

Validation of a 3-item screening tool for geriatric depression in the observation unit of an emergency department

驗證三個項目的老人抑鬱篩選工具於急症室觀察病房使用的正確性

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Introduction: The purpose of this study was to validate a new 3-item Emergency Department Depression Screening Instrument (ED-DSI) in screening for depression in elderly patients presenting to the emergency department (ED). **Methods:** All Cantonese-speaking ED patients 65 years or older staying in the observation ward were included. Patients with a known diagnosis of dementia or depression and those with severe hearing problems were excluded. The doctor-in-charge would administer the 3-item ED-DSI which was adapted from the Geriatric Depression Scale (GDS). The research nurse who was blind to the answers of the initial screening then administered the 15-item GDS to the same patient. The 15-item GDS, which had been validated previously in the local population, was used as the reference standard. **Results:** One hundred patients of whom 70 were female, were recruited. The mean age of the group was 75 years with a range from 65 to > 96 years. Using a cut-off score of 2, the new 3-item ED-DSI was shown to be as effective as the 15-item GDS (using a cut-off score of 8) in identifying depressed subjects. The sensitivity and specificity of the instrument were 90% and 74%, respectively. **Conclusions:** The new 3-item ED-DSI for depression correlated well with the 15-item Geriatric Depression Scale. It can be used for screening of depression in elderly patients in a busy emergency department. (*Hong Kong j.emerg.med.* 2006;13:17-23)

引言：這研究的目的是要驗證一個新的三項目「急症室抑鬱篩選工具」，對識別到急症室求診年老病者抑鬱的正確性。**方法：**研究對象包括所有在急症室觀察病房內 65 歲或以上操粵語的病者；並不包括嚴重失聰或已診斷為痴呆或抑鬱症的病者。主診醫生先以「老人抑鬱指數」中挑選出的三項目「急症室抑鬱篩選工具」為病者評估；其後研究護士在完全不知道這初步評估的答案下，以「老人抑鬱指數」的十五個評審項目為相同的病者再作評估。十五項目的「老人抑鬱指數」先前已於本地的人口驗證為有效，故以此作為參考標準。**結果：**這研究招募了 100 名病者，其中 70 名為女性；年齡範圍為 65 至 96 歲以上，而平均年齡為 75 歲。以 2 為截止數值計算，結果顯示新的三項目「急症室抑鬱篩選工具」在識別抑鬱病者方面與十五項目的「老人抑鬱指數」同樣有效（截止數值為 8），其敏感度及特異性分別為 90% 及 74%。**總結：**新的三項目「急症室抑鬱篩選工具」與十五項目的「老人抑鬱指數」有很好的相關性，它可以在繁忙的急症室用作識別年長的抑鬱病者。

Keywords: Aged, depression, hospital emergency service

關鍵詞：長者、抑鬱、醫院急症服務

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Introduction

Late-life depression is one of the most common psychiatric illnesses in the elderly. A study of elderly Chinese aged 70 years and over (877 men and 734 women) living in Hong Kong found the overall prevalence of depression symptoms to be 35%.¹ Depression is also common in the elderly presenting to the emergency department (ED). In an ED prevalence study in the US, 27% of the 101 participating elderly patients were found to be depressed and none were recognised by the treating emergency physician.² In Hong Kong, no survey has been undertaken for prevalence of depression among elderly people presenting to the ED. There is no lack of screening tools for use in the primary care setting, for example, Beck Depression Inventory (BDI), Centre for Epidemiological Studies Depression Scale (CES-D), Geriatric Depression Scale (GDS) and Zung Depression Rating Scale.³ In the busy ED, a simple screening instrument could greatly facilitate early recognition of depression. The purpose of the present study was to test if a 3-item screening instrument was as effective as the 15-item GDS to detect depression in elderly patients presenting to a local ED.

