different from the family-centered truth-telling culture in Asian countries [11]. Therefore, the Japan Psycho-Oncology Society (JPOS) developed the SHARE model on the basis of studies of cancer patients' preferences for truth telling [12,13]. The SHARE model emphasizes four important dimensions of truth telling: supportive environment, how to deliver bad news, additional information, and reassurance and emotional support [12]. The last dimension (reassurance and emotional support) is particularly emphasized throughout the SHARE model-centered truth-telling process to reflect cancer patients' preferences [12,13]. Implementing SHARE truth telling takes approximately 10–15 min. Only a preliminary study has verified the SHARE model [14], but it may meet the needs for developing CST in Taiwan better than the SPIKES model because Japanese culture is similar to Taiwanese folk customs, and its shorter time to implement truth telling conforms better to Taiwan's busy medical environment. The SHARE model is currently used as the education model for CST not only in Taiwan but also in several major cities in South Korea and China (e.g., Beijing and Xian). The SHARE and SPIKES truth-telling models are compared in Table 1.

To develop a good truth-telling technique, doctors, including clinically experienced attending physicians, must receive periodic training in standardized communication skills. To date, no large-scale study has verified the effectiveness of SHARE model-centered CST. To fill this gap in knowledge, the authors conducted this study for the following reasons: (i) to test the effect of Japanese SHARE model-centered standardized CST on Taiwanese healthcare personnel's preference for truth telling; (ii) to determine the size of this effect; and (iii) to compare the effect of 1-day and 2-day CST programs on participants' truth-telling preference.

Methods

Design and participants

This one-group pretest–posttest study was part of a larger project undertaken by the Taiwan Psycho-Oncology Society (TPOS) to promote CST programs to improve the level of oncologists' truth telling in Taiwan. The study was approved by the institutional review board of Chang Gung Memorial Hospital (101-1173C) to hold 10 CST programs led by certified facilitators using standard patients from September 2010 to November 2011. The TPOS informed all hospitals in Taiwan about the CST (the purpose, time, place, and registration information). This information was also published on the TPOS website and at its annual meeting. Participants were 257 healthcare personnel from northern, central, southern, and eastern Taiwan. The majority of participants was doctors ($n = 143$, 57.4%) and had signed up to participate because of personal interest ($n = 180$, 70%).

Communication skills training programs

The SHARE model used in our study was developed by TPOS in collaboration with JPOS. The SHARE CST was translated into Chinese and used in intensive training of healthcare personnel (at least 50 h of CST, train-the-trainer workshops, facilitator workshops, and facilitator internships). Some translated sentences were also modified to more closely reflect Taiwanese culture. For instance, 'Let's fight this together' was changed to 'Let's work together.' The first 22 facilitators trained by the TPOS were assessed by Dr. Fujimori (main developer of the SHARE model) and Dr. Fang (last author and head of the TPOS) and awarded Taiwan–Japan certificates.

Table 1. Comparison of the SPIKES and SHARE models

	SPIKES	SHARE
Institute where developed	MD Anderson Cancer Center, USA	Japan Psycho-Oncology Society and National Cancer Center Hospital East, Japan
Year developed	2000	2007
Basis for development	Literature search and expert input	Patients' preferences for truth telling
Core values	Patient autonomy, order of truth telling, and providing detailed information	Confucian-based values of Asian culture and reassurance and emotional support for patients and their families during truth telling
Training period	3–5 days	1–2 days
Instructor/trainee ratio	One instructor/five trainees	Two instructors/four trainees (instructors: one expert in psychology and one expert in oncology)
Types of cancer in training materials	$n = 5$ (breast cancer, prostate cancer, lymphoma, lung cancer, and melanoma cancer)	$n = 26$ (trainees choose to engage in role play according to the type of cancer role play)
Teaching methods	Didactic lessons and role play	Didactic lessons and role play
CST-related empirical studies	Verified by many studies	Verified by a preliminary study
Time to execute truth telling	Approximately 60 min	Approximately 10–15 min
Countries where used	Europe, USA, and China	Japan, Taiwan, South Korea, and China

CST, communication skills training.

DOI: 10.1002/pon

These 22 facilitators were the first CST facilitators in Taiwan and conducted CST in this study. To match the Japanese SHARE model CST to the medical culture of Taiwan, all teaching materials provided by JPOS were revised by all TPOS directors on the basis of local data in Taiwan, feedback from CST facilitators and participants, and suggestions of clinical experts. However, the CST process, training of facilitators and standard patients, and use of teaching strategies meet JPOS recommendations.

Considering the positive effects of CST, the Bureau of Health Promotion in Taiwan has sponsored and supported high-quality CST training programs held by the TPOS at various medical institutions in Taiwan since 2011. SHARE CST uses small classes (four participants, two facilitators, and one standard patient). Role play is used to enable participants to learn the important skills of truth telling (Table 2). In Japan, SHARE CST was designed with 1-day and 2-day versions. Although the TPOS tried to promote the 2-day CST, it was not well received in Taiwan's busy medical environment. However, one of our study aims was to compare the effectiveness of 1-day and 2-day CST programs; thus, this study provided two CST programs as options for healthcare personnel (Table 2). Both versions included the same class modules and standard teaching materials and were led by the same facilitators. The only difference was that the 1-day and 2-day versions included 1 and 2 h of role playing for each participant, respectively (Table 2). Participants chose the CST programs according to their needs.

Truth-telling questionnaire

Participants' truth-telling preference was assessed using the 70-item Japanese truth-telling questionnaire [12], which has four subscales: method of disclosing bad news, providing emotional support, providing additional information, and setting. Self-reported responses are scored on a 5-point Likert scale from 1 (extremely unimportant) to 5 (extremely important). Higher scores indicate greater respondent preference for truth telling except for the setting subscale. The questionnaire was shown to have good internal consistency among 529 outpatients with cancer; subscale reliabilities were 0.77–0.93 [12]. The scale was translated into Chinese by Dr. Tang, with Dr. Fujimori's authorization, and found to have good reliability and validity with Taiwanese medical students and attending physicians [15].

Questionnaire scores were used in this study to indicate CST effectiveness. We reasoned that if healthcare personnel's truth-telling perceptions changed after SHARE model-centered CST to more closely match cancer patients' preferences for truth telling, as embodied in the SHARE model, the CST would have been effective, and healthcare personnel's future truth telling would be successful with patients. Dr. Fujimori agreed with this reasoning. The questionnaire was administered as the pretest to all participants before the introduction to the CST program (Table 2). The questionnaire was again completed as the posttest after the last role play and before group feedback. Participants completed questionnaires in 10–30 min. In this study, the internal consistencies (Cronbach's alphas) of the overall truth-telling scale and its subscales were 0.92–0.94 and 0.79–0.91, respectively.

Statistical methods

Data were analyzed by descriptive statistics. For continuous data, such as age and clinical experience, variables were described by means and SDs. For categorical data, such as gender and education level, variables were described by frequency distribution and percentage. These descriptive statistics were used to analyze participants' preference for truth telling. The difference between participants' pretest and posttest truth-telling scores (before and after participating in CST programs) was analyzed by paired-sample t-test. Cohen's d $d = \frac{M1 \cdot \cdot M2}{\sigma}$ was calculated to determine the effect size of the CST [16]. The difference between the truth-telling preferences of participants in the 1-day and 2-day CST programs was analyzed by multiple regression analysis.

Results

Participants' characteristics

The 257 participating healthcare personnel were on average 38.60 years old (SD = 8.09). The majority were women (52.5%) and had graduated from college (61.1%), with half having abundant clinical experience (≥10 years, 50.2%). The largest proportion was doctors (57.2%), followed by nurses (22.2%). The majority served in medical centers (52.8%). Nearly two-thirds of participants took the 2-day CST program ($n = 163$, 63.4%), whereas the rest took the 1-day CST program ($n = 94$, 36.6%). Most participants were satisfied with the programs (93.8%) and were willing to recommend them to other colleagues (98.5%) (Table 3).

Participants' truth-telling preferences

Comparison of all participants' truth-telling scores before and after participating in the CST programs shows that their overall truth-telling scores and subscale scores improved significantly ($p < 0.001$) (Table 4). The effect size was 0.91 $\left(d = \frac{281.89 \cdot \cdot 263.88}{19.89}\right)$.

We also compared the effect of CST program dose (1-day vs. 2-day program) on participants' truth-telling preference. Because healthcare personnel in the 1-day and 2-day CST programs differed in some basic demographic variables (e.g., age, gender, education level, marital status, clinical experience, and workplace hospital level) (data not shown), these were treated as confounding variables.

DOI: 10.1002/pon

Table 2. SHARE model-centered communication skills training programs

	1-day CST program (6 h)		2-day CST program (12 h)	
Time	**Procedures**	**Note**	**Procedures**	**Note**
Day one morning	Facilitators' preworkshop meeting and participant check-in (30 min)	A large-scale classroom is required with a capacity of 50.	Facilitators' preworkshop meeting and participant check-in (30 min)	A large-scale classroom is required with a capacity of 50.
	Participant pretest (10 min)	Each group has four participants assigned to one classroom. Participants assemble in the large classroom to complete truth-telling questionnaire and basic demographic data.	Participant pretest (30 min)	Each group has four participants assigned to one classroom. Participants assemble in the large classroom to complete truth-telling questionnaire and basic demographic data.
	Introduction to workshop (10 min)	The principal investigator gives the introduction in the large classroom.	Introduction to workshop (10 min)	The principal investigator gives the introduction in the large classroom.
	Grouping; introduction to SHARE modules (50 min)	The facilitator of each group starts grouping participants. Facilitators introduce the SHARE model in small-group teaching. SP complete check-in procedure.	Grouping; introduction to SHARE modules (50 min)	The facilitator of each group starts grouping the participants. Facilitators introduce the SHARE model in small-group teaching. SP complete check-in procedure.
	First role-playing practice (60 min)	Each role-playing practice includes only one participant and one SP. The participant and SP practice the truth-telling process, whereas the other three participants observe.	First role-playing practice (60 min)	Each role-playing practice includes only one participant and one SP. The participant and SP practice the truth-telling process, whereas the other three participants observe.
	Second role-playing practice (60 min)			
Day one afternoon	Third role-playing practice (60 min)		Second role-playing practice (60 min)	Day 1 includes four role-playing practice sessions, with each participant practicing once.
	Fourth role-playing practice (60 min)		Third role-playing practice (60 min)	
	Participant posttest (10 min)	Participants return to large classroom to complete truth-telling questionnaire and survey on program satisfaction.	Fourth role-playing practice (60 min)	
	Group feedback (50 min)	Mutual feedback from SP, participants, and facilitators. Sharing of feedback.		
	Certificates issued (10 min)	Facilitators personally issue certificates to participants in their groups. The workshop closes for participants.		
Day two morning			Participant, SP, and facilitator check-in	Grouping is initiated right after check-in.
			Fifth role-playing practice (60 min)	Day 2 includes four role-playing practice sessions so all participants can practice again.
			Sixth role-playing practice (60 min)	
			Seventh role-playing practice (60 min)	
Day two afternoon			Eighth role-playing practice (60 min)	
			Participant posttest (30 min)	Participants return to large classroom to complete truth-telling questionnaire and survey on program satisfaction.
			Group feedback (80 min)	Mutual feedback from SP, participants, and facilitators. Sharing of feedback.
			Certificates issued (10 min)	Facilitators personally issue certificates to participants in their groups. The workshop closes for participants.
			Facilitators' postworkshop meeting (30 min)	Facilitators share CST experiences with each other. If any incident happened during CST, facilitators should reach a consensus on how to manage the situation in the future.

CST, communication skills training; SP, standard patients.

DOI: 10.1002/pon

Descriptive analysis showed that participants in the 2-day program had better posttest truth-telling scores (Table 4), but this difference was not significant ($p > 0.05$) in multiple regression analysis when confounding variables were controlled, except for the setting subscale (Table 5).

