Psychiatry Research ■ (■■■■) ■■■–■■■

Contents lists available at ScienceDirect

Psychiatry Research

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

Association between risk perception, subjective knowledge, and depression in community-dwelling elderly people in Japan

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ARTICLE INFO

Article history:
Received 25 June 2014
Received in revised form
20 February 2015
Accepted 3 March 2015

Keywords:
Attitude to health
Aged
Community health service
Mood disorder
Risk assessment

ABSTRACT

Risk perception is one of the core factors in theories of health behavior promotion. However, the association between knowledge, risk perception, and depressed mood in depression is unknown. The aim of this study was to clarify the relationships between subjective knowledge, risk perception, and objective scores of depression in community-dwelling elderly people in Japan. A total of 747 elderly participants (mean age: 76.1, female: 59.8%) who completed the 15-item Geriatric Depression Scale (GDS-15) along with items assessing subjective knowledge and risk perception were included in the analysis. We assessed the correlation between subjective knowledge and risk perception, and then compare GDS-15 scores by level of subjective knowledge and risk perception. Subjective knowledge was weakly associated with risk perception and related to lower GDS-15 scores in a dose–response pattern, which did not change after adjusting for age, gender, basic activities of daily living (ADL), instrumental ADL, years of education and history of depression. There was no significant association between risk perception and GDS-15 scores. The relationship between knowledge, risk perception, and depressed mood in younger generations is unclear, but warrants examination.

1. Introduction

Risk perception is a core factor in most theories of health behavior promotion, such as fear appeal theory, protection motivation theory, the health belief model, and the extended parallel process model. The basic concept across theories is that perception of high personal risk increases the likelihood of taking precautions and changing behavior; however, the factors that lead to modified behavior differ across the various theories (Weinstein and Nicolich, 1993). For example, in the extended parallel process model, precautionary behavior depends on two appraisals: threat and efficacy. If perceived threat or perceived efficacy is low, precautionary behavior will not be taken. Precautionary behavior is taken only when both perceived threat and perceived efficacy are high (Witte, 1992).

Several meta-analyses have shown that risk perception influences health behavior in empirical settings, although effect sizes have varied. For example, in a review of 34 studies with 15,988 participants about vaccination, risk likelihood ($r=0.26$), susceptibility ($r=0.24$), and severity ($r=0.16$) significantly predicted vaccination behavior (Brewer et al., 2007). Another review of 15 studies with 16,293 participants about protection motivation theory reported an effect size (as expressed by Cohen's d) of threat vulnerability and severity of 0.54 (Floyd et al., 2000). Witte and Allen conducted a meta-analysis of fear appeal and reported the effect size of severity was $r=0.13$ (16 studies, $n=2528$) and susceptibility was $r=0.14$ (11 studies, $n=1797$) (Witte and Allen, 2000).

There is evidence that knowledge of depression affects attitudes and behavior. Indeed, "Blues-out," a depression awareness campaign targeting the gay/lesbian community in Switzerland, was found to significantly reduce the lifetime prevalence of suicidal ideation and suicide plans of studied participants (Wang et al., 2013). The campaign included brochure and website offering basic information on depression, a symptoms checklist, a list of gay-friendly providers and institutions for consultation, a hotline, and emergency cards. Furthermore, the "Defeat Depression Campaign" in the United Kingdom positively changed public attitudes toward depression, reported experiences of depression, attitudes toward antidepressants, and attitudes toward treatment from general practitioners, by about 5–10% (Paykel et al., 1998). In addition, 40.7% of general practitioners definitely or possibly made changes in practice as a result of the

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http://dx.doi.org/10.1016/j.psychres.2015.03.002
0165-1781/

campaign (Rix et al., 1999). Thus, knowledge of depression may positively influence attitudes or behavior, however the relationship between knowledge and risk perception in depression remains unclear. Clarification of this relationship is important for effective health promotion regarding depression.

The relationship between knowledge, risk perception, and depressed mood in depression is another concern. Few studies have investigated the influence of risk perception on depressed mood. A study of patients with multiple sclerosis showed that a higher perception of short-term risk of wheelchair dependence was significantly related to higher levels of anxiety (regression coefficient $B=0.78$, $P<0.001$) and depression ($B=0.45$, $P<0.01$) (Janssens et al., 2004), whereas another study reported that knowledge of evidence-based patient information increased the accuracy of leukemia risk estimation without increasing concerns (Hofmann et al., 2013).

In summary, the relationship between knowledge, risk perception, and depressed mood remains unclear. Currently, no studies, to our knowledge, are examining this relationship in depression research. However, it would be important to clarify this relationship in the field of depression because if knowledge of depression increase depressed mood of people, the enlightenment campaign of depression could be good will with big side effect.

The depression in elderly population is especially important in the aging society and Japan is one of the most aged countries in the world. According to research on community-dwelling older adults, the proportion of individuals reporting depressive symptoms is 2.8–35% (Beekman et al., 1999). The natural course of laterlife depressive disorders is poor: a 6-year follow-up study showed that 76% of patients followed an unfavorable but fluctuating course or a severe chronic course of depression. A study in the United States found that the additional medical cost per one depressed older adult was USD 686 for 1 year and USD 5271 for 4 years (Unutzer et al., 1997).

Thus, the aim of this study was to clarify the relationship among subjective knowledge, risk perception, and objective scores for depression among community-dwelling elderly people in Japan.

