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Correlates of oncologist-issued referrals for psycho-oncology services: what we learned from the electronic voluntary screening and referral system for depression (eVSRS-D)

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Abstract

***Objective*: Depression in cancer patients is under-recognized and under-treated. To better identify depression, we designed a voluntary depression screening system. Based on its data, we examined trends in oncologist-issued referrals for the psycho-oncology service (POS).**

***Methods*: The Electronic Voluntary Screening and Referral System for Depression (eVSRS-D) comprises self-screening, automated reporting, and referral guidance. Using touch-screen kiosks at a tertiary hospital in Korea, participants with cancer completed the Patient Health Questionnaire-9 at their convenience, received the results, and reported their willingness to participate in POS. At oncology appointments, oncologists received the screening reports and issued referrals following pre-recommended guidelines. The correlates of actual referrals were examined across all participants and within the willing and non-willing groups.**

***Results*: Among the 838 participants, 56.3% reported severe depression symptoms, 30.5% wanted a referral, and 14.8% were actually referred. The correlates of participants' desire for referral were more severe depression symptoms, being unmarried, and being metastasis and recurrence free. Among all participants, the correlates of actual referrals were unemployment, less severe depression symptoms, poorer performance, treatment status, and wanting a referral. The sole correlate of actual referrals within the non-willing group was poorer performance, and no significant correlates existed within the willing group. The non-referrals were mostly (87.1%) because of postponed decisions.**

***Conclusions*: The eVSRS-D cannot definitively diagnose major depression but may efficiently self-select a population with significant depression symptoms. The patients' willingness to engage the POS most strongly predicted the actual referrals. Oncologist reviews of screening reports may not result in further depression severity-specific referrals.**

Introduction

Approximately 25% of all cancer patients suffer significantly from depression [1]. Depression in cancer patients has been known to negatively affect the quality of life (QoL) [2], utilization of medical services [3], and possibly survival [4]. However, the under-recognition of depression is still unresolved, as indicated in studies from Europe [5] and China [6]. This longstanding problem may result from the patients' and oncologists' tendencies to avoid discussing emotional issues [7], a lack of staff training [8], and time constraints in patient visits [5]. The under-recognition of depression in cancer care is especially concerning because this recognition subsequently connects patients to interventions that are efficacious in managing depression symptoms and improving QoL [9,10].

Thus, much attention has been placed on screening programs. The National Comprehensive Cancer Network (NCCN) has recommended a routine screening for distress (a broad array of symptoms including depression) in all patients with cancer [11]. However, few institutions in the US have adopted the NCCN guidelines [12]. This failure to adopt the guidelines may be attributable to controversial findings, primarily non-Asian studies [13–15], about the effectiveness [13], cost-effectiveness [14], and applicability [15] of routine distress screenings. These controversies led us to design a different form of screening, i.e. the Electronic Voluntary Screening and Referral System for Depression (eVSRS-D). This 'voluntary' screening was expected to be efficient (i.e. minimize financial and human requirements), to exhibit a high positive predictive value [16], and to minimize the potential 'nocebo effect' [17].

Three components are required for a screening system to be effective [18]: (1) the identification of patients with unmet needs using a valid instrument, (2) the assessment of patients and triage to appropriate services, and (3) evidence-based treatment. Relative to the first (achieved via applying the Patient Health Questionnaire-9 [PHQ-9]) and third (achieved via comprehensive depression care) components, the second component of the eVSRS-D seemed to face greater uncertainty. Although given triage guidelines, the oncologists themselves ultimately decided whether to refer patients [14]. Additionally, patient-derived, oncologist-derived, and environment-derived barriers could threaten the integrity of this component and thus nullify the potential effectiveness of screening [15]. Therefore, we focused on improving this second component before testing the effectiveness of eVSRS-D. We reviewed the trends in the actual referrals for the psycho-oncology service (POS) within the system.

The objectives of this study were the following: (a) to describe the characteristics of the self-selected participants in the eVSRS-D, (b) to examine psychosocial and cancer-related variables that correlated with the actual POS referrals, and (c) to discuss how the eVSRS-D should be revised.

Materials and methods

Patients

This study was performed at the Seoul National University Cancer Hospital (SNUCH), which is a tertiary hospital in South Korea. Those who had voluntarily utilized the eVSRS-D between August 2010 and July 2013 were eligible for the study. During this period, approximately 300,000 patients visited the SNUCH oncology clinic. We excluded participants who had used psychiatric services or the POS prior to screening, those younger than 18, those with severe functional impairments (i.e. an Eastern Cooperative Oncology Group Performance Score [ECOG-PS] ≥ 3) [3,19], those with diagnoses that did not distinguish between double-primary and metastasized cancers, and those with uncertain malignancy statuses. By excluding the uncertain diagnoses, we were able to perform the analyses on the premise that all patients and oncologists had agreed on the patients' gross prognoses. We also excluded those with no oncologist appointment within 90 days after the screening to ensure that all participants promptly discussed referral-related issues. This time window was selected because the majority of the patients in SNUCH had regular oncologist appointments at least every 12 weeks. For those with multiple screening records, the initial record was analyzed.