Table 3. Participant characteristics ($N = 257$)

Characteristic	Mean ± standard deviation (range)	*n* (%)
Age (years)	38.60 ± 8.09 (24–64)	
Gender		
Male		122 (47.5)
Female		135 (52.5)
Education level		
Junior college		12 (4.7)
College		157 (61.1)
≥Graduate school		88 (34.2)
Marital status		
Never married		94 (36.6)
Married		161 (62.6)
Divorced		2 (0.8)
Clinical experience (years)		
1–3		39 (15.2)
4–6		55 (21.4)
7–9		34 (13.2)
≥10		129 (50.2)
Job title		
Doctor		147 (57.2)
Psychologist		19 (7.4)
Nurse		57 (22.2)
Social worker		21 (8.2)
Other		13 (5.0)
Workplace hospital level		
Medical center		131 (52.8)
Nonmedical center		117 (47.2)
Motivation to participate in CST		
Personal interest		180 (70.0)
Assigned		77 (30.0)
CST program (hours)		
6		94 (36.6)
12		163 (63.4)
Satisfaction with the program		
Extremely dissatisfied		7 (2.7)
Neutral		9 (3.5)
Satisfied		82 (31.9)
Extremely satisfied		159 (61.9)
Willing to recommend CST to colleagues		
Yes		253 (98.5)
No		4 (1.5)

CST, communication skills training.

Discussion

Our results show that, after participating in the CST program, healthcare personnel's preference for truth-telling improved significantly, consistent with previous reports on the effectiveness of CST [3,6,17–22]. However, our study evaluated CST effectiveness on the basis of participants' truth-telling preference, whereas other studies assessed participants' self-efficacy [3], confidence in truth telling [17], communication skills with patients [22], and confidence in communication [9,10]. Although the outcomes measured are different, the effectiveness of CST was verified. To more objectively compare the effectiveness of CST in cross-institutional and cross-national studies, future studies should develop and apply consistent assessment outcomes.

Moreover, our results show that the CST had a large ($d = 0.91$), significant effect. This large effect might have been associated with our theoretical framework (SHARE model-centered CST), facilitator quality (facilitators were certified after receiving at least 50 h training), low ratio of facilitators to participants (2 : 4), quality of standard patients (standard patients received intense training and were assessed regularly), and solid, standard teaching materials that were regularly revised according to empirical evidence or experts' comments.

Moreover, 70% of participants had volunteered to attend the CST program. Their motivation to learn may have been stronger than in previous studies. In addition, our participants included doctors with abundant clinical experience and other healthcare personnel, such as psychologists, nurses, and social workers. Including professionals from different fields has been suggested as preferable in CST programs because these professionals provide different perspectives that may enable participants to learn from one another [23]. These reasons may have contributed to the large effect of CST in our study.

Table 4. Comparison of pretest and posttest truth-telling scores ($N = 257$)

	Total sample		1-day CST ($n = 94$)		2-day CST ($n = 163$)	
	Pretest (mean ± SD)	Posttest (mean ± SD)	Pretest (mean ± SD)	Posttest (mean ± SD)	Pretest (mean ± SD)	Posttest (mean ± SD)
Overall scale	263.88 ± 27.0	281.89 ± 22.9*	263.56 ± 30.63	283.56 ± 25.12	264.00 ± 24.62	280.86 ± 21.45
Method of disclosure	77.37 ± 8.87	83.48 ± 7.46*	77.23 ± 9.81	83.52 ± 7.87	77.49 ± 8.29	83.41 ± 7.23
Emotional support	70.78 ± 8.54	76.74 ± 7.08*	70.33 ± 9.10	76.61 ± 7.01	71.01 ± 8.18	76.79 ± 7.13
Additional information	68.26 ± 8.16	72.94 ± 6.91*	67.91 ± 8.72	73.00 ± 6.68	68.45 ± 7.80	72.87 ± 7.05
Setting	47.46 ± 8.50	48.73 ± 9.00*	48.09 ± 10.27	50.44 ± 11.31	47.04 ± 7.32	47.79 ± 7.19

CST, communication skills training; SD, standard deviation.
*$p < 0.001$.

DOI: 10.1002/pon

Table 5. Multiple regression on truth-telling preference by communication skills training dose ($N = 257$)

	CST dose β (2-day vs. 1-day)	p
Overall scale	−3.325	0.168
Method of disclosure	−0.108	0.892
Emotional support	−0.281	0.706
Additional information	−0.961	0.183
Setting	1.736	0.046

CST, communication skills training.
1-day CST is used as the baseline value.
Adjusted for age, gender, education level, marital status, clinical experience, and workplace hospital level.

Our study did not find a significant difference in the truth-telling preference of participants in the 1-day and 2-day CST programs ($p > 0.05$), except for the setting subscale. This finding contrasts with a previous finding that the communication skills of oncologists participating in a 3-day CST program were significantly superior to those of participants in a 1.5-day CST program [19]. The setting subscale items (e.g., ensuring that the telephone does not ring, using technical words, and breaking bad news at the first meeting) are basic communication skills but are often neglected by physicians in Taiwan [15]. Thus, Taiwanese clinicians may need more practice in long CST programs to change their truth-telling preference related to the setting. Our findings suggest that a shorter training program is as equally effective as a longer training program. If this hypothesis is supported in future empirical studies, shorter CST programs can be promoted, which will be particularly beneficial in extremely busy medical environments, such as in Taiwan.

However, our finding that the effectiveness of the two CST programs did not differ significantly may be explained by the selection of assessment times and inadequate selection of outcome variables. We measured participants' outcomes immediately after the programs, but the effectiveness of the two CST programs might differ if the outcomes were measured at longer times, for example, 3 or 6 months after CST. Unfortunately, our plan for long-term assessments was hindered by the difficulty and expense of passing Institutional Review Board (IRB) review at the 62 hospitals across Taiwan from which our participants were recruited. In Taiwan, IRB approval is needed for studies on hospital personnel [24].

Another reason for failure to detect a difference in effectiveness of the 1-day and 2-day CST programs might be inadequate selection of outcome variables. In addition to measuring participants' truth-telling preference, future studies are advised to concurrently assess their self-efficacy [3], confidence in communication [9,10], or anxiety while truth telling. We also suggest that other researchers refer to specific suggestions proposed in a review of CST programs [25] using Kirkpatrick's Triangle to evaluate CST effectiveness at four levels: participants' reactions, participants' learning, participants' behavior, and patients' outcomes. At the first level, participants' satisfaction with the CST (each module) can be assessed. At the second level, standard patients can be invited to assess the truth-telling skills of participants before/after their participation in the CST programs. At the third level, actual clinical situations before/after the CST program can be videotaped to record participants' actual consultations for patients with cancer. At the fourth level, cancer patients can be invited to assess doctors' truth-telling skills, their understanding of the patients' needs, and the fit of their responses. In this study, we used only first-level assessment. Future studies may gradually expand the scope to second-level, third-level, or even fourth-level assessment to more effectively and comprehensively evaluate CST effectiveness.

This study had some limitations. First, participants only completed one posttest immediately after the end of the CST programs. Therefore, the long-term CST effectiveness (e.g., at 3 or 6 months) is unknown. Second, because of time and equipment limitations at the study sites, we did not videotape the participants' truth-telling process and did not include standard patients' assessment of participants' truth-telling skills. Instead, we used only first-level assessment. Future researchers may choose higher-level assessments as suggested [24] to evaluate the benefit of CST more completely. Third, 70% of our participants had volunteered to participate in the CST program. Their self-selection and motivation to learn may have biased our assessment of the effectiveness of the CST program. However, this possibility is minimized by our findings that voluntary and nonvoluntary (assigned) participants did not differ significantly in either their overall truth-telling preference scores or most subscale scores and by the 1-day and 2-day CST programs having the same percentage of voluntary and assigned participants (data not shown).

Conclusions

SHARE model CST improved Taiwanese healthcare providers' preferences for cancer truth telling. Truth-telling knowledge and skills should be replenished every few years for all healthcare personnel, including clinically experienced attending physicians. Further studies are needed to assess the long-term benefit of CST on patients' outcomes and to compare the effectiveness of different CST programs and the factors affecting physicians' method of truth telling.

Acknowledgments

This work was supported by the Bureau of Health Promotion Department of Health, Taiwan, ROC (grant no. 9911009C). We thank all facilitators from the Taiwan Psycho-Oncology Society for promoting and conducting the CST programs. Special thanks to all the healthcare providers who participated in this project.

Conflict of interest

The authors have declared that there is no conflict of interest.

References

1. Baile WF, Buckman R, Lenzi R, Glober G, Beale EA, Kudelka AP. SPIKES—a six-step protocol for delivering bad news: application to the patient with cancer. *Oncologist* 2000;**5**:302–311.
2. Parker PA, Baile WF, de Moor C, Lenzi R, Kudelka AP, Cohen L. Breaking bad news about cancer: patients' preferences for communication. *J Clin Oncol* 2001;**19**:2049–2056.
3. Baile WF, Kudelka AP, Beale EA *et al.* Communication skills training in oncology. Description and preliminary outcomes of workshops on breaking bad news and managing patient reactions to illness. *Cancer* 1999;**86**:887–897.
4. Kiluk JV, Dessureault S, Quinn G. Teaching medical students how to break bad news with standardized patients. *J Cancer Educ* 2012;**27**:277–280.
5. Lee CA, Chang A, Chou CL, Boscardin C, Hauer KE. Standardized patient-narrated web-based learning modules improve students' communication skills on a high-stakes clinical skills examination. *J Gen Intern Med* 2011;**26**:1374–1377.
6. Fallowfield L, Jenkins V, Farewell V, Solis-Trapala I. Enduring impact of communication skills training: results of a 12-month follow-up. *Br J Cancer* 2003;**89**:1445–1449.
7. Jenkins V, Fallowfield L. Can communication skills training alter physicians' beliefs and behavior in clinics? *J Clin Oncol* 2002;**20**:765–769.
8. Goelz T, Wuensch A, Stubenrauch S *et al.* Specific training program improves oncologists' palliative care communication skills in a randomized controlled trial. *J Clin Oncol* 2011;**29**:3402–3407.
9. Fujimori M, Oba A, Koike M *et al.* Communication skills training for Japanese oncologists on how to break bad news. *J Cancer Educ* 2003;**18**:194–201.
10. Fukui S, Ogawa K, Fukui N. Communication skills training on how to break bad news for Japanese nurses in oncology: effects of training on nurses' confidence and perceived effectiveness. *J Cancer Educ* 2010;**25**:116–119.
11. Wuensch A, Tang L, Goelz T *et al.* Breaking bad news in China—the dilemma of patients' autonomy and traditional norms. A first communication skills training for Chinese oncologists and caretakers. *Psycho-Oncology* 2013;**22**:1192–1195.
12. Fujimori M, Akechi T, Morita T *et al.* Preferences of cancer patients regarding the disclosure of bad news. *Psycho-Oncology* 2007;**16**:573–581.
13. Fujimori M, Parker PA, Akechi T, Sakano Y, Baile WF, Uchitomi Y. Japanese cancer patients' communication style preferences when receiving bad news. *Psycho-Oncology* 2007;**16**:617–625.
14. Tang WR, Chen GY, Hsu SH, Fang JK. Preliminary effects of truth telling training. *J Cancer Res Pract* 2010;**26**:112–124.
15. Tang WR, Fang JT, Fang CK, Fujimori M. Truth telling in medical practice: students' opinions versus their observations of attending physicians' clinical practice. *Psycho-Oncology* 2013;**22**:1605–1610.
16. Cohen J. A power primer. *Psychol Bull* 1992;**112**:155–159.
17. Abel J, Dennison S, Senior-Smith G, Dolley T, Lovett J, Cassidy S. Breaking bad news--development of a hospital-based training workshop. *Lancet Oncol* 2001;**2**:380–384.
18. Delvaux N, Razavi D, Marchal S, Bredart A, Farvacques C, Slachmuylder JL. Effects of a 105 hours psychological training program on attitudes, communication skills and occupational stress in oncology a randomised study. *Br J Cancer* 2004;**90**:106–114.
19. Fallowfield L, Jenkins V, Farewell V, Saul J, Duffy A, Eves R. Efficacy of a cancer research UK communication skills training model for oncologists a randomised controlled trial. *Lancet* 2002;**359**:650–656.
20. Fukui S, Ogawa K, Ohtsuka M, Fukui N. A randomized study assessing the efficacy of communication skill training on patients' psychologic distress and coping: nurses' communication with patients just after being diagnosed with cancer. *Cancer* 2008;**113**:1462–1470.
21. Goelz T, Wuensch A, Stubenrauch S, Bertz H, Wirsching M, Fritzsche K. Addressing the transition from curative to palliative care: concept and acceptance of a specific communication skills training for physicians in oncology—COM-ON-p. *Onkologie* 2010;**33**:65–69.
22. Maguire P, Booth K, Elliott C, Jones B. Helping health professionals involved in cancer care acquire key interviewing skills—the impact of workshops. *Eur J Cancer* 1996;**32A**:1486–1489.
23. Stiefel F, Bernhard J, Bianchi G *et al.* Chapter 55. The Swiss Model. *Handbook of Communication in Oncology and Palliative Care.* Kissane DW, Bultz BD, Butow PM, Finlay IG (eds). Oxford University Press: New York, 2011; 641–648.
24. Chang Gung Medical Foundation Institutional Review Board. IRB specifications. 2004. http://www1.cgmh.org.tw/intr/intr1/c0040/web/C/C.htm [Accessed 09 July 2013]
25. Kissane DW, Bylund CL, Banerjee SC *et al.* Communication skills training for oncology professionals. *J Clin Oncol* 2012;**30**:1242–1247.