2. Methods

2.1. Subjects

The study population consisted of 747 community-dwelling elderly people aged 65 years or older living in T town in Japan who completed a depression scale, a subjective knowledge item, and a risk perception item. T town is situated in the midpoint of Shikoku, Japan, and was studied in 2012. Its main industries are agriculture and forestry. The town had a population of 4245, and 1734 (40.8%) residents were aged 65 years or older. The local government distributed self-rating questionnaires to all the elderly people aged 65 years or older except for those who stayed in hospitals or elderly nursing home, and participants mailed their answers to the local government. The total of 1615 questionnaires were distributed, 982 people responded (60.8%). Among them, 747 questionnaires had no missing data.

2.2. Outcome measures

15-Item Geriatric Depression Scale (GDS-15)

The GDS-15 is a validated self-reported depression scale consisting of 15 items with dichotomous answers (yes or no). This scale was developed to exclude the effects of non-specific somatic symptoms such as anorexia and insomnia, which are frequently observed among elderly populations, (Yesavage et al., 1983). The highest possible score is 15, indicating severe depression. Using a cutoff point of 6, the GDS-15 has a sensitivity of 92% and a specificity of 81% to detect major depression as ascertained by the structured clinical interview for the diagnostic and statistical manual of mental disorders, third edition, revised (Lyness et al., 1997). We used the Japanese version of the GDS-15 (Niino et al., 1991). Its sensitivity and specificity using the cut-off point of 6 or more were reported to be 97.3% and 95.9%, respectively (Shreiner et al., 2003). The Cronbach's alpha of GDS-15 in the present study was 0.81.

Risk perception and subjective knowledge

Risk perception about depression was evaluated with the question "How do you feel about depression?" Answers were made on a 4-point scale: 4 (very afraid of), 3 (somewhat afraid of), 2 (rarely afraid of), or 1 (not afraid of at all). Subjective knowledge was evaluated with the question "How much do you know about depression?" This answer was also chosen from a 4-point scale: 4 (a lot), 3 (a little), 2 (hardly anything), or 1 (nothing at all).

Other variables

Other variables included gender, years of education, basic activities of daily living (BADL), instrumental activities of daily living (IADL), and history of major depression.

BADL was measured with seven aspects of daily functioning: walking, ascending and descending stairs, feeding, dressing, going to the toilet, bathing, and grooming. Each BADL item was evaluated using a 4-point rating scale from 0 (completely dependent) to 3 (completely independent). Scores on the seven BADL items were summed to obtain a total score ranging from 0 to 21. A score of 21 on the BADL indicated complete independence (Matsubayashi et al., 1996; Pace, 1989).

IADL was assessed using the instrumental ADL subscale of the Tokyo Metropolitan Institute of Gerontology Index of Competence rating scale (Koyano et al., 1991). It was composed of five items: the ability to use public transport, buy daily necessities, prepare a meal, pay bills, and handle banking matters. Each item is rated as "yes" or "no." The range of scores is from 0 to 5, with higher scores indicating better IADL.

2.3. Analysis

Statistical analysis was performed using SPSS Statistics ver. 20.0 (IBM Inc., Armonk, NY). The correlation coefficient between risk perception and subjective knowledge was calculated using Spearman's rank correlations. Differences between variables among categories were examined using ANOVA (with Bonferroni post-hoc analysis when population variance was same and with Games–Howell post-hoc analysis when population variance was different) for continuous variables and chi-square tests for categorical variables. We used multivariate linear regression modeling to determine the adjusted association of GDS-15 scores with the level of subjective knowledge and risk perception, as well as age, gender, history of depression, BADL, and IADL. Predictors were included using the stepwise method in the multivariate regression model. Significance was set at 0.05 for all analyses.

Table 1
Basic characteristics of participants according to level of subjective knowledge and risk perception.

	Total	Risk perception				p	Subjective knowledge				p
	(n=747)	Very much (n=384)	Somewhat (n=211)	Rarely (n=102)	Not at all (n=50)		Very much (n=292)	A little (n=349)	Hardly (n=85)	Not at all (n=21)	
Age	76.1 (7.3)	76.2 (6.9)	75.7 (7.7)	76.1 (7.4)	76.4 (8.1)	n.s.	75.0 (6.5)	75.8 (7.5)	79.9 (7.0)	79.0 (8.5)	<0.001
Female, %	59.8	63.5	60.2	53.9	42.0	0.02	41.2	46.8	50.6	52.4	0.045
GDS-15	5.1 (3.4)	5.3 (3.4)	5.2 (3.4)	5.2 (3.4)	4.7 (3.3)	n.s.	4.3 (3.1)	5.4 (3.4)	6.0 (3.7)	8.3 (3.9)	<0.001
History of major depression, %	4.8	2.9	6.3	7.8	4.8	n.s.	4.3	5.9	2.5	0	n.s.
Years of education	9.8 (2.3)	9.6 (2.2)	10.0 (2.3)	10.3 (2.3)	9.8 (2.2)	n.s.	10.0 (2.3)	9.9 (2.3)	9.1 (1.6)	8.7 (1.9)	<0.001
Basic ADL (0–21)	20.1 (2.3)	20.1 (2.2)	20.1 (2.4)	20.3 (2.3)	20.1 (3.0)	n.s.	20.6 (1.4)	20.1 (2.4)	19.1 (3.3)	18.8 (4.5)	<0.001
Instrumental ADL (0–5)	4.4 (1.3)	4.4 (1.3)	4.5 (1.2)	4.5 (1.3)	4.4 (1.2)	n.s.	4.7 (0.9)	4.4 (1.3)	3.8 (1.8)	3.5 (2.0)	<0.001

Note: Data are presented as mean (S.D.) unless otherwise noted. Chi-square test and ANOVA were used for categorical and continuous variables, respectively. ADL=activities of daily living.

Please cite this article as: Imai, H., et al., Association between risk perception, subjective knowledge, and depression in community-dwelling elderly people in Japan. Psychiatry Research (2015), http://dx.doi.org/10.1016/j.psychres.2015.03.002