



Original Article

## Difference between tablet methods and paper questionnaire methods of conducting a survey with community-dwelling elderly

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**Abstract.** [Purpose] This study aimed to develop a tablet app that emulates paper questionnaires used in clinical care, and to verify the difference between the utility of tablet survey methods and paper questionnaire methods with elderly people. [Subjects and Methods] A tablet app was developed in the Java language. A questionnaire was provided to 30 community-dwelling elderly people. The subjects were randomly allocated to the group responding on the tablet (tablet group) or that responding to a paper-based questionnaire (questionnaire group). Assessed items included response time to questions, whether or not they had queries regarding the survey, and data input time. For the tablet group, a questionnaire was conducted regarding the operability of the tablet. [Results] There was no difference in response time between the two groups. Significantly more people in the tablet group had queries regarding the survey. Data input time was 426 seconds for the tablet group and 1268 seconds for the questionnaire group. In the survey regarding tablet operability, there were no negative opinions about the visibility of the screen. [Conclusion] Tablets can be used with elderly people to shorten the data input time. The present findings suggested that tablet surveys could be effective for a large-scale investigation.

**Key words:** Tablet survey, Paper questionnaire, Elderly

(This article was submitted Aug. 14, 2017, and was accepted Sep. 4, 2017)

### INTRODUCTION

Questionnaires are used in several clinical arenas<sup>1–4)</sup>. When paper-based questionnaires are used for a large-scale survey, it sometimes takes a long time to input scores and data. Online questionnaire surveys and tablet surveys are now being used more commonly<sup>5–7)</sup>, but elderly people have difficulty in operating online surveys or it is difficult to read surveys on tablets<sup>8)</sup>. Few studies in the medical field have tried to use a tablet app for elderly people. Therefore, this study aimed to develop a tablet app that emulates paper questionnaires used in clinical care, and to verify the difference between the utility of tablet survey methods and paper questionnaire methods with elderly people.

### SUBJECTS AND METHODS

A tablet app was developed in the Java language. The researchers held several meetings and preliminary experiments with research collaborators and completed the final version of the tablet app. The built-in survey items included a basic health

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check list for those over 65 years old, as well as items related to frailty, 15 items of the Geriatric Depression Scale, nutrition, and disease history. By starting the app, users can select the assessment items following each question. After responding to the selected assessment items, CSV data can be output onto the desktop screen automatically. The tablet used for the survey was 10.1-type Lenovo MIX3. The letter size displayed on the screen ranged from 8 mm to 20 mm.

Subsequently, a survey was conducted to verify tablet app operability. A questionnaire was provided to 30 community-dwelling elderly people living in Ohta-ku, Tokyo prefecture, Japan. It comprised a basic health check list for those over 65 years old and items related to frailty. The subjects were randomly allocated to the group responding on the tablet (tablet group) or that responding to a paper-based questionnaire (questionnaire group), and one assessor was assigned to each group. Subjects' characteristics have been shown in Table 1. There were no differences in scores on the Japanese version of Montreal Cognitive Assessment (MoCA-J) scores, which is a cognitive function test, and the basic check list score between the two groups. All subjects provided written informed consent, and this study was approved by Tokyo University of Technology of Health Sciences Ethical Review Board (Authorization Number: E15HS-025). Informed consent was obtained from all participants.

Assessed items included response time to questions by subjects, whether or not they had queries regarding the survey, number of queries, and data input time taken by one assessor. The survey was completed by three participants at a time, and three separate tablets were used for the tablet group. In this study, data input time was defined as the time taken until the data could be statistically analyzed. For the tablet group, the hours were measured until the data on the tablet were compiled onto an Excel sheet from three tablets. For the questionnaire group, the hours were measured until the data were input to the Excel sheet. The assessors were not provided any explanation regarding this study. Instead, the following instruction was provided: "Please input data as quickly as possible."

In addition, for the tablet group, a questionnaire survey was conducted regarding the operability of the tablet. In order to investigate the visibility of the screen and simplicity of data input, six items on the following aspects were rated on a five-point Likert scale: 1) size of the screen, 2) size of the letters, 3) color of the letters, 4) operability of the touch panel, 5) whether tablet survey was more bothersome than a paper survey, and 6) whether it took more time to respond to the survey using the tablet as compared to a paper-based survey.