DOI: 10.1002/pon

Patient Education and Counseling 93 (2013) 350–353

Contents lists available at SciVerse ScienceDirect

Patient Education and Counseling

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

Short Communication

Characteristics associated with empathic behavior in Japanese oncologists

Kyoko Kondo [a,b], Maiko Fujimori [a,c], Yuki Shirai [a,d,e], Yu Yamada [a,f], Asao Ogawa [a], Nobuyuki Hizawa [b], Yosuke Uchitomi [g,*]

[a] Psycho-Oncology Division, Research Center for Innovative Oncology, National Cancer Center Hospital East, Kashiwa, Japan
[b] Department of Pulmonary Medicine, Institute of Clinical Medicine, University of Tsukuba, Tsukuba, Japan
[c] Psychiatry Division, National Cancer Center Hospital, Chuo-ku, Japan
[d] Tokyo Healthcare University Graduate School, Megro-ku, Japan
[e] The Graduate School of Medicine, The Department of Adult Nursing/Palliative Care Nursing, The University of Tokyo, Bunkyo-ku, Japan
[f] Department of Psycho-Oncology, Saitama Cancer Center, Kitaadachi-gun, Japan
[g] Department of Neuropsychiatry, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Kita-ku, Japan

ARTICLE INFO

Article history:
Received 30 October 2012
Received in revised form 22 June 2013
Accepted 28 June 2013

Keywords:
Empathy
Communication
Bad news
Cancer
Interpersonal relationship

ABSTRACT

Objective: Oncologists must have empathy when breaking bad news to patients who have incurable advanced cancer, and the level of empathy often depends on various individual characteristics. This study aimed to clarify the relationship between these characteristics and empathic behavior in Japanese oncologists.
Methods: We videotaped consultations in which oncologists conveyed news of incurable advanced cancer to simulated patients. Oncologists' empathetic behaviors were coded, and regression analysis was performed to determine the existence of any relationships with factors such as age, sex, and specialism.
Results: Sixty oncologists participated. In a multivariate model, only age was related to the empathy score ($r = 0.406$, $p = 0.033$); younger oncologists scored higher than did older oncologists.
Conclusions: We found that empathic behaviors were more frequent in younger oncologists.
Practice implications: This information could be useful in determining the best approach for implementing future empathy and communication training programs for experienced oncologists in Japanese medical institutions.

1. Introduction

Patients with incurable advanced cancer suffer intense emotional anguish, particularly when first receiving the bad news of their disease. However, physicians' empathy—defined in medical settings as "a predominantly cognitive attribute that involves an understanding of experiences, concerns and perspectives of the patient" [1]—is reportedly related to relatively high patient satisfaction and relatively low distress, especially when bad news is being delivered [2–4].

Oncologists' characteristics—such as age, sex, and specialism—may be associated with their empathic behavior. Previous studies analyzed empathy using self-reported questionnaires or audio-recorded conversations, with researchers investigating oncologists' reactions to patients' verbal distress cues. However, self-report questionnaires lack objectivity; furthermore, empathy has non-verbal aspects. Indeed, cancer patients' behavior is richly varied, making it difficult to identify empathy through oncologists' reactions to verbal expressions. Therefore, video-recorded conversations between oncologists and simulated patients (SPs) reacting to oncologists' behavior in a standardized way would allow us to make comparisons between consultations, leading to more useful information.

To examine how oncologists' characteristics influence their empathic behavior when breaking bad news, we analyzed video-recorded conversations between oncologists and SPs.

2. Methods

This study was approved by the Ethics Committee of the National Cancer Center of Japan.

2.1. Participants

2.1.1. Oncologists

Sixty oncologists from the National Cancer Center Hospital in Tokyo and the National Cancer Center Hospital East participated.

* Corresponding author at: Department of Neuropsychiatry, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, 2-5-1 Shikata-cho, Kita-ku, Okayama 700-8558, Japan. Tel.: +81 86 235 7242; fax: +81 86 235 7246.
E-mail address: uchitomi@md.okayama-u.ac.jp (Y. Uchitomi).

0738-3991/$ – see front matter © 2013 Elsevier Ireland Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.pec.2013.06.023

Table 1
Empathy score of oncologists during bad news consultations ($N = 60$).

	Range	Median	*SD*	Correlation to the total
9 items total[a]	6–35	20.5	7.8	–
Empathy score item[b]				
Encouraging patients to ask questions	0–4	4	1.6	0.657
Asking about your worries and concerns	0–4	0	1.4	**0.748**
Saying words to prepare you mentally	0–4	3	1.9	0.634
Remaining silent to consider your feelings	0–4	1	1.7	0.689
Accepting your expression of emotion	0–4	3	1.7	**0.702**
Saying words that soothed your feelings	0–4	3	1.7	**0.755**
Telling the news in a hopeful way	0–4	4	1.0	0.265
Telling what you can hope for	0–4	4	1.1	0.373
Assuming responsibility for your care until the end	0–4	2	1.6	0.536

[a] Sum of 9 items of empathy score (range; 0–36).
[b] Responses were based on a 5-point scale (0 = not at all, 4 = extremely).
Correlations greater than 0.7 are in bold.

Investigators (*M.F. & Y.Y.*) met with each interested oncologist and fully described the study to them. Oncologists who volunteered to participate signed a consent form and gave information on 4 characteristics: age, sex, specialism, and years in practice.

2.1.2. Simulated patients (SPs)

Trained adult SPs participated in the study. Two male and four female adult SPs, all of whom had received at least 3 years of training as simulated cancer patients, participated in this study. The scenario was of middle-aged or elderly patients with advanced cancer, who had undergone numerous diagnostic procedures such as biopsy, having a consultation with their oncologists when being informed of their diagnosis. We videotaped each consultation. None of the SPs had encountered the oncologists previously.

2.2. Survey measures

Empathy score: To score empathy, we used the behavior rating scale, which was based on our previous survey on Japanese cancer patients' communication style preferences when receiving bad news [5–7]. The behavior rating scale included 32 items in 4 subscales, with each item rated on a 5-point scale (0 = not at all to 4 = extremely). The scale assesses the quality and quantity of each empathic behavior, encompassing verbal and non-verbal communication (*e.g.*, atmosphere, tone of voice, expressions, and glances throughout the interview). All items were chosen through discussion with research experts in the field and experienced oncologists and psycho-oncologists. Of the subscales, we chose to use "Reassurance and Emotional support," which consists of 9 items, with a total empathy score ranging from 0 to 36 (Table 1). This subscale correlates with the Interpersonal Reactivity Index, a self-reported questionnaire used for assessing empathy ($r = 0.676$, $p < 0.05$). Two independent coders received over 3 months of training in using the scale manual and videotaped 17 interviews as a preparatory experiment, which accounted for approximately 30% of the analyzed data. Inter-rater and intra-rater reliability for these preliminary interviews were high for the behavior rating scale ($\kappa = 0.826$ and 0.800, respectively).

2.3. Statistical analyses

Univariate analysis between empathy scores and characteristics was performed using Spearman's rank correlation coefficients and the Mann–Whitney *U* test, where appropriate; all characteristics (age, sex, specialism, and years in practice; $p < 0.05$) were retained. The correlation between age and years of practice was strong ($r = 0.924$, $p < 0.001$); thus, we only included age as an independent variable in the multiple regression model to control for multicollinearity. Multiple regression analysis was then performed with empathy score as the dependent variable and the characteristics as independent variables. All *p* values are two-tailed. Analyses were conducted using SPSS version 15.0J (PASW Collaboration and Deployment Services).

3. Results

3.1. Participant characteristics

Sixty Japanese oncologists (50 men; mean age = 36 years) participated in this study (Table 2). Most were surgeons (57%), whereas others specialisms included internal medicine (42%) and radiology (3%).

3.2. Empathy score

Across all consultations, the median empathy score was 20 (Table 1).

Table 2
Characteristics of oncologists ($N = 60$).

		N	%
Age (years)			
Range	28–65		
Mean	36		
SD	6.7		
<35		29	48.0%
36–45		22	37.0%
46<		9	15.0%
Sex			
Male		50	83.0%
Female		10	17.0%
Specialism			
Surgery		34	56.7%
Gastroenterology		18	30.0%
Otorynolaryngology		6	10.0%
Urology		3	5.0%
Gynecology		3	5.0%
Breast oncology		3	5.0%
Respiratory		1	1.7%
Internal medicine		25	41.7%
Gastroenterology		12	20.0%
Respiratory		6	10.0%
Breast oncology		5	8.3%
Hematology		1	1.7%
Radiation oncology		1	1.7%
Radiology		1	1.7%
Physicians' experience (years)			
Range	4–31		
Mean	10		
SD	6.4		
<10		30	50.0%
11–20		21	35.0%
21–30		8	13.3%
>31		1	1.7%

Table 3
Multiple regression analysis of factors associated with empathy score ($N=60$).

Factor	Coefficient β	Standardized β	t	p value
Age[a]	−0.335	−0.289	−0.289	0.033
Sex; male/female	2.325	0.112	0.862	0.392
Specialism; internal medicine/the other	−2.159	−0.138	−0.995	0.324

Multiple $R=0.461$, multiple $R^2=0.165$, adjusted multiple $R^2=0.120$.
[a] Continuous variable.

3.3. Relationships between characteristics and empathy

In the multivariate model, only age was related to the empathy score: younger oncologists scored higher than older oncologists (Table 3).

4. Discussion and conclusion

4.1. Discussion

This is the first reported study on the relationship between oncologists' characteristics and the verbal and non-verbal empathic behavior of oncologists, performed by videotaping oncologists delivering bad news to a SP.

In Western countries, characteristics such as age, sex, and specialism have been found to be associated with oncologists' empathic behavior [8]. In a multivariate model in this study, age was the only factor related to the empathy score: younger oncologists scored higher than older ones. This was in agreement with a previous study and could be because younger oncologists are less likely to have experienced emotional burnout from cancer care [9].

Additionally, younger oncologists may score higher because of changes in educational methods and content. In Japanese medical settings, "empathy" is often confused with "sympathy"—feelings of pity or sorrow for patients' suffering [10]—and senior Japanese physicians are more likely to have been discouraged from empathizing by mentors, because intense emotional involvement with patients could lead to difficulties in making clinical judgments [11] or cause physician burnout [12]. Physician-patient communication skills were commonly taught in medical schools and residencies in the early 1990s in Western countries: however, such practices did not begin in Japan until the early 2000s.

None of the oncologists in this study had taken a communication skills course; education *via* these courses might be the key to unlocking more empathetic behavior and improving patient–physician communication. Some researchers believe that empathy is a personality trait that can decline over time with medical education and medical care [13], and Fujimori et al. have reported that oncologists, who participate in communication skills course, behave more empathic than the oncologists who have not participated in [14]. Therefore, further investigation should be conducted to determine the best timing for communication skills courses during the medical career.

In multivariate analysis, sex and specialism were not significantly associated with empathic behavior.

