month reported at the first interview is shown in Table 3. The frequency was lower in their older age. For example, most respondents reported that they engaged in sexual intercourse 4 or fewer times a month in their 60s.

Table 4 shows the Spearman's rank correlation coefficients (r) and kappa coefficients (κ) between the two interviews for the frequency of sexual intercourse in the respondent's 30s, 40s, 50s, and 60s. The coefficients for the frequency in their 30s and 40s among respondents now in their 50s were smaller, with $r = 0.24$ (n.s.) and $\kappa = 0.04$ (n.s.) in their 30s, and $r = 0.24$ (n.s.) and κ

Table 1 Age distribution of subjects who participated consecutively twice in an annual mass screening for prostatic diseases in a rural town of Hokkaido Prefecture, Japan.

Age (years old)	Number of cases (%)	
50-59	41	(27)
60-69	89	(59)
70-79	18	(12)
80+	3	(2)
Total	151	(100)

Table 2 Mean and standard deviation (S.D.), and Spearman's correlation coefficient (r) of ages at which sexual behavior was experienced.

	Age of respondents ¹⁾ (years old)		1st interview Mean $\pm$ S.D. (years old)	2nd interview Mean $\pm$ S.D. (years old)	r
Age at first marriage	50-59	(n = 41)	27.5 $\pm$ 2.6	27.5 $\pm$ 2.3	0.99**
	60-69	(n = 89)	27.0 $\pm$ 2.9	27.1 $\pm$ 3.0	0.91**
	70+	(n = 21)	27.4 $\pm$ 2.5	27.0 $\pm$ 2.4	0.83**
	Total	(n = 151)	27.2 $\pm$ 2.7	27.3 $\pm$ 2.8	0.92**
Age at which first sexual intercourse was experienced	50-59	(n = 41)	24.0 $\pm$ 3.4	23.1 $\pm$ 3.3	0.68**
	60-69	(n = 89)	24.0 $\pm$ 3.5	24.1 $\pm$ 3.4	0.85**
	70+	(n = 21)	25.4 $\pm$ 3.3	25.4 $\pm$ 3.3	0.81**
	Total	(n = 151)	24.2 $\pm$ 3.5	24.0 $\pm$ 3.4	0.80**
Age at which sexual intercourse was no longer practiced	Total	(n = 21)	60.3 $\pm$ 7.4	60.8 $\pm$ 10.7	0.87

¹⁾ Age of respondents at the first interview, ** $p < 0.01$

Table 3 Distribution of frequency of sexual intercourse.

Age at which sexual intercourse was engaged in (years old)		Frequency (times per month)				
		0 - 4	5 - 8	9 - 16	17 - 28	29 +
30 - 39	(n = 151)	16 (11%)	38 (25%)	70 (46%)	15 (10%)	12 (8%)
40 - 49	(n = 151)	38 (25%)	51 (34%)	53 (35%)	6 (4%)	3 (2%)
50 - 59	(n = 151)	107 (71%)	32 (21%)	9 (6%)	2 (1%)	1 (1%)
60 - 69	(n = 105)	95 (90%)	7 (7%)	3 (3%)	0 (0%)	0 (0%)

Table 4 Spearman's rank correlation coefficient (r) and kappa coefficient (κ) of frequency of sexual intercourse between the two interviews.

Age at the first interview (years old)	Age at which sexual intercourse was engaged in (years old)							
	30 - 39		40 - 49		50 - 59		60 - 69	
	r	κ	r	κ	r	κ	r	κ
50 - 59 (n = 41)	0.24	0.04	0.24	0.18*	0.40*	0.38**	-	-
60 - 69 (n = 89)	0.43**	0.30**	0.34**	0.22**	0.21*	0.18*	-0.04	-0.36
70 + (n = 21)	0.55**	0.35**	0.42+	0.14	0.33	0.29*	-0.14	-0.08
Total (n = 151)	0.41**	0.24**	0.33**	0.20**	0.29*	0.25**	-0.14	-0.05

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Appendix. Interview questionnaire items concerning sexual behavior.

1. (If married) At what age did you first marry ?	_____	years old
2. How old were you when you experienced sexual intercourse for the first time?	_____	years old
3. How often did you usually have sexual intercourse in your thirties ?	_____	per month
4. How often did you usually have sexual intercourse in your forties ?	_____	per month
5. How often did you usually have sexual intercourse in your fifties ?	_____	per month
6. How often did you usually have sexual intercourse in your sixties ?	_____	per month
7. (If you no longer engage in sexual intercourse) How old were you when you stopped having sexual intercourse ?	_____	years old

= 0.18 ($p < 0.05$) in their 40s, while those for the frequency in their 50s were greater with $r = 0.40$ ($p < 0.05$) and $\kappa = 0.38$ ($p < 0.01$). On the other hand, the coefficients for the frequency in their 30s among the respondents now in their 60s ($r = 0.43$, $\kappa = 0.30$; $p < 0.01$) and 70 or older ($r = 0.55$ and $\kappa = 0.35$, $p < 0.01$) were greater. The coefficients in the older age ranges were rather small. In fact, the coefficients in their 60s among the respondents now in their 60s and 70s were not significant at all. As for extreme misclassification, there were three respondents who reported the lowest quintile (0-4/month) at the first interview and the highest quintiles (17-28 or 29+/month) at the second, and only one respondent provide answers in the reverse pattern.