An independent t-test was used to compare intergroup age, height, weight, MoCA-J, the basic check list, items related to frailty, number of taking medicine, response time, and number of queries. A  $\chi^2$  tests was used to compare male-female ratio, family configuration, and whether or not they had queries regarding the survey. All analyses were conducted using the SPSS statistical package for Windows, version 21.0. P values of <0.05 were considered statistically significant.

## RESULTS

The results of each assessed item have been shown in Table 2. There was no difference in response time between the two groups. Significantly more people in the tablet group had queries regarding the survey. Data input time was 426 seconds for the tablet group and 1,268 seconds for the questionnaire group. In the survey regarding tablet operability, there were no negative opinions about the visibility of the screen. However, two people thought that the tablet was more bothersome as compared with paper-based questionnaires.

## DISCUSSION

Since the subjects of this study showed scores lower than 26 points on the MoCA-J (which is the cut-off for this scale)<sup>9</sup>, the respondents may have included a subject or subjects who had mild cognitive impairment (MCI). There was no difference in response time between the two groups in the basic check list score and in items related to frailty. Therefore, it can be presumed that two groups had a similar attribute.

For both groups, the data input time for the 15 respondents was measured. However, the input time for the tablet group was 1/3 of the time required for the questionnaire group. In future, when a large-scale survey is conducted, the use of tablets may be an effective way to alleviate the burden of the researchers.

In general, since elderly people have different abilities related to digital devices as compared with younger people, it is expected that they may not know what to do when they see the display on the screen<sup>8</sup>. There was no negative opinion regarding the visibility of the screen in this study, but some people consider the use of a tablet more bothersome as compared with paper questionnaires, and more people in the tablet group had queries about the survey. Specifically, their queries were related to operation procedures, for instance, "Is it okay to press this display screen?" or "Is this the next operation?". Accordingly, the operation methods of the tablets need to be fully explained in advance when conducting a survey using tablets with elderly people. If the method of operating tablets is demonstrated before conducting a survey, tablets can be used with elderly people to shorten the data input time for a large-scale investigation. A previous study has showed that information collected via a computer is valid as compared to paper-pencil surveys<sup>10</sup>. Thus, the present findings suggested that tablet surveys could be effective for a large-scale investigation.

**Table 1.** Subject characteristics for the tablet group and questionnaire group

	Tablet group (n=15)	Questionnaire group (n=15)
Age, yrs (range)	72.2 ± 4.9 (66–81)	72.7 ± 4.4 (68–80)
Male, n (%)	2 (13)	5 (33)
Height, cm	154.5 ± 10.7	155.8 ± 8.0
Weight, kg	52.0 ± 9.3	53.7 ± 12.3
MoCA-J, point	23.5 ± 4.5	25.6 ± 2.9
The basic check list, point	2.5 ± 2.2	2.8 ± 1.9
Items related to frailty, point	1.1 ± 1.4	1.1 ± 1.3
Number of taking medicine	1.5 ± 2.4	2.0 ± 2.2
Family configuration (single life, two people living, others), n	3, 4, 8	4, 8, 3

Mean ± standard deviation. MoCA-J: Japanese version of Montreal Cognitive Assessment; The basic check list: the basic health check list for those over 65years old.

**Table 2.** The results of assessed item for the tablet group and questionnaire group

	Tablet group	Questionnaire group
Response time to questions by subjects, sec (range)	155.2 ± 41.7 (88–221)	144.4 ± 42.7 (78–221)
Whether or not they had queries regarding the survey (presence, absence)	13, 2	3, 12 *
Number of queries (range)	1.7 ± 1.4 (0–4)	0.2 ± 0.4 (0–1) *
Data input time by the assessor, sec	426	1,268
Size of the screen (very agreed, agreed, neither, disagreed, very disagreed) , n	4, 10, 1, 0, 0	-
Size of the letters (very agreed, agreed, neither, disagreed, very disagreed) , n	5, 9, 0, 1, 0	-
Color of the letters (very agreed, agreed, neither, disagreed, very disagreed) , n	7, 8, 0, 0, 0	-
Operability of the touch panel (very agreed, agreed, neither, disagreed, very disagreed) , n	5, 6, 3, 0, 0	-
Whether tablet survey was more bothersome than a paper survey (very agreed, agreed, neither, disagreed, very disagreed) , n	0, 2, 6, 3, 4	-
Whether it took more time to respond to the survey using the tablet as compared to a paper-based survey (very agreed, agreed, neither, disagreed, very disagreed) , n	0, 0, 4, 7, 4	-

Mean ± standard deviation. \*p<0.05.

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