Regarding specialism, Hojat et al. reported that average empathy ratings were significantly higher among physicians in "people-oriented" specialties (primary care, psychiatry, *etc.*) than among those in "technology-oriented" specialties (surgery, surgical subspecialties, *etc.*) [15,16].

Gender differences in empathy have been attributed to intrinsic factors (*e.g.*, evolutionary-biological gender characteristics) and extrinsic factors (*e.g.*, socialization and gender role expectations) [1,8,17]. For example, women are believed to develop more caregiving attitudes toward their offspring than men, according to the evolutionary theory of parental investment. Furthermore, women are more receptive to emotional signals [15]. Other researchers reported that female physicians spend more time with fewer patients and conduct more patient-oriented care [18]. Although we found no significant correlation between sex and the empathy score, this might be due to a small number of women in the sample, resulting in a lack of statistical power to detect any effect of sex. It could be inequality in sex among Japanese doctors, the ratio that women occupy is around 20%, but increases of late years.

This study has several limitations. First, the sample size was small. Second, data from SPs, not real cancer patients, was used; furthermore, the conversation was video-recorded, so oncologists could have modified their behavior to meet the experimental demands. However, all participants had reported that the SPs had seemed like real patients, they did not give thought to being recorded. Finally, all oncologists who participated in this study belonged to the National Cancer Center Hospitals, and this may limit generalization. Many oncologists employed by these hospitals communicate daily with their patients, and thus, most would score well. Nevertheless, this study is a step toward measuring and improving oncologists' empathy in Japan.

4.2. Conclusion

This report investigated the relationship between oncologists' personal characteristics and their empathic behavior. In multivariate analysis, age was the only factor related to the empathy score: younger oncologists scored higher than older ones.

4.3. Practice implications

Our research could have implications for the selection and education of oncologists. The findings indicate that communication skills training in Japan should be provided not only to younger physicians, but perhaps more importantly also to more experienced physicians.

Disclosure

I confirm that all personal identifiers have been removed or disguised so the persons described are not identifiable and cannot be identified through the details of the story.

Conflict of interest

Dr Shirai, Yamada, and Kondo had received research and salary support through for the Third Term Comprehensive 10-Year Strategy for Cancer Control and Research, Japanese Ministry of Health, Labour and Welfare.

Acknowledgements

This work was supported by the Third Term Comprehensive 10-Year Strategy for Cancer Control and Research, Japanese Ministry of Health, Labour and Welfare.

References

[1] Hojat M. Empathy in patient care: antecedents, development, measurement, and outcomes. New York: Springer; 2007.
[2] Mack JW, Block SD, Nilsson M, Wright A, Trice E, Friedlander R, et al. Measuring therapeutic alliance between oncologists and patients with advanced cancer: the Human Connection Scale. Cancer 2009;115: 3302–11.
[3] Takayama T, Akechi T, Ikenaga Y. Relationship between outpatients' perceptions of physicians' communication styles and patients' anxiety level in a Japanese oncology setting. Soc Sci Med 2001;53:1335–50.
[4] Schofield PE, Butow PN, Thompson JF, Tattersall MH, Beeney LJ, Dunn SM. Psychological responses of patients receiving a diagnosis of cancer. Ann Oncol 2003;14:48–56.
[5] Fujimori M, Akechi T, Morita T, Inagaki M, Akizuki N, Sakano Y, et al. Preferences of cancer patients regarding the disclosure of bad news. Psychooncology 2007;16:573–81.
[6] Fujimori M, Parker PA, Akechi T, Sakano Y, Baile WF, Uchitomi Y. Japanese cancer patients' communication style preferences when receiving bad news. Psychooncology 2007;16:617–25.
[7] Fujimori M, Uchitomi Y. Preferences of cancer patients regarding communication of bad news: a systematic literature review. Jpn J Clin Oncol 2009; 39:201–16.
[8] Hojat M, Gonnella JS, Mangione S, Nasca TJ, Veloski J, Erdmann J. Empathy in medical students as related to academic performance, clinical competence and gender. Med Educ 2002;36:522–7.
[9] Passalacqua SA, Segrin C. The effect of resident physician stress, burnout, and empathy on patient-centered communication during the long-call shift. Health Commun 2012;27:449–56.
[10] Kataoka HU. Series: for attending physicians: professionalism; empathy in medicine. Nihon Naika Gakkai Zasshi 2012;101:2103–7.
[11] Williams JR, editor. Medical ethics manual. 2nd ed., UK: World Health Communication Associates; 2009.
[12] Carmel S, Glick SM. Compassionate-empathic physicians: personality traits and social-organizational factors that enhance or inhibit this behavior pattern. Soc Sci Med 1996;43:1253–61.
[13] Forest-Streit U. Differences in empathy: a preliminary analysis. J Med Educ 1982;57:65–7.
[14] Fujimori M, Shirai Y, Asai M, Katsumata N, Kubota K, Uchitomi Y. Development and preliminary evaluation of communication skills training program for oncologists based on patient preferences for communicating bad news. Palliative Support Care 2013 (in press).
[15] Hojat M, Gonnella JS, Nasca TJ, Mangione S, Vergare M, Magee M. Physician empathy: definition, components, measurement, and relationship to gender and specialty. Am J Psychiatry 2002;159:1563–9.
[16] Hojat M, Mangione S, Gonnella JS, Nasca T, Veloski J, Kane G. Empathy in medical education and patient care (letter). Acad Med 2001;76:669.
[17] Kataoka HU, Koide N, Hojat M, Gonnella JS. Measurement and correlates of empathy among female Japanese physicians. BMC Med Educ 2012;12:48.
[18] Hojat M, Gonnella JS, Xu G. Gender comparisons of young physicians' perceptions of their medical education, professional life, and practice: a follow-up study of Jefferson Medical College graduates. Acad Med 1995;70:305–12.

Psychology
2013. Vol.4, No.6, 515-519
Published Online June 2013 in SciRes (http://www.scirp.org/journal/psych)

Scientific Research
http://dx.doi.org/10.4236/psych.2013.46073

An ERP Study of Autistic Traits and Emotional Recognition in Non-Clinical Adolescence

Ken'ichi Nixima[1,2,3], Maiko Fujimori[2,4], Kazuo Okanoya[1,2,3]
[1]Department of Life Sciences, Graduate School of Arts and Sciences, the University of Tokyo, Tokyo, Japan
[2]ERATO Okanoya Emotional Information Project, Japan Science and Technology Agency, Saitama, Japan
[3]Emotional Information Joint Research Laboratory, Riken Brain Science Institute, Saitama, Japan
[4]Psycho-Oncology Division, National Cancer Center Hospital East, Chiba, Japan
Email: cokanoya@mail.ecc.u-tokyo.ac.jp

Received March 16th, 2013; revised April 19th, 2013; accepted May 17th, 2013

Autistic-like traits are characterized by impaired emotional recognition and proposed to be continuously distributed in the entire population. In the non-clinical population, however, the relationship between the autistic-like traits and the behavioral/physiological patterns of emotion processing ability has not been examined. In this study, we investigated the autistic traits (even including moderate-AQ participants) of typically developing adolescents, measured with the Autism Spectrum Quotient (AQ), and the spectral property of their behavioral and physiological responses during emotion-discrimination tasks. Participants were screened and divided into three groups (high-, moderate-, and low-AQ groups) according to AQ scores. Each group participated in the subsequent emotion-discrimination (using angry, happy and neutral facial expressions) experiment involving event-related potentials (ERPs). The results indicated that high-AQ group displayed significant different patterns (lower late positive potentials) of the emotional processing involved in behavioral and physiological tasks compared with the moderate-AQ group. In contrast, their behavioral and physiological patterns were comparable to those shown in the low-AQ group. Thus, in the non-clinical adolescents, the spectrum of emotion recognition patterns might show a non-linear relationship with AQ scores, even suggesting that AQ could not be considered as a simple index for emotional processing.

Keywords: Autistic Traits; AQ; Emotions; Facial Expression; Event-Related Potentials

Introduction

Autism spectrum disorders (ASD) are neurodevelopmental disorders that interrupt social functioning, language, or communication and involve stereotyped repetitive behaviors and highly restricted interests (DSM-IV; American Psychiatric Association, 1994, ICD-10; World Health Organization, 1992). Previous researches have shown that recognition of emotional facial expressions was interrupted by autism (Dawson, Webb, Carver, Panagiotides, & McPartland, 2004; Dawson, Webb, & McPartland, 2005; Golan, Baron-Cohen, Hill, & Golan, 2006; Golan, Baron-Cohen, & Golan, 2008; Wong, Fung, Chua, & McAlonan, 2008; Wong, Fung, McAlonan, & Chua, 2009), and deficits in emotional processing are one of the central manifestation of autism.

Autistic characteristics are proposed to be continuously distributed in the entire population and can therefore be measured in a quantitative way by using an appropriate screening tool. Baron-Cohen et al. (2001) indicated that autistic-like traits in typically developing (non-clinical) individuals are measured with the Autism Spectrum Quotient (AQ). The AQ enables quantitative investigation of autistic traits among normally developing individuals. Previous articles have used AQ to compare between individuals with high AQ score and those with low AQ score in studies of visual processing (Almeida, Dickinson, Maybery, Badcock, & Badcock, 2010; Grinter, Maybery, Van Beek, Pellicano, Badcock, & Badcock, 2009), mirror-neuron activity (Puzzo, Cooper, Vetter, & Russo, 2010), or emotional processing (Poljac, Poljac, & Wagemans, 2012). These previous studies found that the high-AQ group displayed abnormal patterns compared to the low-AQ group, which validates the assumption that autism is a continuum even in the non-clinical population.

To attain an integrated view of the autistic-like trait continuity in non-clinical population, however, we have limited knowledge of the moderate-AQ group property, because previous AQ researches just conducted the comparison between two groups (high- and low-AQ groups). Also, these studies mainly addressed cognitive or behavioral patterns, and issues involving the relationship between physiological aspects and autistic traits remained almost unaddressed.

As a step toward elucidating the emotional spectral property or linearity of autistic traits distributed in the entire population, we investigated the behavioral (measured by accuracy and reaction times), and physiological (measured by ERPs) aspects of emotional face processing in non-clinical adolescents, even including the high-, moderate-, and low-AQ groups.

Methods

Participants

A total of 533 typical developing students (380 males, 153 females; aged 19.5 ± 1.6) at the University of Tokyo were initially screened with the Autism Spectrum Quotient-Japanese version (Wakabayashi, Tojo, Baron-Cohen, & Wheelwright, 2004). The Autism Spectrum Quotient (Baron-Cohen et al., 2001) is a self-report instrument (total scores range from 0 to 50) consisting of five subscales (Social, Attention Switching, Local Detail, Communication, and Imagination). The mean score on the AQ was 22.4, and the standard deviation was 6.74. We divided participants into three groups according to AQ scores; participants with scores that were at least one standard deviation higher (>29) or lower (<16) than the mean were placed in the high- and low-AQ groups respectively. Participants with scores around the mean (21 - 24) were placed in the moderate-AQ group. These three groups (high-AQ group, n = 97; moderate-AQ group, n = 135; low-AQ group, n = 111) were contacted via e-mail and invited to participate in the subsequent ERP experiment.

A total of 55 individuals (high-AQ group, n = 22; moderate-AQ group, n = 17; low-AQ group, n = 16) responded our invitation e-mail and agreed to participate in the ERP experiment. In the whole ERP study, 13 (out of 55) participants were excluded from the analysis due to excessive artifacts (n = 11; see EEG Recording section), equipment failure (n = 1), or sleepiness (n = 1). The high-AQ group comprised 14 adolescents (nine males and five females) aged 18 - 25 (M = 20.3, SD = 2.3) with AQ scores >29 (M = 31.7, SD = 2.4). The moderate-AQ group comprised 14 adolescents (nine males and five females) aged 18 - 22 (M = 20.1, SD = 1.4) with AQ scores 21 - 24 (M = 22.6, SD = .9). The low-AQ group comprised 14 adolescents (nine males and five females) aged 18 - 25 (M = 20.1, SD = 2.0) with AQ scores <16 (M = 11.8, SD = 2.7). All participants were right handed and had no history of neurological disease. All procedures were approved in advance by the Ethics Committee of the University of Tokyo, and all participants provided written informed consent before each experiment.

