Journal of Affective Disorders 162 (2014) 30–33

Contents lists available at ScienceDirect

Journal of Affective Disorders

journal homepage: www.elsevier.com/locate/jad

Preliminary communication

Item non-response on self-reported depression screening questionnaire among community-dwelling elderly

Asuka Koyama [a,*], Ryuta Fukunaga [b], Yasuhisa Abe [b], Yoshitomo Nishi [a], Noboru Fujise [a], Manabu Ikeda [a]

[a] Department of Neuropsychiatry, Faculty of Life Sciences, Kumamoto University, 1-1-1 Honjo, Chuo-ku, Kumamoto, Japan
[b] Yatsushiro Kousei Hospital, Kumamoto, Japan

ARTICLE INFO

Article history:
Received 10 March 2014
Accepted 14 March 2014
Available online 27 March 2014

Keywords:
Complete case analysis
GDS
Japan

ABSTRACT

Background: In responses to self-reported depression screening questionnaires, item non-response, which refers to the absence of answers to specific questions, is problematic. The objective of this study were (1) to clarify the features of respondents with item non-response on a self-reported elderly depression screening questionnaire (15-item geriatric depression scale; GDS-15) as compared to respondents with full responses, and (2) to compare positive depression screening rates calculated using two methods: excluding respondents with item non-response (complete case analysis; CCA) and estimating by multiplying mean scores from valid responses by the total number of GDS-15 items for respondents with item non-response.

Methods: This was a cross-sectional study conducted from 2010 to 2012. Of 4794 elderly subjects (65 years and older) living in one town in Japan 2836 community-dwelling elderly people (59.2%) were included in the analysis.

Results: Item non-response was observed in 25.0% of respondents. Respondents with item non-response had a higher rate of depression and mental and physical problems. Respondents with depression (estimated GDS-15 score ≥ 6) and suicidal ideation both had a 1.6-times higher risk of item non-response on the GDS-15. The positive depression screening rate on GDS-15 by CCA was 16.5%, compared with 18.9% when calculated by the estimated GDS-15 score.

Limitations: Our survey was conducted in one rural area and targeted only elderly people.

Conclusion: The incidence of item non-response among community-dwelling elderly people was associated with depression of the respondent. Excluding subjects with item non-response when calculating positive depression screening rates in elderly individuals causes the rate to be underestimated.

1. Introduction

Although self-reported survey research is convenient, inexpensive, and places little burden on respondents, item non-response, that is, absence of answers to specific questions, is problematic (Yan and Curtin, 2010). Item non-response occurs for many reasons, including careless mistakes, refusal to respond to questions about private issues, the absence of a "not applicable" option, or use of questions that the respondent does not understand.

The complete case analysis (CCA) method is commonly used to address missing data from survey respondents by excluding subjects with missing data from analysis. If item non-response occurs at random (referred to as "Missing Completely at Random"), it can be ignored. CCA is convenient for this type of data, although it decreases the number of respondents. However, other types of missing data may also occur. These include "Missing at Random" data, in which the incidence of missing responses depends on some measurable characteristic of the individual but not on the missing value itself, and "Missing not at Random" data, in which the incidence of missing depends on missing itself. For example, people with high or low income might be less likely to report their income. For both "Missing at Random" and "Missing not at Random" data, missing itself has an important meaning and the results determined by complete case analysis are biased.

We had an opportunity to analyze secondary data of depression among community-dwelling elderly assessed by the geriatric depression scale (GDS)-15 Japanese version, a self-reported questionnaire (Niino et al., 1991). We hypothesized that item non-response would

* Corresponding author.
E-mail addresses: asuka@fc.kuh.kumamoto-u.ac.jp (A. Koyama), rtfkng@gmail.com (R. Fukunaga), abeb42@gmail.com (Y. Abe), yoshitomo.nishi@nifty.com (Y. Nishi), nfujise@kumamoto-u.ac.jp (N. Fujise), mikeda@kumamoto-u.ac.jp (M. Ikeda).

http://dx.doi.org/10.1016/j.jad.2014.03.022
0165-0327/

not occur at random because depression itself affects the incidence of item non-response. For example, depressed people often lack motivation and have difficulty concentrating, which may lead to missing responses. In addition, item non-response may occur in elderly respondents due to decreases in cognitive function. However, little is known about the issue of item non-response on a self-reported elderly depression screening questionnaire. Although Shrive et al. described how to deal with missing data on the Zung Self-reported Depression scale using six different imputation techniques, they carried out random simulations using only the full-response group (Shrive et al., 2006), which does not reflect a real non-response situation.

The aim of this study is to clarify features of respondents with item non-response on the GDS-15 compared with respondents with full-responses and compare positive depression screening rates calculated using CCA with rates determined by GDS-15 estimated by multiplying mean scores from valid responses by the number of total GDS-15 items. Our hypothesis is that rates calculated using CCA will underestimate the true rate of depression.