Measures

The PHQ-9 is a widely used screening tool for detecting probable major depressive syndrome (MDS) among those with medical illnesses [20], including cancer [3]. Its nine items probe the symptoms of MDS, as defined by the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV*) [21]. Each item is scored from 0 to 3 (total score range: 0–27). According to the total score, the severity of depression symptoms is categorized as one of five levels: minimal (0–4), mild (5–9), moderate (10–14), moderately severe (15–19), and severe (20–27) [20]. According to a meta-analysis that determined the diagnostic accuracy of the PHQ-9 using standardized diagnostic interviews [22], a cut-off score of 10 is the most widely validated for the detection of MDS (16 studies employed this cut-off; sensitivity: 0.85; specificity: 0.89). We adopted a cut-off score of 15 (6 studies in the meta-analysis examined this cut-off; sensitivity: 0.62; specificity: 0.96) to allow for more specific detection [22]. The construct validity and feasibility of the PHQ-9, as administered with touch-screen computers, have been evaluated in a diverse cancer population [23]. Additionally, the Korean version of the PHQ-9 has been demonstrated to be reliable and valid for screening depressive patients [24].

The age, sex, marital status, employment status, education level, and religion of the participants were obtained from the nursing reports that were included in the electronic medical database. Cancer-related information was collected from the oncologist-recorded medical charts in the database. The active cancer treatment status was determined based on records of hormone therapy, radiotherapy, or chemotherapy within 3 weeks prior to the screening. The oncologist-assigned ECOG-PSs, which are indicators of the participants' overall medical conditions, were extracted from the database. ID numbers (entered directly by the participants or via a card reader) were used to link the screening responses with the database.

Each participant's willingness for a referral was determined immediately after they reviewed the screening report at the kiosks. Only the actual referrals issued by the oncologists at the clinical appointments within 90 days after the screenings were considered valid.

Design of the eVSRS-D

The eVSRS-D was launched in 2010 as one of four independent modules (i.e. depression, health-related behaviors, skin side effects, and risk of breast cancer) comprising the digital survey project of the SNUCH. The patients selected a module that suited their needs for a brief self-screening. The project aimed to examine the effectiveness of voluntary self-assessments on various outcomes, and its findings have begun to be published [25]. Touch-screen computers were installed at kiosks to allow for electronic data collection without additional dedicated staff [26]. The kiosks stood in the waiting areas of the SNUCH oncology clinic at locations that were easily visible to the patients. The eVSRS-D was advertised through leaflets and audio announcements.

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The eVSRS-D consisted of (a) a 'voluntary' self-screening for depression, (b) automated reports for the patients and oncologists, (c) an assessment of patient's willingness to engage POS, and (d) referral guidance for the oncologists. Based on a study performed in a general population [16], we expected that 'voluntary' screening would self-select a population with a high prevalence of previously unidentified depression symptoms.

For the following reasons, the focus of our screening was narrowly placed on depression symptoms: (a) a feasible tool (PHQ-9) for quantifying these symptoms exists [20]; (b) the severities of these symptoms have been reported to predict the potential beneficiaries of the POS [19]; and (c) the symptoms could be efficaciously managed by the POS available in the SNUCH. Nevertheless, our screening protocol may have missed various distress-related problems other than depression, including practical and financial worries, which are mentioned in the NCCN guidelines [11].

Patients and oncologists within the eVSRS-D

After agreeing to the question, 'Proceed to self-assessment for depression and receive feedback?', the patients completed the PHQ-9 at their discretion. Then, the patients immediately received an automated screening report. The report contained two sentences: (a) 'The severity of your depression symptoms are: (one of the five severity levels [20])'; and (b) 'The POS can help manage your current symptoms.' Below these sentences, the following question appeared: 'Are you willing to participate in the POS? If yes, we will help you schedule a visit.'

If a patient engaged in the eVSRS-D, an oncologist was notified with the patient's screening report through a computer system at the next scheduled appointment. The report included the scores for each of the PHQ-9 items, the severity of the depression symptoms, and patient's willingness to participant in POS. The oncologists evaluated the need for referral using pre-recommended guidelines. Next, the oncologists were asked to click on one of the following buttons: 'refer', 'do not refer', or 'postpone'. The 'refer' button generated a referral document that was sent to the psycho-oncology clinic where receptionists scheduled a visit for the patient. After clicking on the 'do not refer' button, the oncologist was asked to select one of the following reasons to deactivate further notifications: patient refusal, insufficiently severe symptoms, or manageable during the oncologist appointment. Other reasons could be typed in using a keyboard. Upon 'postpone' responses, the notification screen was deactivated until the next oncologist appointment.

Before implementing the eVSRS-D, a psychiatrist (BJ Hahm) led a 1-h-long single-session educational intervention for the oncologists in the SNUCH. Recommended guidelines regarding how referrals should be issued based on the information in the screening reports were delivered using several case vignettes. The guidelines encouraged the oncologists to refer every participant whose depression symptom severity was marked as 'moderately severe' or 'severe' (PHQ-9$\geq$15) to POS. In cases of less severe symptoms, the oncologists were instructed to make their own decisions regarding referrals. These instructions were displayed on every notification window to remind the oncologists.