Stimuli

The stimuli for this study consisted of 144 photographs of 16 healthy professional actors (targets; eight males and eight females) displaying an emotional facial expression. Targets were instructed to direct their gaze toward the lens of camera, and instructed to express three emotions (anger, happiness, and neutrality) at three levels (high, medium, and low) of intensity. Each photograph was shown to a sample of 20 healthy participants (10 males and 10 females, age range: 22 - 58; randomly sampled separate from the present ASD study) who were asked to rate the emotions experienced by targets on a 7-point Likert scale ranging from "not at all" (0) to "extremely" (6). The resulting mean ratings ranged between 0 and 5.0 (high anger: M = 3.1, SD = 1.6; medium anger: M = 2.1, SD = 1.4; low anger: M = 1.7, SD = 1.4; high happiness: M = 4.0, SD = 1.4; medium happiness: M = 2.9, SD = 1.6; low happiness: M = 2.1, SD = 1.3; neutrality: M = .2, SD = .4) for the 144 photographs.

Procedure

The 144 photographs were pseudo-randomized to generate a sequence of 720 trials (each photograph was shown five times). Each face was presented for 500 ms on a screen (15-inch monitor), and inter-stimulus intervals varied between 1500 and 2000 ms to eliminate the effects of any anticipation experienced by participants. Participants were asked to look at a fixation point on a monitor situated 100 cm in front of them and not to move their eyes. Before each block of 48 trials, participants were instructed to press one of two buttons with their thumbs that corresponded to "emotional" (angry/happy) and "neutral" expressions in response to stimuli. Presentation version 14.1 (Neurobehavioral Systems, Inc., USA) was used to present the stimuli and to record the behavioral data (reaction times and button-press responses).

EEG Recording

A 32-channel NeuroScan scan system (Neuroscan, Inc., USA) was used to record scalp EEGs ranging from nasion to inion and from the right to the left ear. Electrode impedances were kept below 10 kΩ before recording. The continuous signal was amplified (×1000) and sampled at 500 Hz using the nasal-apex electrode as a reference. All electrodes were re-referenced to linked electrodes placed on the left and right earlobes, and a low-pass filter with a bandwidth of 30 Hz was applied. Vertical and horizontal electrooculograms (EOG) were also recorded to exclude trials with eye blinks and movements. ERPs and EOGs were recorded with a 100-ms pre-stimulus baseline and an 800-ms post-stimulus interval. A semiautomatic artifact-rejection procedure was applied to the continuous data. First, epochs containing amplitude changes exceeding 75 μV for the EOG and EEG channels were excluded. Next, all epochs and channels were scanned manually for additional disturbances. ERP data including more than 480 (out of 720) noise-free trials were used for the data analysis.

Data Analysis

We analyzed the behavioral data (accuracy and reaction times) using repeated-measures ANOVA with emotion (angry/happy/neutral) as the within-subject factor and group (high-, moderate-, and low-AQ) as the between-subjects factor. One participant in the high-AQ group was excluded from the analysis of behavioral data due to equipment failure.

The ERP data was analyzed by averaging the mean scores for each participant on the individual trials for each emotion and intensity. Using the components commonly analyzed in other ERP studies of emotional processing (Schupp, Ohman, Junghofer, Weike, Stockburger, & Hamm, 2004; see details in discussion), the late positive potential (LPP) was identified based on the direction of the peak and the grand-average latency of each component across the groups. To identify the LPP, the average PZ amplitudes between 500 and 600 ms post-stimulus were analyzed using a one-way ANOVA for emotion (anger, happiness, and neutrality) and using repeated-measures ANOVA for emotion (anger, happiness) and intensity (high, medium, and low). The mean LPP amplitude of each emotion was examined with a one-way ANOVA for group (high-, moderate-, and low-AQ). We applied the Greenhouse-Geisser adjustment for the violation of the sphericity assumption and performed the least-significant-difference (LSD) post-hoc test to assess specific differences. These calculations were performed with SPSS Statistics 19 (IBM, USA).

Results

Behavioral Data

Accuracy. The three groups did not differ significantly with respect the mean accuracy of responses {F(2, 38) = .138, p = n.s., power (1 − β error prob) = .70, effect size (η^2) = .0070; **Figure 1(a)**}. Data on response accuracy reflected a significant main effect of emotion {F(1.2, 47.1) = 13.98, $p < .001$, 1 − β = .98, η^2 = .27}. Participants found it easier to discriminate between happy and neutral expressions than between any other pairs of expressions (anger vs neutral & anger vs happy); this effect was beyond that for group membership ($p < .001$).

Reaction time. We found a significant main effect of emotion on the reaction times for accurate responses (F(1.3, 50.8) = 98.715, $p < .001$, 1 − β = 1.00, η^2 = .72; **Figure 1(b)**). The participants responded more rapidly to emotional (angry $p < .001$; happy $p < .001$) faces than to neutral faces. Additionally, we found a significant interaction between group and emotion (F(2.7, 50.8) = 3.843, $p < .05$, 1 − β = .76, η^2 = .17). The post-hoc test has shown that the moderate-AQ group tended to respond more rapidly to angry or neutral expressions than did the high-AQ group, and to happy faces than did the low-AQ group ($p < .10$).

The positivity of the average Pz amplitudes between 500 and 600 ms post-stimulus was significantly greater in response to emotional faces than to neutral faces (F(1.7, 69.9) = 7.637, $p < .01$, 1 − β = .91, η^2 = .16; **Figure 2(a)**). Additionally, we found a significant main effect of intensity (F(1.4, 58.1) = 33.419, $p < .001$, 1 − β = 1.00, η^2 = .45; **Figure 2(b)**) in that greater emotional intensity triggered greater positivity. Overall, this positive potential was identified as the LPP that is correlated with the emotional processing (see LPP details in discussion).

We observed a significant main effect of group beyond that of emotion (**Figure 2(c)**; angry: F(2, 39) = 4.121, $p < .05$, 1 − β = .70, η^2 = .17; happy: F(2, 39) = 3.322, $p < .05$, 1 − β = .60,η^2 = .15; neutral: F(2, 39) = 5.032, $p < .05$, 1 − β = .79, η^2 = .21) on the mean LPP amplitudes. The moderate-AQ group showed significantly higher LPP amplitudes than did the high-AQ group in response to angry ($p < .05$), happy ($p < .05$), and neutral faces ($p < .01$). The moderate-AQ group also showed significantly higher amplitudes than did the low-AQ group in response to all emotions ($p < .05$).

Discussion

In the present study, we investigated the relationship between autistic traits and the emotion recognition to verify the emotional spectral property of autistic traits in the entire population. Our data suggest that the high-AQ (and low-AQ) group might experience greater difficulty (lower LPPs) with emotion recognition than did the moderate-AQ group.

Behavioral Data

The response accuracy of individuals in the high-AQ group was comparable to that shown by other groups on the behavioral task. This result corresponds with the Interpersonal Reactivity Index (Davis, 1980) data in our cognitive study (Nixima, data not shown) and indicates that these individuals appropriately discriminate among the emotions of others. In contrast, the high-AQ group tended to require more time to detect facial emotions, which supports the findings of a previous study (Celani, Battacchi, & Arcidiacono, 1999). Consistent with a previous study of autistic individuals (Hubl et al., 2003), the behavioral data imply that the high-AQ group are able to correctly discriminate among emotional faces, although they sometimes require more time for processing.

It is important to note that the behavioral pattern of the low-AQ group was similar to that of the high-AQ group. They tended to require more time for emotional discrimination compared to the moderate-AQ group, but no significant differences in accuracy were observed among the three groups. The behavioral patterns in the low-AQ group should be further investigated in the future.

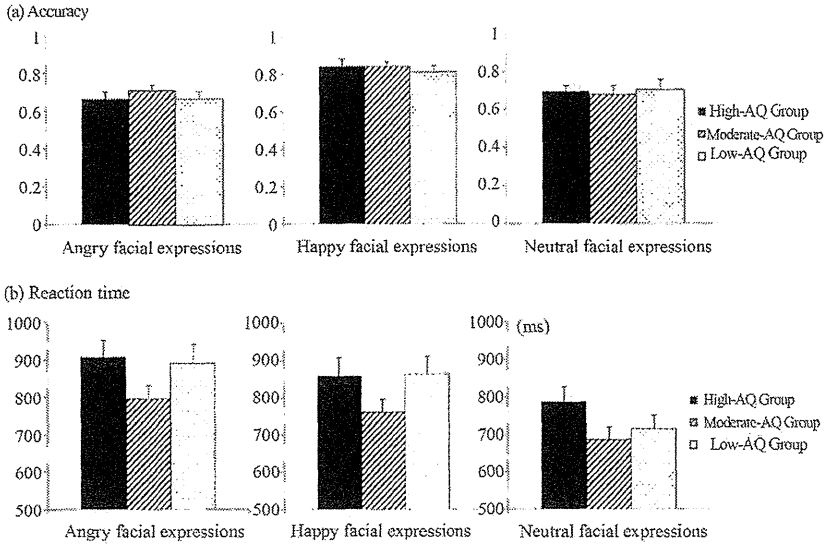

Figure 1.
(a) Accuracy results of the high-, moderate-, and low-AQ group for angry, happy, and neutral facial expressions; (b) Reaction time results of the high-, moderate-, and low-AQ group for angry, happy, and neutral facial expressions. Error bars indicate standard error of the mean (s.e.m), respectively.

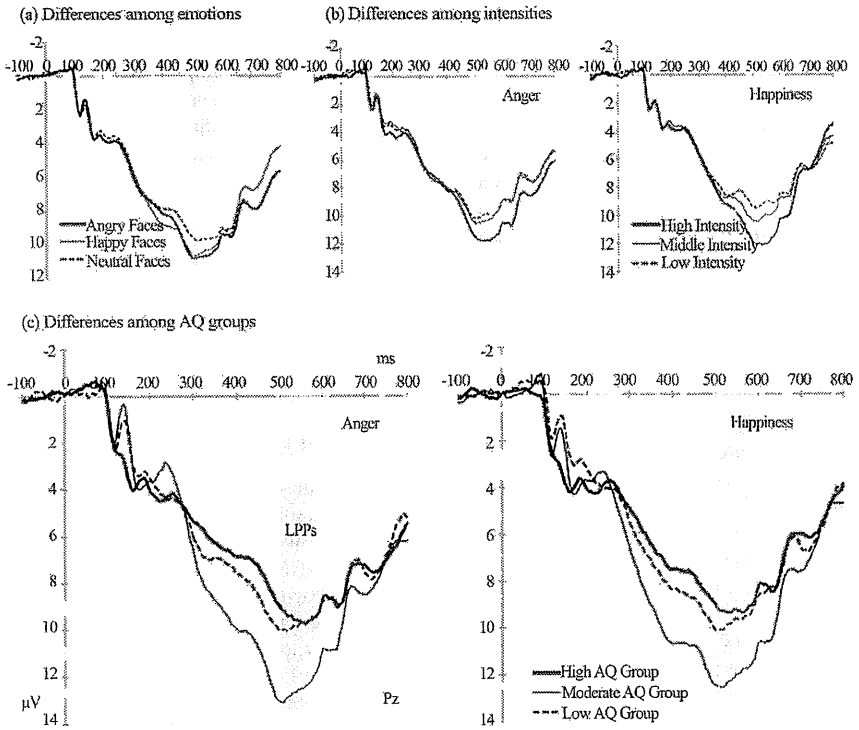

Figure 2.
(a) Grand-averaged ERPs elicited at Pz for angry, happy, and neutral facial expressions presented in a continuous sequence; (b) Grand-averaged ERPs for the high, middle, and low intensities of angry and happy facial expressions; (c) Grand-averaged ERPs for each AQ group elicited at Pz for angry and happy facial expressions.