2. Methods

2.1. Participants and procedures

We used secondary data obtained from an epidemiologic survey study conducted from 2010 to 2012 in Asagiri, Kumamoto, Japan. Asagiri has suffered from depopulation and aging. A detailed description of the survey is available elsewhere (Fukunaga et al., 2012).

In each year, one area of the town was selected and all residents aged 65 years and older received a self-reported questionnaire by postal mail. They were asked to return questionnaires using the return envelope. Returning the questionnaire was assumed to represent informed consent. Of 4794 subjects, 3167 (66.1%) returned the questionnaire. A total of 331 subjects who were in the hospital or nursing home or who could not answer because of dementia or other reasons were excluded. All procedures for the present study followed the 2009 Clinical Study Guidelines of the Ethics Committee of Kumamoto University Hospital (Kumamoto, Japan) and were approved by the Internal Review Board.

2.2. Measures

GDS was used to assess depression. Although a standard 30-item version (Yesavage et al., 1983) and a shortened 15-item version (Sheikh and Yesavage, 1986) are available, this study used the Japanese 15-item version. GDS-15 Japanese version has a sufficient reliability and validity (Watanabe and Imagawa, 2013). For each item, subjects answered “Yes” or “No”. Depressive answers were scored 1-point for each item and sum of all items represented the GDS-15 total score (range, 0–15). A score of 6 or more is considered to represent ‘possible depression’ (Schreiner et al., 2001).

Other variables assessed included age, gender, living alone or not, routine hospital visits, sleep problems (having/not having), appetite (having/not having), serious worries about money (having/not having), suicidal ideation (having [included “sometimes”, “often”, and “always”]/not having).

2.3. Statistical analysis

For statistical analysis, we calculated the incidence of item non-response on the GDS-15 by counting the number of unanswered items. Respondents who failed to answer one or more questions were defined as the “item non-response group” and those who answered all questions were defined as the “full-response group.” We compared sociodemographic characteristics, physical and mental complaints, and each item of the GDS-15 between the item non-response group and full-response group, excluding cases with item non-response in each analysis. Second, we compared mean GDS-15 scores and the percentage of respondents who scored ≥ 6 between two groups. For item non-response group, we estimated GDS-15 scores by multiplying the mean score from valid responses by the number of GDS-15 items. Logistic regression analysis was conducted to assess the likelihood of item non-response among depressive respondents or respondents with suicidal ideation. In addition, we compared the positive screening rate calculated by CCA with the one determined by GDS-15 estimates (multiplying the mean score from valid responses by the number of GDS-15 all items). All tests were 2-tailed and the significance levels were Bonferroni-corrected. All statistical analyses were performed with SPSS 21.0J for Windows (IBM SPSS Japan, Tokyo, Japan).

3. Results

Of 2836 subjects, 719 (25.0%) were included in the “item non-response group”. In this group, 54% did not respond to 1 item, 19% did not respond to 2 items, 15% did not respond to 3 to 5 items, 9% did not respond to 6 to 14 items, and 4% did not respond to any item. Mean age and the percentage of females were significantly higher in the item non-response group than the full-response group. In the item non-response group, the percentage with routine hospital visits, sleep problems, loss of appetite, and having suicidal ideation was significantly higher than in the full-response group. The GDS-15 mean score and the percentage of the respondents who scored cutoff point of 6 or more of GDS-15 were significantly higher in the item non-response group than in the full-response group (Table 1).

Table 2 shows the incidence of item non-response of all respondents for each GDS-15 item and the comparison of the percentage of depressive answers in each item between groups. In 13 of 15 items, the percentage of respondents who selected depressive answers was significantly higher in the item non-response group than in the full-response group.

Logistic regression analysis revealed that the existence of depression (GDS-15 score ≥ 6) and suicidal ideation were risk factors for item non-response after adjusting for age, gender, and routine hospital visits. Odds ratios were 1.6 (95% CI, 1.3–2.0, $p < 0.001$) and 1.6 (95% CI, 1.2–2.0, $p < 0.001$), respectively.

When we calculated the positive depression screening rate on GDS-15 by CCA, that is, excluding the item non-response group, the percentage was 16.5%. When we calculated GDS-15 score in item non-response group by mutiplying mean scores from valid responses by the number of total GDS-15 items, the total positive rate was 18.9%, which was remarkably higher than that calculated using CCA.

4. Discussion

The present study was the first to show a correlation between the incidence of item non-response and depression among elderly community-dwelling survey respondents. Respondents with depression and suicidal ideation had a 1.6 times higher risk of item non-response on the GDS-15. In addition, the rate calculated using CCA was lower than GDS-15 estimates determined by multiplying mean scores from valid responses by the number of total GDS-15 items. From these findings, we could conclude that the rate of depression calculated using CCA would be underestimated. Recently, imputation methods such as multiple imputation analysis have been gaining use when dealing with item non-response (Rubin, 1987). However, this technique has some restrictions. For