Does a single-item measure of depression predict mortality?

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ABSTRACT

OBJECTIVE To determine if a single-item measure of depression predicts mortality over 5 years.

DESIGN Secondary analysis of a population-based cohort study.

SETTING Province of Manitoba.

PARTICIPANTS A total of 1751 community-dwelling adults aged 65 years or older.

MAIN OUTCOME MEASURES Self-reported depression; age, sex, education, functional status, and cognition; death over 5 years. Depression was measured with 1 item drawn from the Center for Epidemiologic Studies Depression (CES-D) scale: "I felt depressed." Bivariate and multivariate analyses were conducted.

RESULTS Those with self-reported depression had a 5-year mortality of 30.2% versus 19.7% in those without self-reported depression ($P<.001$, χ^2). This association persisted after adjustment for age, sex, education, functional status, and cognition: adjusted odds ratio for mortality 1.35 (95% confidence interval 1.03 to 1.76). Among those with cognitive impairment, however, neither the CES-D scale nor the single-item measure predicted mortality.

CONCLUSION A simple measure of depression drawn from the CES-D predicts mortality among cognitively intact community-dwelling older adults, but not among cognitively impaired older adults. Further study is needed in order to determine the usefulness of this question in clinical practice.

EDITOR'S KEY POINTS

- Previous studies have shown that responses to a single-item measure of depression were closely correlated with a clinical diagnosis of depression, but a single question has not been clearly shown to predict mortality, while depressive symptoms measured by longer scales have.
- This study examined whether the statement "I felt depressed" predicted 5-year mortality in a sample of community-dwelling older adults. The authors found that it did predict mortality among cognitively intact study participants, even after adjusting for many potential confounding variables, although the magnitude of the effect decreased. When self-rated health was entered into the model, the single-item measure no longer predicted mortality.
- Although their findings reinforce the potential usefulness of a simple single-item measure of depression, the authors do not advocate screening populations for depression with this question. This single question might lack sensitivity for the diagnosis of depression, and many elderly people with depression present without substantial mood symptoms. Furthermore, screening assumes that early detection and management of depression results in better outcomes and is practical for a health care system, and this study does not address these issues.

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Peut-on prédire la mortalité par une mesure de la dépression comportant un seul item?

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RÉSUMÉ

OBJECTIF Déterminer si une mesure de la dépression avec un seul item peut prédire la mortalité de 5 ans.

TYPE D'ÉTUDE Analyse secondaire d'une étude de cohorte stratifiée.

CONTEXTE Manitoba.

PARTICIPANTS Un total de 1751 personnes de 65 ans et plus vivant dans le milieu naturel.

PRINCIPAUX PARAMÈTRES À L'ÉTUDE Auto-déclaration de dépression; âge, sexe, scolarité, état fonctionnel et état cognitif; mortalité de 5 ans. La dépression était mesurée à l'aide d'une seule question tirée de l'échelle de dépression du Center for Epidemiologic Studies (CES-D) «je me suis senti déprimé». Des analyses multifactorielles et bifactorielles ont été effectuées.

RÉSULTATS Ceux qui déclaraient être déprimés avaient une mortalité de 5 ans de 30,2 % contre 19,7 % pour ceux qui déclaraient ne pas être déprimés ($P<0.001$, χ^2). Cette association persistait après ajustement pour l'âge, le sexe, la scolarité, l'état fonctionnel et l'état cognitif : rapport de cotes ajusté pour la mortalité 1,35 (intervalle de confiance à 95 % 1,03 à 1,76). Chez ceux présentant une atteinte cognitive, toutefois, ni l'échelle du CES-D ni la mesure par un seul item ne prédisait la mortalité.

CONCLUSION Un mesure simple de la dépression tirée du CES-D prédit la mortalité chez des personnes âgées vivant dans le milieu naturel mais non chez celles présentant une atteinte cognitive. D'autres études seront nécessaires pour déterminer l'utilité de cette question en pratique clinique.