ERP Data

We found significant group differences of late positive potentials (LPPs), late ERP components commonly analyzed in previous ERP studies of emotional processing (Schupp et al., 2004). LPPs have been considered to correlate with emotional processing and defined as the positive potentials of the ERPs over the centro-parietal sites between 400 and 600 ms post-stimulus (Schupp et al., 2004; Schupp, Flaisch, Stockburger, & Junghofer, 2006) that might reflect activity within neocortical brain circuits (Eimer & Holmes, 2007). Such LPP patterns for angry and happy faces in this study were consistent with a previous ERP study (Eimer & Holmes, 2003).

In the present study, the high-AQ group displayed significant lower LPP amplitudes than the moderate-AQ group. The neural activity difference between these two groups can be supported by the results of previous ERP studies of autistic individuals (Dawson et al., 2004; Wong et al., 2008; as described below). In contrast, the low-AQ group also demonstrated lower LPP amplitudes than did the moderate-AQ group. Although these results are consistent with the result of the reaction time patterns in this study, the similar patterns between the high- and low-AQ groups should be further investigated in the future.

The abnormal ERP patterns of autistic individuals compared with the typical developing participants have been reported by previous studies (Dawson et al., 2004; Wong et al., 2008). For example, Dawson et al. (2004) utilized high-density ERPs to investigate responses to fearful versus neutral faces in children with autism, and found that children with autism demonstrated impaired neural responses to both kinds of faces. These previous researches mainly addressed early ERP components (such as P1 or N170), which might represent an early-low level stage of holistic face perception or the structural encoding of a face (Taylor, 2002; Itier & Taylor, 2002). In our own study, we also analyzed these early ERP components at each channel, but there were no significant difference among groups (data not shown). The early ERP components (P1 or N170) are generally smaller components than LPPs, and the difference among groups in the non-clinical participants might be hardly detected.

Autistic Traits and Emotional Recognition in Non-Clinical Adolescence

The relationship of behavioral and physiological patterns between the high- and moderate-AQ group, taken together, validate the conceptualization of autistic traits as a continuum that includes normally developing individuals. We suggest that the presence of high autistic traits interrupts the instantaneous discrimination of emotions.

In contrast, the low-AQ group demonstrated comparable behavioral and physiological patterns to the high-AQ group. If this is the case, the spectrum of emotional recognition possibly shows a non-linear relationship with AQ scores. The emotional continuum of autistic traits might be ambiguous in the non-clinical population, rendering the AQ unable to identify autistic traits in those with low scores. The difference between low and moderate AQ score means little in terms of the presence of autistic traits for emotional recognition, given that the AQ, as a clinical screening tool, identifies only high autistic-like individuals. In other words, the AQ can be considered to be sensitive to

the spectrum of emotional processing in high or moderate autistic traits, and might not adequately capture the variability in the normal range including low autistic traits. To apply the AQ for comparison with high autistic traits in normal individuals, moderate autistic traits should be more remarked than low autistic traits, from the behavioral/physiological aspect of emotional processing. Consequently, investigations of the usefulness of the AQ for quantifying autistic traits in non-clinical individuals, especially those with low autistic-like traits, must continue.

Conclusion

Our results suggest that the high-AQ group have different patterns (longer reaction times and lower LPPs) of the emotional processing underpinning behavioral and physiological responses compared to the moderate-AQ group, which affirms the autistic-like trait continuity underlying the AQ as well as the results of previous studies. This study has also shown that, similar to the high-AQ group, the low-AQ group shows a comparable pattern of emotion recognition, suggesting that the spectrum of emotion recognition in autism would show a non-linear relationship with AQ scores. The results in our study possibly mean that AQ could not be considered as a simple index for emotional processing and needs to be further investigated in the future.

Acknowledgements

This work was supported by the Okanoya Emotional Information Project of the Japan Science and Technology Agency (JST-ERATO).

REFERENCES

Almeida, R. A., Dickinson, J. E., Maybery, M. T., Badcock, J. C., & Badcock, D. R. (2010). A new step towards understanding Embedded Figures Test performance in the autism spectrum: The radical frequency search task. *Neuropsychologia, 48,* 374-381. doi:10.1016/j.neuropsychologia.2009.09.024

American Psychiatric Association (2000). Diagnostic and statistical manual of mental disorders: DSM-IV-TR. Washington, DC: American Psychiatric Association.

Baron-Cohen, S., Wheelwright, S., Skinner, R., Martin, J., & Clubley, E. (2001). The Autism-spectrum Quotient (AQ): Evidence from Asperger syndrome/high-functioning autism, males and females, scientists and mathematicians. *Journal of Autism and Developmental Disorders, 31,* 5-17. doi:10.1023/A:1005653411471

Celani, G., Battacchi, M. W., & Arcidiacono, L. (1999). The understanding of the emotional meaning of facial expressions in people with autism. *Journal of Autism and Developmental Disorders, 29,* 57-65. doi:10.1023/A:1025970600181

Davis, M. H. (1980). A multidimensional approach to individual differences in empathy. *JSAS Catalog of Selected Documents in Psychology, 10,* 85.

Dawson, G., Webb, S. J., Carver, L., Panagiotides, H., & McPartland, J. (2004). Young children with autism show atypical brain responses to fearful versus neutral facial expressions of emotion. *Developmental Science, 7,* 340-359. doi:10.1111/j.1467-7687.2004.00352.x

Dawson, G., Webb, S. J., & McPartland, J. (2005). Understanding the nature of face processing impairment in autism: Insights from behavioral and electrophysiological studies. *Developmental Neuropsychology, 27,* 403-424. doi:10.1207/s15326942dn2703_6

Eimer, M., & Holmes, A. (2007). Event-related brain potential correlates of emotional face processing. *Neuropsychologia, 45,* 15-31. doi:10.1016/j.neuropsychologia.2006.04.022

Eimer, M., & Holmes, A. (2003). The role of spatial attention in the processing of facial expression: An ERP study of rapid brain responses to six basic emotions. *Cognitive, Affective, & Behavioral Neuroscience, 3,* 97-110. doi:10.3758/CABN.3.2.97

Golan, O., Baron-Cohen, S., Hill, J. J., & Golan, Y. (2006). The "reading the mind in films" task: Complex emotion recognition in adults with and without autism spectrum conditions. *Social Neuroscience, 1,* 111-123. doi:10.1080/17470910600980986

Golan, O., Baron-Cohen, S. & Golan, Y. (2008). The "reading the mind in films" task [child version]: Complex emotion recognition in adults with and without autism spectrum conditions. *Journal of Autism and Developmental Disorders, 38,* 1534-1541. doi:10.1007/s10803-007-0533-7

Grinter, E. J., Maybery, M. T., Van Beek, P. L., Pellicano, E., Badcock, J. C., & Badcock, D. R. (2009). Global visual processing and self-rated autistic-like traits. *Journal of Autism and Developmental Disorders, 39,* 1278-1290. doi:10.1007/s10803-009-0740-5

Hubl, D., Bolte, S., Feineis-Matthews, S., Lanfermann, H., Federspiel, A., Strik, W., et al. (2003). Functional imbalance of visual pathways indicates alternative face processing strategies in autism. *Neurology, 61,* 1232-1237. doi:10.1212/01.WNL.0000091862.22033.1A

Itier, R. J., & Taylor, M. J. (2002). Inversion and contrast polarity reversal affect both encoding and recognition processes of unfamiliar faces: A repetition study using ERPs. *NeuroImage, 15,* 353-372. doi:10.1006/nimg.2001.0982

Poljac, E., Poljac, E., & Wagemans, J. (2012). Reduced accuracy and sensitivity in the perception of emotional facial expressions in individuals with high autism spectrum traits. *Autism,* E-published ahead of print. doi:10.1177/1362361312455703

Puzzo, I., Cooper, N. R., Vetter, P., & Russo, R. (2010). EEG activation differences in the pre-motor cortex and supplementary motor area between normal individuals with high and low traits of autism. *Brain Research, 1342,* 104-110. doi:10.1016/j.brainres.2010.04.060

Schupp, H. T., Flaisch, T., Stockburger, & J., Junghofer, M. (2006). Emotion and attention: Event-related brain potential studies. *Progress in Brain Research, 156,* 31-51. doi:10.1016/S0079-6123(06)56002-9

Schupp, H. T., Ohman, A., Junghofer, M., Weike, A. I., Stockburger, J., & Hamm, A. O. (2004). The facilitated processing of threatening faces: An ERP analysis. *Emotion, 4,* 189-200. doi:10.1037/1528-3542.4.2.189

Taylor, M. J. (2002). Non-spatial attentional effects on P1. *Clinical Neurophysiology, 113,* 1903-1908. doi:10.1016/S1388-2457(02)00309-7

Wakabayashi, A., Tojo, Y., Baron-Cohen, S., & Wheelwright, S. (2004). The Autism-Spectrum Quotient (AQ) Japanese version: Evidence from high-functioning clinical group and normal adults. *Shinrigaku Kenkyu Japanese Journal of Psychology, 75,* 78-84. doi:10.4992/jjpsy.75.78

Wong, T. K. W., Fung, P. C. W., Chua, S. E., & McAlonan, G. M. (2008). Abnormal spatiotemporal processing of emotional facial expressions in childhood autism: Dipole source analysis of event-related potentials. *European Journal of Neuroscience, 28,* 407-416. doi:10.1111/j.1460-9568.2008.06328.x

Wong, T. K. W., Fung, P. C. W., McAlonan, G. M., & Chua, S. E. (2009). Spatiotemporal dipole source localization of face processing ERPs in adolescents: A preliminary study. *Behavioral and Brain Function, 5,* 16. doi:10.1186/1744-9081-5-16

World Health Organization (1992). *The ICD-10 classification of mental and behavioral disorders: Clinical descriptions and diagnostic guidelines*. Geneva: World Health Organization.

Psycho-Oncology
Psycho-Oncology **22**: 995–1001 (2013)
Published online 2 May 2012 in Wiley Online Library (wileyonlinelibrary.com). **DOI**: 10.1002/pon.3090

Impaired mental health among the bereaved spouses of cancer patients

Mariko Asai[1,2,13]*, Nobuya Akizuki[1,3], Maiko Fujimori[1], Ken Shimizu[4], Asao Ogawa[1], Yutaka Matsui[2], Tatsuo Akechi[5], Kuniaki Itoh[6], Masafumi Ikeda[7], Ryuichi Hayashi[8], Taira Kinoshita[9], Atsushi Ohtsu[10], Kanji Nagai[11], Hiroya Kinoshita[1,12] and Yosuke Uchitomi[1]

[1]*Psycho-Oncology Division, Research Center for Innovative Oncology, National Cancer Center Hospital East, Kashiwa, Chiba, Japan*
[2]*Graduate School of Comprehensive Human Sciences, University of Tsukuba, Tsukuba, Ibaraki, Japan*
[3]*Psycho-Oncology Division, Chiba Cancer Center, Chiba, Chiba, Japan*
[4]*Psychiatric Services Division, National Cancer Center Hospital, Tokyo, Japan*
[5]*Department of Psychiatry and Cognitive-Behavioral Medicine, Nagoya City University Graduate School of Medical Sciences, Nagoya, Aichi, Japan*
[6]*Hematology Oncology Division, National Cancer Center Hospital East, Kashiwa, Chiba, Japan*
[7]*Hepatobiliary and Pancreatic Oncology Division, National Cancer Center Hospital East, Kashiwa, Chiba, Japan*
[8]*Head and Neck Surgery Division, National Cancer Center Hospital East, Kashiwa, Chiba, Japan*
[9]*Gastric Surgery Division, National Cancer Center Hospital East, Kashiwa, Chiba, Japan*
[10]*Digestive Endoscopy and Gastrointestinal Oncology Division, National Cancer Center Hospital East, Kashiwa, Chiba, Japan*
[11]*Thoracic Surgery Division, National Cancer Center Hospital East, Kashiwa, Chiba, Japan*
[12]*Palliative Care Division, National Cancer Center Hospital East, Kashiwa, Chiba, Japan*
[13]*Graduate School of Clinical Psychology, Teikyo Heisei University, Toshima, Tokyo, Japan*

**Correspondence to: Graduate School of Clinical Psychology, Teikyo Heisei University, 2-51-4 Higashi-Ikebukuro, Toshima, Tokyo 170–8445, Japan. E-mail: m.asai@thu. ac.jp*