Methods

All Cantonese-speaking ED patients 65 years or older who stayed in the ED observation ward for further assessment and treatment were included. Patients with a known diagnosis of dementia or depression and those with severe hearing problems were excluded from the study. A convenience sample of 100 patients was planned. Approval was obtained from the hospital's ethics committee to carry out the research in our ED patients.

The research questionnaire consisted of two parts. The first part included demographic data, for example, sex, age, marital status, occupation, living conditions and family structure (Appendix 1). The second part was the new 3-item GDS Emergency Department Depression Screening Instrument (ED-DSI), which was administered by the doctor during ward rounds (Appendix 2). The first author, a nurse researcher, who was blind to the answers to the ED-DSI, administered

the 15-item Geriatric Depression Scale (GDS-short version) to the same patient on a different occasion, usually within the same day (Appendix 3). The GDS-short version questionnaire consisted of 15 'YES' or 'NO' items. Each question would attract a score of either 0 or 1 according to the scoring scheme. For clinical purposes, a score equal to or greater than 8 points was used to define depression.

The GDS screening instrument was originally developed by Yesavage in the early 1980s.⁴ The new 3-item ED-DSI was adapted from the 15-item GDS (short version) by selecting the items with the highest Pearson χ^2 , a method which was found in a previous study in 1999 by Hoyl et al to have good correlation with clinical depression.⁵ Since our participants were Cantonese speaking, the Cantonese versions of the new 3-item ED-DSI and the 15-item GDS (short version) were adopted (Appendix 2). The instrument was developed and tested by the psychiatric team of Kwai Chung Hospital in 1998,⁶ based on the Chinese version that had been validated by Chiu et al in 1994.⁷ A pilot study was carried out on 19 December 2002 on five individuals to test the research procedure. Test-retest reliability of the instrument was also established.

Descriptive and analytical statistics were computed using the SPSS statistical programs. The sensitivity and specificity of the new 3-item ED-DSI were calculated using different cut-off scores. The internal consistency of both scales was tested using the KR-20 coefficient.

Results

The study was conducted from 26 to 31 December 2002. A total of 102 patients were invited to participate in the study. However, one refused and one dropped out during the interview. As a result, 100 participants were recruited for the study ($n = 100$).

There were 70 female patients in the sample of 100 subjects. The mean age of the sample was 75 years and a large proportion (approximately 72%) fell within the 65–80 age bracket. The marital status was as follows: 48% married; 48% widowed; 3% single; and 1%

separated/divorced. Most of the patients (72%) lived with spouse and family, 12% stayed in private or government old-age accommodation, and 13% lived alone. The majority of the patients had retired (46%) or were housewives (49%). Only 36% of the patients were recipients of public assistance and 63% were receiving an old-age allowance from the Hong Kong Government.

For the 15-item GDS, the cut-off score was set as 8. Of the 100 subjects, 42 were found to be depressed (score of ≥ 8). For the 3-item ED-DSI, if the cut-off score was set as 2, 53 were found to be depressed (score of ≥ 2). Using a 2×2 table, the sensitivity and specificity of the new 3-item ED-DSI versus the 15-item GDS (short form) could be calculated (Table 1). The trade-off between sensitivity (90%) and specificity (74%) seems to be best with a cut-off score of 2. The positive and negative predictive values were 72% (95% CI = 58–82) and 91% (95% CI = 80–97) respectively. The different results on sensitivity and specificity basing on different cut-off scores were as shown in Table 2. However, the positive likelihood ratio (LR+) values for the screening tool using cut-off scores of 1, 2 and 3, were 2.2, 3.5 and 22.3 respectively.

The reliability of the scales as measured by the KR-20 coefficient was relatively high for both the 15-item GDS (0.8055) and the 3-item scale (0.8094). In addition, the inter-rater agreement between the nurse

researcher (15-item GDS) and doctors (3-item scale) for the three identical items chosen was also quite good ($\kappa = 0.835$; 95% CI = 0.748–0.923; $p < 0.001$).