The POS at the SNUCH

When they were referred by oncologists, the participants were scheduled to visit the psycho-oncology clinic at the SNUCH. The visit consisted of an assessment by a clinical psychologist and a consultation by a psychiatrist (an experienced psycho-oncologist). The POS at the clinic encompassed the following interventions that are effective in managing depression among cancer patients: psychotherapy, psychoeducation, pharmacotherapy, and mindfulness-based therapy [10].

Data and analysis

The characteristics of study participants are presented using descriptive statistics. For the subgroup analyses, the participants were divided into two subgroups, i.e. willing and non-willing groups. Between-group differences were examined using t- or χ^2-tests. To examine the correlates of the actual referrals, univariate logistic regression analyses were applied to the entire group of participants and each subgroup. The variables with p-values < 0.05 were included as covariates in the multivariate logistic regression analyses. For variables with three or more categories, p-trend values are presented. The oncologist-reported reasons for non-referral are reported with descriptive statistics. All statistical procedures were performed with PASW statistics for Windows version 18.0 (SPSS Inc., Chicago), and the statistical tests were two-tailed with a 5% significance level.

Ethical approval

We informed all participants that their screening results could later be used for research. The SNUCH Institutional Review Board approved the data collection and analyses (1111-002-383). We followed the principles in the Declaration of Helsinki (2008).

Results

Characteristics of the participants

A total of 838 participants (females 558; 66.6%) were included in the analyses among the 1,234 eligible candidates (Figure 1). The participants' median age was 52 (range: 19–84), and 56.3% (n=472) of the participants reported

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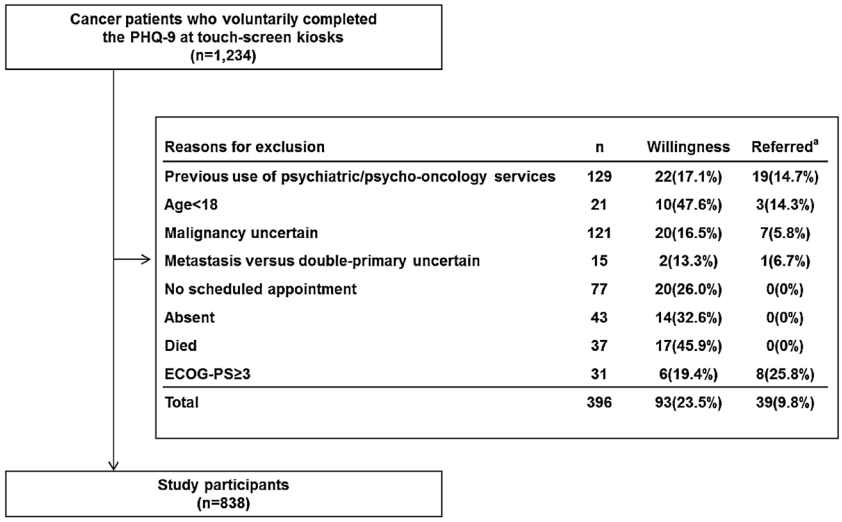

Reasons for exclusion	n	Willingness	Referred[a]
Previous use of psychiatric/psycho-oncology services	129	22(17.1%)	19(14.7%)
Age<18	21	10(47.6%)	3(14.3%)
Malignancy uncertain	121	20(16.5%)	7(5.8%)
Metastasis versus double-primary uncertain	15	2(13.3%)	1(6.7%)
No scheduled appointment	77	20(26.0%)	0(0%)
Absent	43	14(32.6%)	0(0%)
Died	37	17(45.9%)	0(0%)
ECOG-PS≥3	31	6(19.4%)	8(25.8%)
Total	396	93(23.5%)	39(9.8%)

Figure 1. The derivation of the study participants. ECOG-PS (Eastern Cooperative Oncology Group Performance Score), [a]by oncologists within 90 days after screening

clinically significant depression symptoms (PHQ-9 total≥15). Among the participants, 30.5% (n = 256) were willing to be referred to the POS, and 14.8% (n = 124) were actually referred. Among those who qualified for POS referral according to our guidelines, only 18.2% (n = 86) were actually referred. Relative to the non-willing group, those in the willing group were more likely to have more severe depression symptoms, to be unmarried, and to be metastasis- and recurrence-free (Table 1).

Correlates of the referrals to the POS: univariate analyses

Among all participants, greater odds of being referred to the POS were significantly associated with being unemployed, having either less ('minimal-to-mild') or more severe ('moderately severe' and 'severe') depression symptoms (versus having 'moderate' symptoms), having poorer performance, being actively treated for cancer, and wanting a referral. Within the willing group, the correlates of being referred were the patients' performances and cancer treatment statuses, but depression symptom severity was not correlated with being referred. Within the non-willing group, the correlates were the patients' employment statuses, depression symptom severities, performances, and cancer treatment statuses (Table 2).