Received: 14 October 2011
Revised: 16 February 2012
Accepted: 2 April 2012

Abstract

Objective: **Few cancer physicians routinely provide bereavement follow-up in clinical practice. The purpose of this study was to identify the prevalence of impaired mental health among the bereaved spouses over several years and explore the indicators for early detection of high-risk spouses during end-of life (EOL) care.**

Methods: **A cross-sectional mail survey was conducted for the bereaved spouses of patients who had died at the National Cancer Center Hospital of Japan. Bereaved spouses with potential psychiatric disorders were identified by the cut-off score of the 28-item General Health Questionnaire. Associated factors of potential psychiatric disorders were explored by logistic regression analysis.**

Results: **A total of 821 spouses experiencing bereavement from 7 months to 7 years returned the questionnaires. Overall mean prevalence of potential psychiatric disorders was 44% (360/821). Bereaved spouses 'under 55 years' (71%) or '2 years after bereavement' (59%) revealed a significantly higher prevalence ($p < 0.01$). Associated factors during EOL care were several characteristics such as 'spouses' history of psychiatric disorder (odds ratio (OR) = 3.19), 'patients' with stomach cancer (OR = 1.87), and 'patients' using psychiatric consultation services (OR = 1.52) as well as spouses' dissatisfaction with EOL care such as 'physicians' treatment of physical symptoms' (OR = 3.44) and 'time spent communicating with patients' (OR = 1.55).**

Conclusions: **Nearly half the bereaved spouses showed potential psychiatric disorders even 7 years after bereavement. Patients' psychological distress, spouses' history of psychiatric disorder, and dissatisfaction with EOL care were indicators of high-risk spouses.**

Introduction

Conjugal bereavement was the strongest risk factor for depression among elderly community subjects in a meta-analysis of 20 studies (odds ratio (OR) = 3.3) [1] and bereaved spouses showed a significant increase in the risk of depression compared with married people in large cohort studies (1.5-fold, 3.6-fold) [2,3]. In oncology settings, spouses experienced the highest levels of distress among family members at the time of patient death [4] and bereavement brought an increased risk of major depressive disorder [5,6]. Cancer is a leading cause of death worldwide and accounted for 7.6 million deaths (around 13% of all deaths) in 2008 [7]; however, few cancer physicians routinely provide bereavement follow-up in clinical practice [8].

Several longitudinal studies have reported that impaired mental health among the bereaved clearly diminishes over time. The prevalence of major depressive disorder among caregivers of cancer patients was identified by clinical interview: 28% at the time of hospice enrollment, 12% at 6 months after death, and 7% at 1 year after death [5,6]. Depression, anxiety, and grief measured by self-administered questionnaire decreased during the first year after bereavement [9–11] and then remained unchanged over the next year [11]. On the other hand, cross-sectional studies reported that negative effects such as anger, sadness, self-blame, and guilt did not decrease among those who had been bereaved for more than 4 years [12,13] and 25% of the bereaved parents had not worked through their grief even 4–9 years after the loss [14]. However,

these persistent symptoms could not predict the prevalence of potential psychiatric disorders among the bereaved.

Impaired mental health among the bereaved who have lost a relative to cancer is associated with several characteristics of the patients and the bereaved. As for clinical characteristics of cancer patients, 'short duration of hospice enrollment' [5,6], 'intensive end-of-life (EOL) care' [15], and 'ICU death' [16] were associated with impaired mental health among the bereaved. In addition, bereaved characteristics of 'under 65 years' [9], 'female' [5,17,18], 'spouse' [5], 'prior physical symptoms' [5], 'prior depression' [5,9,17], and 'anticipatory grief' [16] were also reported. However, these associated factors are not useful as indicators for early detection of high-risk spouses during EOL care in clinical practice at a hospital even though 90% of cancer patients in Japan die in a hospital [19].

In the present study, the primary purpose was to identify the prevalence of impaired mental health that can be used to predict the prevalence of potential psychiatric disorders among the bereaved who have lost their spouse to cancer. The secondary purpose was to investigate associated factors of the prevalence so that we could suggest the indicators for early detection of high-risk spouses during EOL care.

Methods

Study sample

We conducted a cross-sectional mail survey for the bereaved spouses whose partner had died at the National Cancer Center Hospital East (NCCHE). This study was approved by the Institutional Review Board and Ethics Committee of the National Cancer Center of Japan in January 2009.

First, in January 2009, we found it necessary to identify family members to whom we intended to mail study participation invitations; this was because of a lack of accurate data about marital status in the hospital patient database. Eligibility criteria were (i) patient's primary clinician belonging to the eight divisions cooperating with this study (Hematology, Pancreatic, Head and Neck, Gastric Surgery, Gastrointestinal, Thoracic Surgery, Thoracic Oncology, and Palliative Care), which covered 98% of the patients who died at NCCHE; (ii) patient's data available in the hospital's patient database operating since January 2001; and (iii) patient's death occurring at least 6 months earlier. Exclusion criteria and flow of the study sample are explained in Figure 1.

We matched the demographic characteristics of the deceased cancer patients drawn from the hospital patient database with those of the bereaved spouses based on the completed questionnaires. Respondents' characteristics ($n=821$) showed a lower proportion of males (30%, $n=242$ vs. 36%, $n=753$, $p<0.01$) and a shorter duration of bereavement (3.0 ± 1.9 vs. 3.2 ± 2.0 years, $p<0.01$) compared with the non-responders ($n=2081$) among the 2902 candidate participants; the difference in values of the deceased patients' characteristics such as age, duration of last hospital admission, place of death, history of usage of psychiatric consultation services, and cancer site was not significant.

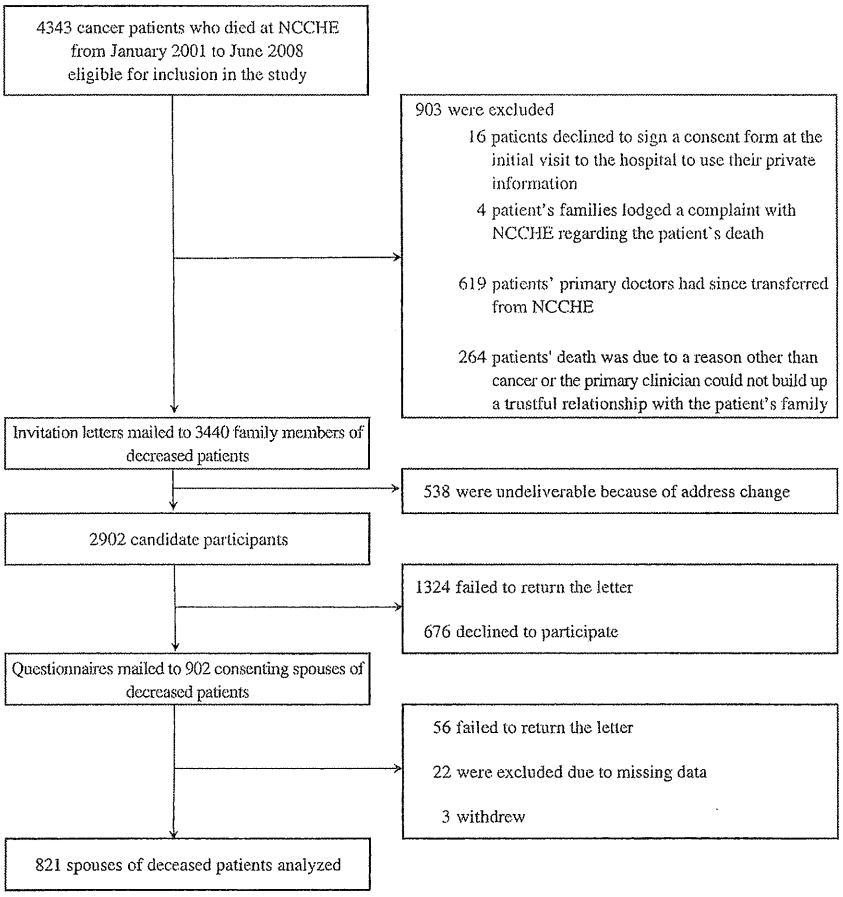

Figure 1. Flow of study sample

DOI: 10.1002/pon

Measures

Deceased patients' characteristics

We examined the overall computerized patient database of NCCHE to identify cancer patients' characteristics. Time since cancer diagnosis to death was declared in the questionnaires completed by the bereaved. History of usage of psychiatric consultation services was identified by using the consultation database developed by the Psychiatric Services Division of the NCCHE. This computerized database [20] includes demographic variables and psychiatric disorders of patients who were referred to the Psychiatric Services Division.

Bereaved spouses' characteristics

The questionnaires completed by the bereaved spouses included physical and psychological information such as physical illness under treatment and history of psychiatric disorder prior to their partner's death as well as demographic variables.

Dissatisfaction with EOL care

The bereaved spouses retrospectively reported their dissatisfaction with EOL caregiving (five items) and physician's EOL care (four items) during the month prior to the patient's death using a five-point Likert-type scale (0: very satisfied, 1: fairly satisfied, 2: neutral 3: fairly dissatisfied, 4: very dissatisfied). We rescored each item as 0 (absence of dissatisfaction, 0–2) or 1 (presence of dissatisfaction, 3–4) in this study.

Impaired mental health

The General Health Questionnaire (GHQ), using a four-point Likert-type scale (possible range, 0–3; higher scores indicate impaired mental health), has been widely used to detect persons with nonspecific psychiatric disorders [21]. We used the validated Japanese 28-item version (GHQ28 [22]). Persons with potential psychiatric disorders were identified by the cut-off score of the GHQ scoring method (0-0-1-1; possible range, 0–28; cut-off score, 5/6). This cut-off score showed the best sensitivity and specificity when compared with the ratings of the clinical interview [23,24] and this approach has shown its applicability to the Japanese version [22].

Statistical analysis

Impaired mental health was compared using analysis of variance with the Bonferroni multiple comparison method or *t*-test. Potential psychiatric disorders were compared by using the chi-square test with residual analysis. Variables showing p-values < 0.05 in the univariate analysis were entered as independent variables in a multivariate logistic regression analysis with backward elimination to identify associated factors of potential psychiatric disorders.

P-values < 0.05 were considered significant and all p-values were two-tailed. All statistical analyses were carried out using SPSS ver.12.0J for Windows (SPSS Japan Institute Inc., Tokyo, Japan).

Results

Characteristics of deceased patients/bereaved spouses

Table 1 summarizes the characteristics of the 821 participants experiencing bereavement from 7 months to 7 years.

Table 1. Characteristics of deceased patients and bereaved spouses ($n = 821$)

	Mean ± SD (median, range)	*n*	(%)
Deceased patients' characteristics			
Age, years	64 ± 9.0 (65, 32–88)		
Time since cancer diagnosis to death, months	27 ± 29 (16, 1–187)		
Duration of last hospital admission, days	27 ± 29 (17, 1–208)		
Bereaved spouses' characteristics			
Age, years	66 ± 9.0 (66, 32–89)		
Time since bereavement, years	3.0 ± 1.9 (3.0, 0.6–7.2)		
Gender			
Male		242	30
Female		579	70

SD, standard deviation.

In this study, 579 bereaved (70%) were female, 441 patients (54%) died in the Palliative Care Unit, and 629 bereaved (77%) were involved in EOL caregiving 'everyday'.

Prevalence of impaired mental health and potential psychiatric disorders

As shown in Table 2, we estimated the population of bereaved spouses to be 2649 by multiplying the total number of 4343 deceased patients by 0.61, which is the approximate ratio of Japanese cancer patients who have a spouse at the time of death among overall cancer deaths in Japan in 2007 (206,389/336,139)[19]. As a result, the overall sampling rate (estimated) was 31% (821/2,649), and the prevalence of potential psychiatric disorders was 44% (360/821, 95% CI = 40.6–47.4).