POINTS DE REPÈRE DU RÉDACTEUR

- Certaines études antérieures ont montré que la mesure de la dépression avec un seul item était étroitement corrélée à un diagnostic de dépression, mais on n'avait pas clairement démontré qu'une seule question peut prédire la mortalité, ce que la mesure des symptômes dépressifs par un plus grand nombre de questions peut faire.
- Dans cette étude, on s'est demandé si la phrase «je me suis senti déprimé» prédisait la mortalité de 5 ans dans un échantillon d'adultes âgés vivant dans la communauté. Les résultats indiquent qu'elle prédit la mortalité chez les participants sans atteinte cognitive, même après ajustement pour plusieurs variables parasites, quoique cela réduisait l'importance de l'effet. Lorsqu'on ajoutait l'évaluation de sa propre santé, la question unique ne prédisait plus la mortalité.
- Même si ces observations renforcent l'utilité potentielle d'une mesure de la dépression par une seule question, les auteurs ne préconisent pas un tel dépistage de la dépression. Cette question unique pourrait ne pas avoir la sensibilité nécessaire pour diagnostiquer la dépression, et plusieurs personnes âgées déprimées ne présentent pas de troubles importants de l'humeur. En outre, on suppose que la détection précoce et le traitement de la dépression résultant du dépistage entraînent de meilleures issues et profitent au système de santé, mais la présente étude n'a pas porté sur ces questions.

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Depression is a common problem that is associated with functional decline[1] and mortality.[2] Some, therefore, advocate casefinding of depression as part of general assessment. The US Preventive Services Task Force[3] recommended simple screening instruments, and a Yale Task Force on Geriatric Assessment recommended that physicians ask a single simple question, "Do you often feel sad or depressed?"[4] If a patient answers yes, then the Yale task force recommends administering the Geriatric Depression Scale.[5] The Canadian Task Force on Preventive Health Care recommended screening for depression when there was adequate follow-up and care, but found less evidence for screening when follow-up care was not available.[6] Subsequently, it was shown that responses to a single question were closely correlated with a clinical diagnosis of depression,[7] and that simple 2-question scales performed well compared with more complex scales.[8] In palliative care settings, self-reported depression is also accurate.[9]

However, a single question has not been clearly shown to predict mortality, while depressive symptoms measured by longer scales have.[2] In order to determine if a single-item measure of depression predicts death, we conducted a secondary analysis of an existing data set. The objectives were to determine if the statement "I felt depressed," drawn from the Center for Epidemiologic Studies Depression (CES-D) scale, predicts mortality over 5 years; and to determine if any association persists after adjusting for potential confounding variables and interacting factors.

METHODS

Sample

The Manitoba Study of Health and Aging (MSHA) is a population-based cohort study conducted in conjunction with the Canadian Study of Health and Aging.[10] The original sampling frame was from a list provided by Manitoba Health. Those residing in institutions (nursing homes, hospitals, and prisons) were not included in these analyses. Initially, 2890 persons were selected. Of these, 443 refused to participate, 480 were not eligible (had died, had entered nursing homes, or were too ill), 162 could not be located, and 54 did not complete the screening questionnaire. This left a sample of 1751 participants. The sample was followed for 5 years until 1996 or 1997, and death was ascertained by death certificates and proxy reports. Four hundred participants (23%) had died by 1997. The study was approved by the local institutional review board and was in compliance with the Declaration of Helsinki.

Measures

Depressive symptoms were measured using the CES-D scale.[11] This is a reliable, valid, widely used instrument to measure depressive symptoms. It consists of 20 items, each scored from 0 to 3. One item on this scale asks the participant to consider the previous week and respond to the statement "I felt depressed." The item was scored as 0 (rarely or none of the time), 1 (some or a little of the time), 2 (occasionally or a moderate amount of the time), or 3 (most or all of the time). For the primary analyses, we dichotomized the response into rarely or none of the time versus all other categories. In sensitivity analyses, we also considered the item "I felt sad" in a similar manner. Finally, we combined these 2 variables: those who answered rarely or never to either of the 2 questions versus those who did not.

The CES-D consists of 4 subscales: positive affect, negative affect, somatic factors, and interpersonal factors.[11] Because older adults might present with predominantly somatic complaints, we also conducted analyses with those who had any somatic complaints on the somatic factor subscale.