Correlates of the referrals to the POS: multivariate analyses

Among all participants, the significant correlates from the univariate analyses remained significant, with the exception of the depression severity variable. The association between a greater likelihood of being referred and more severe depression symptoms (i.e. 'moderately severe' and 'severe' versus 'moderate') disappeared. Within the willing group, the actual referrals exhibited no correlation with any of the potential variables. Within the non-willing group, the actual referrals exhibited a significant correlation with the participants' performance (Table 3).

Reasons for non-referral

The non-referrals (n = 714) were primarily because of the oncologists postponing decisions (n = 622; 87.1%). Forty-six (6.4%) refused referrals. In 34 (4.8%) cases, the oncologists considered the participants' depression symptoms to be insufficiently serious to warrant a referral. Three (0.4%) participants did not attend the appointment. In two (0.3%) cases, the participants had already engaged in a psychosocial service after screening. In one (0.1%) case, the participant could not be referred because of a terminal condition. Six (0.8%) cases were not referred for unknown reasons.

Discussion

To our knowledge, this is the first study to examine patterns of oncologist-issued referrals for psychosocial care within a voluntary psychiatric screening system for cancer patients. The participants with metastasized or recurred cancer exhibited less severe depression symptoms (χ^2 test; $p < 0.001$) and less frequently desired referrals, and these findings contrast those of a previous report [27]. This discrepancy may have resulted from the 'voluntary' nature of the screening. Voluntary screenings can be biased toward attracting healthier individuals because of the lack of motivation among depressed individuals [16,28]. The rate of provisional MDS diagnoses (56.3%) seemed to be much higher than the previously reported rates of MDS among Koreans newly diagnosed with cancer (24.2%) [27] and

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Table 1. Characteristics of study participants

Variables	All participants (n = 838)	Patients' willingness[a]		Statistics
		Willing (n = 256)	Non-willing (n = 582)	
Age:				$\lambda^2 = 0.84$
–45	247(29.5)	78(30.5)	169(29.0)	
46–55	267(31.9)	84(32.8)	183(31.4)	
56–	309(36.9)	88(34.4)	221(38.0)	
Sex: female	558(66.6)	174(68.0)	384(66.0)	$\lambda^2 = 0.32$
Marital status:				$\lambda^2 = 9.48$**
Married	694(82.8)	199(77.7)	495(85.1)	
Single/separated	122(14.6)	52(20.3)	70(12.0)	
Unknown	22(2.6)	5(2.0)	17(2.9)	
Employment status:				$\lambda^2 = 0.07$
Employed	340(40.6)	105(41.0)	235(40.4)	
Unemployed[b]	470(56.1)	141(55.1)	329(56.5)	
Unknown	28(3.3)	10(3.9)	18(3.1)	
Years in education:				$\lambda^2 = 0.76$
–9	143(17.1)	47(18.4)	96(16.5)	
10–12	334(39.9)	104(40.6)	230(39.5)	
13–	337(40.2)	98(38.3)	239(41.1)	
Unknown	24(2.9)	7(2.7)	17(2.9)	
Religion:				$\lambda^2 = 2.47$
Atheist	323(38.5)	102(39.8)	221(38.0)	
Buddhist	155(18.5)	50(19.5)	105(18.0)	
Christian	229(27.3)	71(27.7)	158(27.1)	
Catholic	104(12.4)	25(9.8)	79(13.6)	
Others/unknown	27(3.2)	8(3.1)	19(3.3)	
Cancer type:				$\lambda^2 = 2.78$
Breast	224(26.7)	74(28.9)	150(25.8)	
Stomach	112(13.4)	24(9.4)	70(12.0)	
Colorectal	94(11.2)	35(13.7)	77(13.2)	
Lung	84(10.0)	29(11.3)	55(9.5)	
Others[c]	324(38.7)	94(36.7)	230(39.5)	
ECOG-PS:				$\lambda^2 = 4.31$
0	362(43.2)	120(46.9)	242(41.6)	
1	389(46.4)	117(45.7)	272(46.7)	
2	87(10.4)	19(7.4)	68(11.7)	
Recurred/distant metastasis: yes	358(42.7)	96(37.5)	262(45.0)	$\lambda^2 = 4.11$*
Cancer treatment status: active[d]	456(54.4)	140(54.7)	316(54.3)	$\lambda^2 = 0.01$
Cancer surgery history: yes	516(61.6)	154(60.2)	362(62.2)	$\lambda^2 = 0.31$
Depression symptom severity (PHQ-9 total)				$\lambda^2 = 462.74$**
Minimal/mild (0–9)	126(15.0)	2(0.8)	124(21.3)	
Moderate (10–14)	240(28.6)	14(5.5)	226(38.8)	
Moderately severe (15–19)	256(30.5)	51(19.9)	205(35.2)	
Severe (20–27)	216(25.8)	189(73.8)	27(4.6)	
Actual referral: yes	124(14.8)	74(28.9)	50(8.6)	$\lambda^2 = 58.20$**