Discussion

Depression is increasingly recognised as a serious mental health problem in older people. It has been observed in the US that there was a significant increase (15%) in ED psychiatric-related diagnoses between 1992 and 2000.⁸ People in groups often characterised as lacking access to medical care, were most at risk and the elderly presenting to the ED often belonged to such groups. In our study, the prevalence rate (42%) of depression was actually quite high. In a local survey of elderly Chinese aged 70 years and above, the prevalence of depression was determined using the same 15-item GDS as 29.2% for men and 41.1% for women, using a cut-off point of 8.¹ These findings suggest that the ED is an important place for identification of depressed elderly patients. Early referral for treatment may prevent some patients from committing suicide. Depression is an important factor for suicide and the suicide rate among elderly people is 4–5 times above the average in Hong Kong.⁹

How good are emergency physicians in picking up depression basing on clinical grounds only? In a study by Meldon in the US, recognition of depression by

Table 1. 2×2 table using a cut-off score = 2

ED-DSI (3-item)	15-item GDS (short form)		Total
	Depressed	Non-depressed	
Depressed	38	15	53
Non-depressed	4	43	47
Total	42	58	100
Sensitivity	90% (= 38/42)		
Specificity	74% (= 43/58)		

Table 2. Sensitivity and specificity of the new 3-item instrument (ED-DSI)

Cut-off score	Sensitivity (95% CI)	Specificity (95% CI)	Positive predictive value (95% CI)	Negative predictive value (95% CI)
1	95 (84–99)	57 (44–69)	62 (49–72)	94 (81–98)
2	90 (78–96)	74 (62–84)	72 (58–82)	91 (80–97)
3	67 (51–79)	97 (88–99)	93 (79–98)	80 (69–88)

emergency physicians was poor, with a sensitivity of 27% (95% CI = 12–46), specificity of 75% (95% CI = 63–84), and positive predictive value of 32% (95% CI = 27–41). Only 13% (95% CI = 4–31) of depressed patients were identified and referred for further psychiatric evaluation.¹⁰ We are not aware of any similar studies in local emergency departments. There are no reasons to believe our system is any better than that in the US.

The challenge is to find an easy-to-use screening tool for our busy daily practice. The Geriatric Depression Scale (GDS) is a commonly used screening tool for depression among the elderly in Hong Kong. A previous study had shown that it was a reliable tool for Chinese patients.⁷ However, the original GDS with 30 questions would be too time-consuming for use in the busy ED. Although a shorter form with 15 items was also validated for use among Hong Kong elderly,⁶ it is still not short enough for the purposes of screening in our busy emergency departments.

Fabacher et al used a prospective convenience sample of English-speaking ED patients 65 years or older to validate a 3-question screening instrument.¹¹ The results were compared with the 30-question Geriatric Depression Scale. A total of 103 patients were screened and 33 (32%) were identified by the GDS as depressed. Of these, 26 were correctly identified by the 3-question depression screening instrument, giving a sensitivity of 79% (95% CI = 65–93) and a negative predictive value of 87% (95% CI = 79–95). Our 3-item ED-DSI actually had a slightly better performance than Fabacher's instrument. Using a cut-off value of 2, the sensitivity, specificity and negative predictive value were 90%, 74% and 91%, respectively (Table 2).

Can we use only one question for screening? A study in the US has shown the reliability of screening for depression by asking patients one simple question: "Have you been feeling sad or depressed lately?"¹² However, this has not been tested in the ED population. Fabacher analysed the performance of individual questions in the 3-item tool and a similar question, "Do you often feel sad or depressed?" yielded the highest sensitivity (61%), specificity (83%) and negative predictive value (82%). However, the sensitivity was lower than the 3-item tool (79%).