With impaired mental health, three-way interaction (age × gender × time) was not significant (F (18, 689) = 1.56, $p = 0.07$). Two-way interaction (age × gender: F (3, 689) = 2.75, $p = 0.04$) was significant: males 'under 55 years' showed significantly greater prevalence than males '55–64 years' or 'over 75 years' (F (3, 214) = 3.66, $p = 0.01$, A0 > A1, A3, $p < 0.05$) and females 'under 55 years' or '55–64 years' showed significantly greater prevalence than females '65–74 years' (F (3, 533) = 4.65, $p < 0.01$, A0, A1 > A2, $p < 0.05$). The main effect of time was significant (F (6, 689) = 2.71, $p = 0.01$): the bereaved who had lost their spouse '2 years ago' revealed significantly greater prevalence than those who had lost their spouse '4 years ago' with multiple comparison (F (2, 738) = 3.31, $p < 0.01$, T2 > T4, $p < 0.05$).

The prevalence of the bereaved varied with age and time: 'under 55 years' (71%) revealed significantly higher prevalence than those '65–74 years' (42%) (χ^2 (3) = 23.17, $p < 0.01$, A0 > A2, $p < 0.01$) and the bereaved who had lost their spouse '2 years ago' (59%) revealed significantly higher prevalence than those who had lost their spouse '4 years ago' (37%) (χ^2 (6) = 17.81, $p < 0.01$, T2 > T4, $p < 0.01$). No significant difference was observed between genders (χ^2 (1) = 1.08, $p = 0.34$).

Factors associated with potential psychiatric disorders

In the univariate analysis, 14 variables were significantly associated with potential psychiatric disorders ($p < 0.05$, Table 3). Table 4 shows the results of a multivariate logistic regression analysis: 'patients using psychiatric consultation

Table 2. Prevalence of impaired mental health and potential psychiatric disorders among bereaved spouses of cancer patients

			Deceased patients	Population[a] (estimated)	Sample	Sample rate (estimated)	Impaired mental health (GHQ28, 0–28)		Potential psychiatric disorders (GHQ28 ≥ 6)	
	Year	Group	*N*	*N'*	*n*	% (*n*/*N'*)	Mean (SD)	*n'*	% (*n'*/*n*)	95% CI
Total			4343	2649	821	31	7.17 (6.79)	360	44	40.6–47.4
Age										
	-54	A0			75		(9.95) 6.59	53	71	60.4–81.0
	55–64	A1			232		7.65 (6.77)	118	51	44.5–57.3
	65–74	A2			339		6.37 (6.68)	141	42	36.4–46.9
	75–	A3			109		6.62 (6.77)	46	42	32.9–51.5
Gender										
Male			1494	911	220	24	6.93 (6.65)	98	45	37.9–51.1
Female			2849	1738	538	31	7.27 (6.86)	262	49	44.5–52.9
Time since bereavement										
	<1	T0	258	157	55	35	8.67 (7.41)	30	55	41.3–67.7
	<2	T1	668	407	133	33	7.79 (7.38)	66	50	41.1–58.1
	<3	T2	611	373	134	36	8.60 (6.92)	79	59	50.7–67.3
	<4	T3	616	376	111	30	6.00 (6.29)	44	40	30.5–48.7
	<5	T4	643	392	96	24	5.48 (6.05)	35	37	26.9–46.1
	<6	T5	671	409	108	26	6.74 (6.56)	45	42	32.4–51.0
	≥6	T6	876	534	108	20	6.97 (6.55)	55	51	41.5–60.3

Some percentages do not add up to 100% because of missing data.

SD, standard deviation; CI, confidence interval.

[a]Population was estimated by multiplying the number of deceased patients (*N*) by 0.61, which is the approximate ratio of Japanese cancer patients who have a spouse at the time of death among overall cancer deaths in Japan in 2007.

services' (OR = 1.52), 'patients with stomach cancer' (OR = 1.87), and 'bereaved with a history of psychiatric disorder' (OR = 3.19) were significantly associated factors among the characteristics of patients/bereaved prior to the patient's death. Additionally, 'time spent communicating with patients' (OR = 1.55) and 'physician's treatment of physical symptoms' (OR = 3.44) were significantly associated factors among the bereaved spouses' dissatisfaction with EOL care during the final month.

Discussion

In this study, we identified a considerably high prevalence of potential psychiatric disorders among the bereaved (44% of total respondents). Patients' psychological distress, bereaved spouses' history of psychiatric disorder, and dissatisfaction with EOL care were indicators for early detection of high-risk spouses prior to the patient's death.

Our results indicated that, even 7 years after losing their spouse, a significant number of the bereaved have potential psychiatric disorders (37–59%). This is a higher prevalence than that of consecutive patients in general practice in Britain (35%) [25] and is three-fold higher than that of a healthy sample in Japan (14%) [22]. We discuss this high prevalence from two aspects of the results. First, more than half the spouses within less than 3 years since bereavement showed potential psychiatric disorders. This high prevalence might be inflated by normal grief, a common psychological reaction among the bereaved. Our results support those of the previous studies in which prevalence decreased during the first year after bereavement [9–11]. However, our results do not support previous results where prevalence remained unchanged over the second year [11]. This discrepancy might partly be because of spouses participating in the Japanese Buddhist rite of *sankaiki* where bereaved families gather together on the second anniversary of the death and reminisce about the deceased. This mourning ceremony might increase the psychological distress of the bereaved by triggering negative psychological states such as yearning, an unfulfilled desire to reunite with the deceased. Second, around 40% of the respondents whose bereavement was 3–7 years earlier showed potential psychiatric disorders. Even though their psychological distress might have eased somewhat after the mourning ceremony in the second year, the prevalence of both impaired mental health and potential psychiatric disorders was considerably high among the spouses after bereavement. This result could be because of subsequent physical problems of the bereaved because 'physical illness under treatment' was significantly associated with morbidity. However, this persistent prevalence might suggest prolonged bereavement distress because dissatisfaction with EOL (their caregiving and the physician's care) was strongly associated with potential psychiatric disorders in this study.

Among the characteristics of patients/bereaved, 'bereaved spouse's history of psychiatric disorders prior to the patient's death' was the most highly correlated factor (OR = 3.19) and replicated previous studies on the indicators of vulnerability to bereavement stress [5,9,17]. Patients with stomach cancer in this study might have a higher rate of psychological symptoms because the highest rate of mixed anxiety/depression symptoms (20%) was seen with stomach cancer patients among 22 cancer types in a large cohort study [26]. Considering the positive association between patient and caregiver psychological distress in meta-analyses [27,28], patients' psychological distress factors of 'stomach cancer' or 'usage of psychiatric consultation service' could raise spouses' psychological distress prior to the patient's death. In addition, because psychological distress of caregivers prior to the patient's death predicted its prevalence after bereavement in a longitudinal multisite study [16], the initial detection of spouses with high psychological distress prior to the patient's death might be the most useful strategy for preventing subsequent impaired mental health among the bereaved.

Table 3. Factors associated with potential psychiatric disorders among bereaved spouses of cancer patients: univariate analysis

			Potential psychiatric disorders					
	Total		Presence		Absence		Analysis	
Variables	*n*	(%)	*n*	(%)	*n*	(%)	χ^2	*p*
Deceased patients' characteristics								
Age (< 65 years)	386	(47.0)	198	(51.3)	188	(48.7)	4.56	0.04
Time since cancer diagnosis to death (< 1 year)	285	(34.7)	144	(50.5)	141	(49.5)	1.69	0.20
Duration of last hospital admission (< 1 week)	182	(22.2)	93	(51.1)	89	(48.9)	1.25	0.27
Place of death (Palliative care unit)	402	(49.0)	190	(47.3)	212	(52.7)	0.02	0.94
History of usage of psychiatric consultation service	152	(18.5)	87	(57.2)	65	(42.8)	7.24	<0.01
Cancer site				(51.3)		(48.7)		
Lung	241	(29.4)	113	(46.9)	128	(53.1)	0.05	0.88
Pancreas	88	(10.7)	39	(44.3)	49	(55.7)	0.40	0.57
Stomach	60	(7.3)	38	(63.3)	22	(36.7)	6.56	0.02
Colon	63	(7.7)	24	(38.1)	39	(61.9)	2.42	0.15
Head and neck	60	(7.3)	25	(41.7)	35	(58.3)	0.89	0.42
Esophagus	45	(5.5)	26	(57.8)	19	(42.2)	2.03	0.17
Breast	41	(5.0)	20	(48.8)	21	(51.2)	0.03	0.87
Liver	38	(4.6)	17	(44.7)	21	(55.3)	0.12	0.74
Biliary tract	33	(4.0)	19	(57.6)	14	(42.4)	1.41	0.29
Lymphoma	9	(1.1)	4	(44.4)	5	(55.6)	0.03	1.00
Bereaved spouses' characteristics								
Age (< 65 years)	307	(37.4)	171	(55.7)	136	(44.3)	13.94	<0.01
Gender (Male)	220	(26.8)	98	(44.5)	122	(55.5)	1.08	0.34
Time since bereavement (< 3 years)	322	(39.2)	175	(54.3)	147	(45.7)	10.55	<0.01
Living status (Living alone)	363	(44.2)	171	(47.1)	192	(52.9)	0.04	0.88
Employment status (Employed)	216	(26.3)	106	(49.1)	110	(50.9)	0.30	0.63
Education (≤9 years)	121	(14.7)	51	(42.1)	70	(57.9)	1.65	0.23
Physical illness under treatment	424	(51.6)	227	(53.5)	197	(46.5)	14.10	<0.01
History of any psychiatric disorder prior to patients' death	60	(7.3)	43	(71.7)	17	(28.3)	15.37	<0.01
Bereavement experience after the death of spouse	196	(23.9)	91	(46.4)	105	(53.6)	0.12	0.74
Religiousness	311	(37.9)	157	(50.5)	154	(49.5)	1.89	0.18
Involvement in end-of-life caregiving (Everyday)	579	(70.5)	285	(49.2)	294	(50.8)	2.94	0.09
Dissatisfaction with end-of-life caregiving								
Knowledge of physical symptoms and management	235	(28.6)	130	(55.3)	105	(44.7)	9.01	<0.01
Professional supports for physical symptoms and management	177	(21.6)	104	(58.8)	73	(41.2)	12.31	<0.01
Knowledge of psychological symptoms and management	228	(27.8)	119	(52.2)	109	(47.8)	3.20	0.08
Professional supports for psychological symptoms and management	208	(25.3)	122	(58.7)	86	(41.3)	14.99	<0.01
Time spent communicating with patients	169	(20.6)	99	(58.6)	70	(41.4)	10.93	<0.01
Dissatisfaction with physicians' end-of-life care								
Treatment of physical symptoms	67	(8.2)	49	(73.1)	18	(26.9)	19.44	<0.01
Treatment of psychological symptoms	119	(14.5)	71	(59.7)	48	(40.3)	8.66	<0.01
Time spent communicating with patients	191	(23.3)	104	(54.5)	87	(45.5)	5.21	<0.01
Time spent communicating with patients' families	232	(28.3)	123	(53.0)	109	(47.0)	4.17	0.05

Fisher's exact test was performed when the sample number was less than 10. All variables were coded as: 0 = absence, 1 = presence.

Table 4. Factors associated with potential psychiatric disorders among bereaved spouses of cancer patients: multivariate logistic regression analysis

Variables	Beta	SE	OR	95% CI	p
Deceased patients' characteristics					
History of usage of psychiatric consultation service	0.42	0.20	1.52	1.02–2.26	0.04
Stomach cancer	0.63	0.30	1.87	1.04–3.38	0.04
Bereaved spouses' characteristics					
Age (< 65 years)	0.72	0.17	2.06	1.47–2.88	<0.01
Time since bereavement (< 3 years)	0.46	0.16	1.58	1.15–2.17	<0.01
Physical illness under treatment	0.82	0.17	2.26	1.62–3.16	<0.01
History of any psychiatric disorder prior to the patient's death	1.16	0.33	3.19	1.68–6.06	<0.01
Dissatisfaction with end-of-life caregiving					
Knowledge of physical symptoms and management	0.32	0.18	1.38	0.97–1.96	0.07
Time spent communicating with patients	0.44	0.20	1.55	1.05–2.30	0.03
Dissatisfaction with physicians' end-of-life care					
Treatment of physical symptoms	1.24	0.31	3.44	1.89–6.26	<0.01

Beta values indicate standardized regression coefficients on the final model after backward elimination. All variables were coded as: 0 = absence, 1 = presence.
SE, standard error; OR, odds ratio; CI, confidence interval.

DOI: 10.1002/pon