Values are numbers (percentages) of participants unless otherwise indicated.
*$p < 0.05$.
**$p < 0.01$.
[a]Patients responded immediately after reviewing their results.
[b]Includes housewives.
[c]Thyroid: 56(6.7%); leukemia/lymphoma: 52(6.2%); liver (including cholangiocarcinoma): 43(5.1%); obstetric cancers: 29(3.5%); head and neck: 26(3.1%); pancreas: 21(2.5%); sarcomas: 18(2.1%); kidney: 17(2.0%); bladder: 12(1.4%); bile duct: 10(1.2%); esophagus: 10(1.2%); prostate: 10(1.2%); brain: 9(1.1%); gallbladder: 9(1.1%); testis: 2(0.2%).
[d]Hormone therapy, radiotherapy, or chemotherapy within 3 weeks before screening.
PHQ-9 (Patient Health Questionnaire-9); ECOG-PS (Eastern Cooperative Oncology Group Performance Score).

Chinese cancer patients (12.6%) [6]. In a previous study conducted among volunteers for a depression screening from a general population [16], a similarly high percentage of MDS (53.3%) was reported. It can be inferred that patients with severe depression symptoms may still be inclined to self-assess themselves.

We considered that the participants with 'severe' or 'moderately severe' depression symptoms were all potential beneficiaries of the POS [22,29]. However, only a fourth of these patients (124/472) were referred, which is consistent with the less than optimal referral rates that have previously been reported [14,30]. We identified the

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Table 2. Univariate analyses examining correlates of oncologist-issued referral for the psycho oncology service

			Patients' willingness[a]			
	All participants (n = 838)		Willing (n = 256)		Non-willing (n = 582)	
Variables	**Referred (%)**	**OR[b](95%-CI)**	**Referred (%)**	**OR[b](95%-CI)**	**Referred (%)**	**OR[b](95%-CI)**
Age						
–45 (REF)	36(14.6)	1.00	22(28.2)	1.00	14(8.3)	1.00
46–55	34(12.7)	0.86(0.52–1.42)	24(28.6)	1.02(0.51–2.02)	10(5.5)	0.64(0.28–1.48)
56–	52(16.8)	1.19(0.75–1.88)	28(31.8)	1.19(0.61–2.31)	24(10.9)	1.35(0.68–2.69)
Sex						
Female (REF)	81(14.5)	1.00	45(25.9)	1.00	36(9.4)	1.00
Male	43(15.4)	1.07(0.72–1.60)	29(35.4)	1.57(0.89–2.76)	14(7.1)	0.74(0.39–1.40)
Employment status						
Employed (REF)	37(10.9)	1.00	24(22.9)	1.00	13(5.5)	1.00
Unemployed[c]	83(17.7)	1.76(1.16–2.66)**	46(32.6)	1.63(0.92–2.91)	37(11.2)	2.16(1.12–4.17)*
Years in education						
–9 (REF)	25(17.5)	1.00	14(29.8)	1.00	11(11.5)	1.00
10–12	51(15.3)	0.85(0.50–1.44)	28(26.9)	0.87(0.41–1.86)	23(10.0)	0.86(0.40–1.84)
13–	45(13.4)	0.73(0.43–1.24)	29(29.6)	0.99(0.46–2.12)	16(6.7)	0.55(0.25–1.24)
Marital status						
Married (REF)	106(15.3)	1.00	60(30.2)	1.00	46(9.3)	1.00
Single/separated	15(12.3)	0.78(0.44–1.39)	11(21.2)	0.62(0.30–1.29)	4(5.7)	0.59(0.21–1.70)
Religion						
Atheist (REF)	50(15.5)	1.00	29(28.4)	1.00	21(9.5)	1.00
Buddhist	25(16.1)	1.05(0.62–1.77)	13(26.0)	0.88(0.41–1.90)	12(11.4)	1.23(0.58–2.60)
Christian	29(12.7)	0.79(0.48–1.30)	19(26.8)	0.92(0.47–1.81)	10(6.3)	0.64(0.29–1.41)
Catholic	16(15.4)	0.99(0.54–1.83)	10(40.0)	1.68(0.68–4.16)	6(7.6)	0.78(0.30–2.02)
Depression symptom severity						
Minimal/mild	21(16.7)	2.62(1.33–5.18)**	2(100)	NA	19(15.3)	3.23(1.51–6.90)**
Moderate (REF)	17(7.1)	1.00	5(35.7)	1.00	12(5.3)	1.00
Moderately severe	35(13.7)	2.08(1.13–3.82)*	18(35.3)	0.98(0.29–3.38)	17(8.3)	1.61(0.75–3.46)
Severe	51(23.6)	4.06(2.26–7.28)**	49(25.9)	0.63(0.20–1.97)	2(7.4)	1.43(0.30–6.74)
Cancer type						
Breast (REF)	29(12.9)	1.00	19(25.7)	1.00	10(6.7)	1.00
Stomach	14(14.9)	1.18(0.59–2.34)	5(20.8)	0.76(0.25–2.32)	9(12.9)	2.07(0.80–5.34)
Colorectal	17(15.2)	1.20(0.63–2.30)	9(25.7)	1.00(0.40–2.52)	8(10.4)	1.62(0.61–4.30)
Lung	18(21.4)	1.83(0.96–3.52)	12(41.4)	2.04(0.83–5.05)	6(10.9)	1.71(0.59–4.96)
Others	46(14.2)	1.11(0.68–1.83)	29(30.9)	1.29(0.65–2.55)	17(7.4)	1.12(0.50–2.51)
ECOG-PS						
0 (REF)	35(9.7)	1.00	25(20.8)	1.00	10(4.1)	1.00
1	69(17.7)	2.02(1.30–3.11)**	45(38.5)	2.38(1.33–4.23)**	24(8.8)	2.25(1.05–4.80)*
2	20(23.0)	2.79(1.52–5.13)**	4(21.1)	1.01(0.31–3.32)	16(23.5)	7.14(3.07–16.63)**
Recurred/distant metastasis						
No (REF)	64(13.3)	1.00	43(26.9)	1.00	21(6.6)	1.00
Yes	60(16.8)	1.31(0.89–1.92)	31(32.3)	1.30(0.75–2.26)	29(11.1)	1.77(0.99–3.19)
Cancer treatment status[d]						
Inactive (REF)	39(10.2)	1.00	26(22.4)	1.00	13(4.9)	1.00
Active	85(18.6)	2.02(1.34–3.03)**	48(34.3)	1.81(1.03–3.16)*	37(11.7)	2.58(1.34–4.97)**
Cancer surgery history						
No (REF)	53(16.5)	1.00	31(30.4)	1.00	22(10.0)	1.00
Yes	71(13.8)	0.81(0.55–1.19)	43(27.9)	0.89(0.51–1.54)	28(7.7)	0.75(0.42–1.36)
Patients' willingness[a]						
Non-willing (REF)	50(8.6)	1.00	—	—	—	—
Willing	74(28.9)	4.33(2.91–6.43)**				