The availability of a screening instrument does not always translate into its being used, especially in a very busy ED where doctors and nurses have too many tasks at hand. The patient in acute distress may also not be willing. A suitable time for screening might be just before the nurse is preparing to discharge the patient. At this point, the patient's acute problem has been dealt with and the patient might be better prepared to answer some screening questions. Researchers in domestic violence found that modification of the chart by inserting screening questions significantly increased the recognition rate of domestic violence.¹³ In our case, the screening questions could be printed at the nurse discharge box as a reminder. Other people have used computer questionnaires to help with screening while the patient is waiting to be seen by the doctor.¹⁴ This innovation is probably not very useful in Hong Kong, as our elderly patients are usually computer-illiterate.

Will screening at the ED affect outcome? Since previous ED studies, like our study, have not looked at the clinical outcomes of screening, some authors have suggested that, at this time, the evidence is not sufficient to recommend for or against offering routine screening for depression in the ED.¹⁵

Limitations of the study

In this study, we were using the 15-item GDS (short version) as the gold standard. Although the 15-item GDS (short version) is a well validated and accepted screening tool for the elderly, it can be argued that one should use DSM-IV (Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition), that is, final diagnosis by a psychiatrist as the gold standard. Unfortunately, it was beyond the scope of this project to complete a psychiatric evaluation for all cases to validate the GDS score. The 3-item screening tool was generated by selecting the items with the highest Pearson χ^2 as suggested by Hoyl,⁵ who performed a cross-sectional study involving a total of 74 frail outpatients. Since our patients were from the emergency department, the characteristics of the patients might have differed. Also, this 3-item screening tool could only be used to diagnose depression but not for grading its severity.

This study might not be representative of the ED elderly population as a whole. Since we only had access to patients in the observation ward, we might not be able to generalise our results to elderly patients who were admitted or discharged. The next logical step is to test it again in the general ED population, for example, during the discharge process.

There was also the possibility of patient selection bias as participation was voluntary and only Cantonese-speaking patients were included. Other patient variables could also affect the accuracy of the instrument. Although patients with known dementia were excluded, we did not test cognitive function in the participants. Some may have had undiagnosed dementia. Using a Mini-Mental State Examination score of ≤ 26 as a conservative estimate of intact cognition, 37 out of 103 patients in Fabacher's study were excluded because of previously unrecognised cognitive impairment.¹¹ Since the performance of the screening tool was better after excluding patients with impaired cognition, if there should be any bias in our study it would probably be an underestimation of the accuracy. Some elderly patients who were in distress due to underlying medical conditions might be biased in their answers. In our study, this bias was minimised by the fact that patients were usually more settled in the observation ward after initial treatment in the acute care area of the ED.

Inter-rater variability in the administration of the test could also be an issue if it is adopted for general use in the ED. Ideally, we could ask different doctors to evaluate the same patient to check for inter-rater reliability. However, this was not practical since at any one time there was usually only one doctor in charge of the observation ward.

Conclusions

As a screening tool for detecting depression in the elderly in the observation unit of an emergency department, the 3-item ED-DSI correlates well with the 15-item GDS. This short screening instrument makes depression screening possible in a busy emergency department.

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Appendix 1. Demographic data part of questionnaire

Survey on Geriatric Depression
In ED of PYNEH

Patient Gum Label

Personal Detail**A) Sex**

- | | | |
|-----------|----|-----|
| 1. Male | A1 | () |
| 2. Female | A2 | () |

B) Age

- | | | |
|--------------------------------|----|-----|
| 1. 65 years old – 70 years old | B1 | () |
| 2. 71 years old – 75 years old | B2 | () |
| 3. 76 years old – 80 years old | B3 | () |
| 4. 81 years old – 85 years old | B4 | () |
| 5. 86 years old – 90 years old | B5 | () |
| 6. 91 years old – 95 years old | B6 | () |
| 7. 96 years old or above | B7 | () |

C) Marital status

- | | | |
|----------------------------------|----|-----|
| 1. Single | C1 | () |
| 2. Married | C2 | () |
| 3. Separated or Divorced | C3 | () |
| 4. Widowed | C4 | () |
| 5. Others (Please specify _____) | C5 | () |