Discussion

Surveys on sexual behavior have rarely been conducted in Japan, and we thus only can compare our results to those obtained in other countries. Such studies have only been performed in Western countries,¹²⁻¹⁵ and most of them reported that the frequency of sexual intercourse was maximum when the subjects were in their 20s or 30s and later decreased. Our results are fairly consistent with these previous reports. However, there are difficulties in comparison since different countries may have different views of sexual behavior.

Evaluating the reliability and validity⁹⁾ of a questionnaire is very important to the collection of data on sexual behavior as in any epidemiological survey. It is difficult to evaluate the validity of these data because most of the data are about behavior in the past that cannot be verified. The reproducibility of questionnaires on lifestyle, e.g., dietary habits,¹⁶⁻¹⁸ usually encompasses both the stability of the subject's lifestyle and the reliability of the subject's

answer. Our present study, however, is thought to evaluate reliability in the main because most of the items on the questionnaire were about past behavior which had not changed between the two interviews in the test-retest method.

There have recently been several studies on sexual behavior to evaluate the risks for AIDS⁸⁾ and on the reproducibility of such data.^{19,20)} These reports cannot be compared with our study because their subjects were much younger and the items on the questionnaires concerned mainly the number of sexual partners, condom use, unlike the items in our interview questionnaire. Moreover, the test-retest intervals of those reports were as short as a few months, though many reports showed good reproducibility. For example, De Irala et al.¹⁹⁾ reported generalized kappa coefficient as 0.85 on sexual activity in 3 months prior to admission, 0.85 on subjects reporting sexual activities at admission, 0.83 on number of opposite sex or male same-sex partners, 0.91 on any drug-injecting sexual partners, and 0.72 on condom use.

Good reliability is one of the most important points for collecting data on sexual behavior for case-control studies of prostatic diseases, as in any epidemiological study. Pfeiffer¹⁴⁾ recommended that the interviewer must be comfortable with the notion that aged persons could continue to have or desire an active sexual life and that the interviewer should communicate his acceptance of this fact to elderly respondents. We had well-trained urologists interview the subjects of this study individually because they are well aware of such behavior and the desires of aged males. Unfortunately, we were unable to evaluate the reliability of individual interviews because the questionnaires of this study were not marked with the interviewer's name.

The level of Spearman's rank correlation coefficient which

presents good reproducibility has not been established. Some reports about dietary habits suggested that a coefficient above 0.6 is "good" and that below 0.2 is "poor".¹⁶⁻¹⁸⁾ Our study followed this guideline, but a higher level may be more appropriate since most items on our questionnaire concerned past behavior.

The Spearman's coefficients of all variables answered regarding age (i.e., age at first marriage, age at which first sexual intercourse was experienced, and age at which sexual intercourse was no longer practiced) between the two interviews were above 0.6, suggesting that the reproducibility of these items was good and that of "age at first marriage" among the respondents now in their 50s was outstanding ($r = 0.99$). However, the reproducibility of the "frequency of sexual intercourse" answers was not too good. The Spearman's coefficients of all items of "frequency of sexual intercourse" were below 0.6 and some were below 0.2. The kappa coefficients of these corresponded to the Spearman's coefficients with few exceptions. In fact, there were only 4 respondents (of 151) who met the definition of extreme misclassification. Therefore, it seemed that answers regarding the frequency of sexual intercourse

did not agree exactly, but not differ too much between the two interviews. The interview questionnaire was thus concluded to be satisfactory to be used in evaluating sexual behavior variables as risk factors for prostatic diseases, because such variables were shown to be risks.

In our study, the reliability of individual interviewers could not be evaluated. However, the overall reliability in our study implied an assessment of the individual interviewers. Since the reliability was almost satisfactory, it was possible to believe that the reliability of individual interviewers was well within acceptable limits.

Good reproducibility was shown in the variables "age at first marriage", "age at which first sexual intercourse was experienced", and "age at which sexual intercourse was no longer practiced". The reproducibility of the variables "frequency of sexual intercourse" was fair or poor, but the extreme misclassification was rare. Therefore, the reproducibility of the questionnaire on sexual behavior in middle-aged or elderly Japanese males was considered to be satisfactory.

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