CI (confidence interval); ECOG-PS (Eastern Cooperative Oncology Group Performance Score); NA (not-applicable); OR (odds ratio).

*$p < 0.05$.

**$p < 0.01$.

[a]Patients responded immediately after reviewing their results.

[b]Univariate logistic regression.

[c]Housewives included.

[d]Hormone therapy, radiotherapy, or chemotherapy within 3 weeks before screening.

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Table 3. Multivariate analyses examining correlates of oncologist-issued referral for the psycho oncology service

			Patients' willingness[a]			
	All participants		Willing		Non-willing	
Variables	**OR[b] (95%-CI)**	***p*-trend**	**OR[b] (95%-CI)**	***p*-trend**	**OR[b] (95%-CI)**	***p*-trend**
Employment status						
Employed (REF)	1.00		—		1.00	
Unemployed[c]	1.68(1.08–2.61)*				1.94(0.98–3.81)	
Depression symptom severity		0.015*				0.160
Minimal/mild	2.58(1.26–5.28)*				2.37(1.07–5.23)*	
Moderate (REF)	1.00		—		1.00	
Moderately severe	1.32(0.67–2.57)				1.50(0.69–3.29)	
Severe	0.76(0.35–1.65)				0.80(0.16–3.97)	
ECOG-PS		<0.001**		0.198		<0.001**
0	1.00		1.00		1.00	
1	1.95(1.19–3.19)**		2.11(1.16–3.85)*		1.62(0.73–3.59)	
2	2.89(1.46–5.75)**		0.90(0.27–2.99)		4.74(1.93–11.65)**	
Cancer treatment status[d]						
Inactive (REF)	1.00		1.00		1.00	
Active	1.72(1.09–2.71)*		1.50(0.83–2.70)		1.96(0.98–3.92)	
Patients' willingness[a]						
Non–willing (REF)	1.00		—		—	
Willing	7.71(4.12–14.42)**					

OR (odds ratio); CI (confidence interval); ECOG-PS (Eastern Cooperative Oncology Group Performance Score).
*$p < 0.05$.
**$p < 0.01$.
[a]Patients responded immediately after reviewing their results.
[b]Multivariate logistic regression.
[c]Housewives included.
[d]Hormone therapy, radiotherapy, or chemotherapy within 3 weeks before screening.

following factors that negatively affected the translation of the triage guidelines into actual referrals: the participants' employment statuses, performances, cancer treatment statuses (active/inactive), and willingness to be referred. These findings parallel previous findings that greater care needs are correlated with unemployment, poor performance, and extensive cancer treatment [31,32]. Participant non-willingness was found to be the strongest inhibitor of being referred to the POS. However, we could not determine to the extent to which the oncologist- and patient-factors contributed to these potential inhibitors.