D) Occupation

- | | | | |
|----------------------------------|--------|----|-----|
| 1. Employed | } To E | D1 | () |
| 2. Self-employed | } To E | D2 | () |
| 3. Unemployed | } To F | D3 | () |
| 4. Retired | } To F | D4 | () |
| 5. Housewife | } To F | D5 | () |
| 6. Others (Please specify _____) | | D6 | () |

E) Professional

- | | | |
|--------------------------------------|----|-----|
| 1. Administrative or Managerial work | E1 | () |
| 2. Clerical or Secretarial work | E2 | () |
| 3. Professional people | E3 | () |
| 4. Entertainment | E4 | () |
| 5. Sales | E5 | () |
| 6. Construction or Furnishing | E6 | () |
| 7. Factory worker or Technician | E7 | () |
| 8. Transportation or Driver | E8 | () |
| 9. Others (Please specify _____) | E9 | () |

F) Are you currently receiving any public assistance from the Social Welfare Department?

- | | | |
|--------|----|-----|
| 1. Yes | F1 | () |
| 2. No | F2 | () |

G) Do you live?

- | | | |
|-------------------------|----|-----|
| 1. With family | G1 | () |
| 2. With friend | G2 | () |
| 3. Alone | G3 | () |
| 4. Private old age home | G4 | () |
| 5. Government C&A home | G5 | () |

H) Which type of housing are you living in?

- | | | |
|----------------------------------|----|-----|
| 1. Self-owned (Private Housing) | H1 | () |
| 2. Rent (Private Housing) | H2 | () |
| 3. Self-owned (Public Housing) | H3 | () |
| 4. Rent (Public Housing) | H4 | () |
| 5. Temporary Housing | H5 | () |
| 6. Wooden Hut | H6 | () |
| 7. Stone House | H7 | () |
| 8. Others (Please specify _____) | H8 | () |

End

Appendix 2. The 3-item screening tool for geriatric depression**Patient Gum Label**

填表日期： _____

我哋想做一個問卷調查，係有關長者對一啲事物嘅感受，請你穩一穩，喺過去嘅一星期內，你有冇呢一啲嘅感覺。答案無話對與錯，如果有嘅話，請你答有。如果有嘅話，請你答有。

老人抑鬱短量表—(ED-DSI)

1. 你是否常常感到煩悶? [Do you often get bored?]
問<1>：喺上個禮拜裡面，你係咪成日都覺得好煩悶呢？ 是 不是
2. 你是否常常感到無助? [Do you often feel helpless?]
問<1>：喺上個禮拜裡面，你有冇覺得無論做乜嘢，都係無用呢？ (若病人無反應問<2>)
問<2>：喺上個禮拜裡面，你有冇覺得無論做乜嘢，都係無補於事呢？ 是 不是
3. 你是否覺得自己現在一無是處呢? [Do you feel pretty worthless the way you are now?]
問<1>：喺上個禮拜裡面，你係咪覺得自己好無用呢? (若病人無反應問<2>)
問<2>：喺上個禮拜裡面，你係咪覺得自己完全無用呢？ 是 不是

註：節錄自葵涌醫院廣東話口語化版本

總分： **Appendix 3.** Geriatric Depression Scale (short form)

1. Are you basically satisfied with your life? YES / NO
2. Have you dropped many of your activities and interests? YES / NO
3. Do you feel that your life is empty? YES / NO
4. Do you often get bored? YES / NO
5. Are you in good spirits most of the time? YES / NO
6. Are you afraid that something bad is going to happen to you? YES / NO
7. Do you feel happy most of the time? YES / NO
8. Do you often feel helpless? YES / NO
9. Do you prefer to stay at home, rather than going out and doing new things? YES / NO
10. Do you feel you have more problems with memory than most? YES / NO
11. Do you think it is wonderful to be alive now? YES / NO
12. Do you feel pretty worthless the way you are now? YES / NO
13. Do you feel full of energy? YES / NO
14. Do you feel that your situation is hopeless? YES / NO
15. Do you think that most people are better off than you are? YES / NO