Cognition was measured using the Modified Mini-Mental State Examination (3MSE).[12] Functional status was assessed using the activities of daily living (ADL) and the instrumental ADL (IADL) scales from the Older American Resources Utilization Survey.[13] For these analyses, respondents with any impairment in IADL or ADL were considered impaired. Self-rated health was assessed by self-report and was dichotomized: very good or good versus not too good, poor, or very poor.

Data analysis

All participants for whom complete data were available were included (N = 1737). Associations between baseline variables and mortality over the 5-year period were sought using χ^2 tests for categorical variables and *t* tests for continuous variables. To adjust for the effect of confounding variables, multiple logistic regression models were constructed, with the outcome being death. Covariates included the single-item statements, age, sex, education, 3MSE score, and IADL or ADL impairment. Analyses were conducted in SPSS, version 8.

RESULTS

There were 490 persons with self-reported depression. Those with self-reported depression were more likely to be older (77.2 years vs 75.6 years, $P<.001$, *t* test) and to have fewer years of education (8.6 vs 9.6, $P<.001$, *t* test). Women (31.8% vs 23.0%, $P<.001$, χ^2 test) and those with functional impairment were more likely to report depression (55.5% with IADL impairment vs 32.7%, $P<.001$, χ^2 test; 31.0% with ADL impairment vs 15.5%, $P<.001$, χ^2 test).

The single item "I felt depressed" predicted 5-year mortality: 30.2% with self-reported depression died versus 19.7% of those without self-reported depression

($P<.001$, χ^2 test). In multivariable models, the item predicted mortality even after adjusting for many potential confounding variables, although the magnitude of the effect decreased. When self-rated health was entered into the model, the single-item measure no longer predicted mortality (**Table 1**).

Analyses using the item "I was sad" were similar: The mortality for those reporting sadness was 27.3% versus 20.6% for those not reporting sadness ($P=.003$, χ^2 test). When the 2 items were combined into 1 measure, the results were also very similar, with mortality of 27.9% among those with self-reported sadness or depression versus 19.2% among those without ($P<.001$, χ^2 test). The predictive ability of these simple statements was very similar to the entire CES-D score. The mortality in those with a CES-D of 16 or more was 34.7% versus 20.9% in those with a CES-D of less than 16 ($P<.001$, χ^2 test).

We looked for interactions in this effect. Among those with impaired cognition (3MSE score <78), the single-item question did not predict mortality (42.4% of those with depression vs 34.7% of those without, $P=.20$, χ^2 test). In those with intact cognition (3MSE score >77), the single-item measure did predict death (25.6% in those with depression vs 17.0% in those with depression, $P<.001$). This interaction was also present using the entire CES-D score: In those with cognitive impairment, the mortality among those with a CES-D score of less than 16 was 40.0% versus 38.4% in those with a CES-D of 16 or more ($P=.78$, χ^2 test). In those with a normal 3MSE score, however, the CES-D predicted mortality: 32.1% versus 17.5%, $P\leq.001$, χ^2 test.

Because depression might present atypically with prominent somatic complaints, such as anhedonia, disinterest, and poor energy, we considered the single-item question in those with somatic complaints. In this group, the 1-item measure of depression also predicted mortality: 22.5% in those with no self-reported depression versus 30.9% in those with self-reported depression ($P=.001$, χ^2 test).

DISCUSSION

There are limitations to this study. Clinical assessment using standardized criteria remains the criterion standard for the diagnosis of depression. In the MSHA, depressive symptoms were measured with the CES-D. Thus, we could not associate answers to the 1-item question with clinical diagnoses of depression. Second, there were few biophysical measures in the MSHA. It is possible that those with more severe medical disease might be more likely to report depressive symptoms and subsequently die, thereby confounding the associations we observed. Indeed, when we entered self-rated health into the regression models, the effect of depression diminished substantially. There are also some strengths to the study. It examines a representative sample using reliable, standardized measures collected by trained interviewers.