Notably, the single and separated participants were not referred more frequently than the married participants. This finding contrasts that of a previous report that found that single or separated patients seek POS more often [33]. The oncologists might not have explored the patients' family situations sufficiently in the clinics, which may have reduced referral willingness among the single or separated patients from being translated into actual referrals. All multivariate models revealed that more severe depression symptoms may not predict actual referrals. By assigning the oncologists the role of a 'middle man', the eVSRS-D seems to have failed to produce the referrals that were influenced by the patients' depression symptom severities.

Postponed decisions were commonly reported among the non-referred cases. Even in the willing group, 71.1% (182/256) of the participants did not receive a prompt referral primarily (91.2%) because of postponing. Environmental aspects (i.e. the oncologists' workloads) of the oncology clinics might have resulted in such decisions [34]. The oncologists might have felt overburdened because they were forced to select one clinical option within a limited time to abide by the pre-recommended guidelines [15,18]. Moreover, the absence of regular monitoring may have contributed to this finding. Disparities between research and non-research conditions are widely known to influence, for example, how accurately clinicians are able to recognize depressive disorders during cancer care [6,30].

Additional improvements to the referral flow of the eVSRS-D can be suggested based on our results. More intensive staff training may be needed to develop the oncologists' tendencies to persuade even non-willing patients with provisional MDS to accept a referral [8,15]. The removal of postponing option should be considered because it may increase the number of actual referrals and the adherence to the guidelines. However, regarding the oncologists' workloads and the inevitable time-constraints of oncology clinics, omitting the oncologists ('middle men') from the referral pathway seems more realistic. This option could not be applied in our study because of administrative restrictions; the POS was accessible only with a referral from oncologist. Thus, it is necessary to open a channel for participant self-referrals to increase the number of referrals. This option is plausible because the participants'

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depression severities were strongly correlated their willingness to be referred. Nevertheless, negative consequences may arise from self-referrals. Some patients whose depression symptoms could be better managed by oncologists (i.e. fatigue because of neutropenia) may visit the psycho-oncology clinic and overburden the mental health sector.

The generalizability of our results may be limited. This study was confined to a single tertiary hospital, and the participants might have had more treatment-refractory cancers. Because of self-selection, the participants may have been more eager to explore their psychological issues. Considering the physical environment of screening (i.e. the waiting areas of oncology clinics), the participants may have been more likely to be ambulatory and sufficiently vigilant to detect the kiosks. We could neither assess the number of patients who were unaware of eVSRS-D kiosks nor determine how many refused to complete the PHQ-9. Nevertheless, a rough estimation was available based on the uptake rate of cancer patients into our less research-oriented screening system.

The study has several other limitations. First, we were unable to assess problems other than depression symptoms, e.g., pain [7], medical comorbidities, and practical issues [11]. Screening for such a broad array of problems might have increased the rate of POS referrals. Moreover, the quality of the doctor-patient communication, the oncologists' attitudes toward the screening, and the side effects of screening could not be assessed. Furthermore, we could not elucidate whether the eVSRS-D improved the patients' psychosocial outcomes.

Despite these limitations, we delineated the potential users of the eVSRS-D and showed that this system may efficiently produce a selected population with a high prevalence of significant depression symptoms. Controlled trials are warranted (i.e. comparisons of control patients versus oncologist- or self-referred patients) to determine whether voluntary screening for depression is effective and acceptable. Additionally, qualitative studies are needed to elucidate the reasons for the oncologists' non-referrals.

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Conflict of interest

None

References

1. Holland JC. IPOS Sutherland Memorial Lecture: an international perspective on the development of psychosocial oncology: overcoming cultural and attitudinal barriers to improve psychosocial care. *Psycho-Oncology* 2004;**13**:445–459.
2. Valdimarsdottir U, Helgason ÁR, Fürst C, Adolfsson J, Steineck G. The unrecognised cost of cancer patients' unrelieved symptoms: a nationwide follow-up of their surviving partners. *Br J Cancer* 2002;**86**:1540–1545.
3. Pirl WF, Greer JA, Traeger L, *et al*. Depression and survival in metastatic non–small-cell lung cancer: effects of early palliative care. *J Clin Oncol* 2012;**30**:1310–1315.
4. Hjerl K, Andersen EW, Keiding N, Mouridsen HT, Mortensen PB, Jorgensen T. Depression as a prognostic factor for breast cancer mortality. *Psychosomatics* 2003;**44**:24–30.
5. Fallowfield L, Ratcliffe D, Jenkins V, Saul J. Psychiatric morbidity and its recognition by doctors in patients with cancer. *Br J Cancer* 2001;**84**:1011.
6. Zhao L, Li X, Zhang Z, *et al*. Prevalence, correlates and recognition of depression in Chinese inpatients with cancer. *Gen Hosp Psychiatry* 2014;**36**(5):477–482.
7. Passik SD, Dugan W, McDonald MV, Rosenfeld B, Theobald DE, Edgerton S. Oncologists' recognition of depression in their patients with cancer. *J Clin Oncol* 1998;**16**:1594–1600.
8. Ryan H, Schofield P, Cockburn J, *et al*. How to recognize and manage psychological distress in cancer patients. *Eur J Cancer Care* 2005;**14**:7–15.
9. Jacobsen PB, Jim HS. Psychosocial interventions for anxiety and depression in adult cancer patients: achievements and challenges. *CA Cancer J Clin* 2008;**58**:214–230.
10. Rodin G, Lloyd N, Katz M, Green E, Mackay JA, Wong RK. The treatment of depression in cancer patients: a systematic review. *Support Care Cancer* 2007;**15**:123–136.
11. Holland JC, Andersen B, Breitbart WS, *et al*. Distress management. *J Natl Compr Canc Netw* 2013;**11**:190–209.
12. Pirl WF, Muriel A, Hwang V, *et al*. Screening for psychosocial distress: a national survey of oncologists. *J Support Oncol* 2007;**5**:499–504.
13. Meijer A, Roseman M, Delisle VC, *et al*. Effects of screening for psychological distress on patient outcomes in cancer: a systematic review. *J Psychosom Res* 2013;**75**:1–17.
14. Hollingworth W, Metcalfe C, Mancero S, *et al*. Are needs assessments cost effective in reducing distress among patients with cancer? A randomized controlled trial using the distress thermometer and problem list. *J Clin Oncol* 2013;**31**:3631–3638.
15. Carlson LE, Waller A, Mitchell AJ. Screening for distress and unmet needs in patients with cancer: review and recommendations. *J Clin Oncol* 2012;**30**:1160–1177.
16. Magruder KM, Norquist GS, Feil MB, Kopans B, Jacobs D. Who comes to a voluntary depression screening program? *Am J Psychiatry* 1995;**152**(11):1615–1622.
17. Thombs BD, Coyne JC, Cuijpers P, *et al*. Rethinking recommendations for screening for depression in primary care. *CMAJ* 2012;**184**:413–418.
18. Carlson LE. Screening alone is not enough: the importance of appropriate triage, referral, and evidence-based treatment of distress and common problems. *J Clin Oncol* 2013;**31**:3616–3617.
19. McLachlan SA, Allenby A, Matthews J, *et al*. Randomized trial of coordinated psychosocial interventions based on patient self-assessments versus standard care to improve the psychosocial functioning of patients with cancer. *J Clin Oncol* 2001;**19**:4117–4125.
20. Kroenke K, Spitzer RL, Williams JB. The PHQ-9. *J Gen Intern Med* 2001;**16**:606–613.
21. APA. *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)*. American Psychiatric Association: Washington, DC, 1994.
22. Manea L, Gilbody S, McMillan D. Optimal cut-off score for diagnosing depression with the Patient Health Questionnaire (PHQ-9): a meta-analysis. *CMAJ* 2012;**184**:E191–E196.
23. Fann JR, Berry DL, Wolpin S, *et al*. Depression screening using the Patient Health Questionnaire-9 administered on a touch screen computer. *Psycho-Oncology* 2009;**18**:14–22.
24. Park S, Choi H, Choi J, Kim K, Hong J. Reliability and validity of the Korean version of

the Patient Health Questionnaire-9 (PHQ-9). *Anxiety Mood* 2010;**6**:119–124.
25. Byun HJ, Lee H-J, Yang JI, *et al*. Daily skin care habits and the risk of skin eruptions and symptoms in cancer patients. *Ann Oncol* 2012;**23**:1992–1998.
26. Allenby A, Matthews J, Beresford J, McLachlan S. The application of computer touch-screen technology in screening for psychosocial distress in an ambulatory oncology setting. *Eur J Cancer Care* 2002;**11**:245–253.
27. Kim SJ, Rha SY, Song SK, *et al*. Prevalence and associated factors of psychological distress among Korean cancer patients. *Gen Hosp Psychiatry* 2011;**33**:246–252.
28. Ford DE. Principles of screening applied to psychiatric disorders. *Gen Hosp Psychiatry* 1988;**10**:177–188.
29. Block SD. Assessing and managing depression in the terminally ill patient. ACP-ASIM End-of-Life Care Consensus Panel. American College of Physicians—American Society of Internal Medicine. *Ann Intern Med* 2000;**132**:209–218.
30. Keller M, Sommerfeldt S, Fischer C, *et al*. Recognition of distress and psychiatric morbidity in cancer patients: a multi-method approach. *Ann Oncol* 2004;**15**:1243–1249.
31. Mor V, Allen SM, Siegel K, Houts P. Determinants of need and unmet need among cancer patients residing at home. *Health Serv Res* 1992;**27**(3):337–360.
32. Costanzo E, Lutgendorf S, Mattes M, *et al*. Adjusting to life after treatment: distress and quality of life following treatment for breast cancer. *Br J Cancer* 2007;**97**:1625–1631.
33. Jacobsen PB, Donovan KA, Trask PC, *et al*. Screening for psychologic distress in ambulatory cancer patients. *Cancer* 2005;**103**:1494–1502.
34. Newell S, Sanson-Fisher RW, Girgis A, Bonaventura A. How well do medical oncologists' perceptions reflect their patients' reported physical and psychosocial problems? *Cancer* 1998;**83**:1640–1651.

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