Some advocate asking the question "Do you feel sad or depressed?" as part of a simple procedure for screening for disability.[4] Previous studies have shown that asking the simple question "Do you often feel sad or depressed?" compares favourably with longer screening instruments for depression.[6] This study goes on to demonstrate that a single-item self-report of depression predicts death over a fairly long interval. We found that the predictive validity of this question is restricted to

Table 1. Results of multiple logistic regression models: *Even after adjustment for many potential confounding variables, a single-item measure of depressive symptoms predicted mortality over 5 years; when self-rated health was added into the model, the single-item measure did not predict mortality.*

CONFOUNDING VARIABLE	MODEL 1 ADJUSTED OR (95% CI)	MODEL 2 ADJUSTED OR (95% CI)	MODEL 3 ADJUSTED OR (95% CI)	MODEL 4 ADJUSTED OR (95% CI)
Having self-reported depression (vs not reporting depression)	1.78 (1.37-2.28)	1.55 (1.19-2.01)	1.35 (1.03-1.76)	1.27 (0.96-1.67)
Older age (vs younger age)	1.10 (1.08-1.12)	1.09 (1.07-1.11)	1.08 (1.05-1.09)	1.07 (1.05-1.09)
Female sex (vs male)	2.03 (1.60-2.60)	1.92 (1.50-2.45)	2.34 (1.80-3.03)	2.34 (1.80-3.03)
Fewer years of education (vs more years of education)		1.01 (0.98-1.05)	1.01 (0.97-1.05)	1.01 (0.97-1.05)
3MSE score indicating cognitive impairment (vs no impairment)		0.97 (0.96-0.98)	0.98 (0.97-0.99)	0.98 (0.97-0.99)
Having IADL impairment (vs no impairment)			2.11 (1.58-2.81)	1.96 (1.46-2.63)
Having ADL impairment (vs no impairment)			1.43 (1.05-1.95)	1.36 (1.00-1.87)
Poor self-rated health (vs good health)				1.40 (1.04-1.88)

ADL—activities of daily living, CI—confidence interval, IADL—instrumental activities of daily living, 3MSE—Modified Mini-Mental State Examination, OR—odds ratio.

those with normal cognition. To our knowledge, previous research on the association between mortality and depression is limited. Mehta et al[14] have reported that depressive symptoms and cognition have an additive effect on mortality; however, they used a measure that was specific to their study, limiting the generalizability to other settings. There are several possible reasons for our finding that depressive symptoms did not predict mortality in cognitively impaired older adults. First, the mortality of older adults with cognitive impairment is very high at baseline,[15-19] and it might therefore be difficult to detect an additional effect of depression on mortality. Second, measurements of depressive symptoms might not be accurate in those with cognitive impairment, owing to issues reporting depressive symptoms. Third, the cause of depressive symptoms might be different in cognitively impaired individuals, perhaps reflecting a feature of the cognitive impairment rather than major depression.

We do not necessarily advocate screening populations for depression with this question. This single question might lack sensitivity for the diagnosis of depression. Many elderly persons with depression present without substantial mood symptoms.[20] Furthermore, screening assumes that early detection and management of depression results in better outcomes and is practical for a health care system. Indeed, some recommend against routine screening or casefinding for depression.[21] Others are somewhat ambivalent about screening and casefinding for depression versus having a high index of suspicion for depression in some populations and clinical settings.[22] Our study clearly does not address the issues of cost, practicality, or efficacy of treatment of depression. Nevertheless, these findings reinforce the potential usefulness of a very simple single-item measure of depression for identifying seniors at risk for adverse outcomes in populations of cognitively intact seniors. As well, they lend some support to the current recommendations for using a simple screening question versus a longer, more complex instrument. Our findings, do not, however, support the use of either single-item instruments or of longer instruments in those with cognitive impairment.

Conclusion

A simple, single-item measure of depression predicts mortality over 5 years in a cognitively intact population-based sample. Further study into the usefulness of this question as a casefinding instrument for depression in older adults in clinical settings is needed before widespread adoption by family physicians.

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Competing interests

None declared

Contributors

Drs St John and **Montgomery** contributed to concept and design of the study; data gathering, analysis, and interpretation; and preparing the manuscript for submission.

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