Screening instruments for a population of older adults: The 10-item Kessler Psychological Distress Scale (K10) and the 7-item Generalized Anxiety Disorder Scale (GAD-7)

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ABSTRACT

Screening tools that appropriately detect older adults' mental disorders are of great public health importance. The present study aimed to establish cutoff scores for the 10-item Kessler Psychological Distress (K10) and the 7-item Generalized Anxiety Disorder (GAD-7) scales when screening for depression and anxiety. We used data from participants ($n=1811$) in the Enquête sur la Santé des Aînés-Service study. Depression and anxiety were measured using DSM-V and DSM-IV criteria. Receiver operating characteristic (ROC) curve analysis provided an area under the curve (AUC) of 0.767 and 0.833 for minor and for major depression when using K10. A cutoff of 19 was found to balance sensitivity (0.794) and specificity (0.664) for minor depression, whereas a cutoff of 23 was found to balance sensitivity (0.692) and specificity (0.811) for major depression. When screening for an anxiety with GAD-7, ROC analysis yielded an AUC of 0.695; a cutoff of 5 was found to balance sensitivity (0.709) and specificity (0.568). No significant differences were found between subgroups of age and gender. Both K10 and GAD-7 were able to discriminate between cases and non-cases when screening for depression and anxiety in an older adult population of primary care service users.

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1. Introduction

Worldwide, the population of older adults, aged 65 and over, is expected to triple by 2050 (WHO, 2011). This increase in population comes along with an increased need for research and advancements in improved mental health for seniors considering the negative impact of mental health issues on quality of life, functionality, cognition as well as physical health, the latter presenting a suggested bidirectional effect with common mental health problems, such as depression and anxiety (Ramasubbu et al., 2012; Roy-Byrne et al., 2008; Rugulies, 2002; Skoog et al., 1993).

Large population based studies in developed countries have reported rates of depression and anxiety ranging from 2.6% to 27% in older adults (Blazer et al., 1987; Scott et al., 2008; Mosier et al., 2010; Kessler et al., 2010). In Canada, a study using the Enquête sur la Santé des Aînés (ESA) survey on the health of older adults showed that 13% and 5.7% of community dwelling seniors reported psychological distress symptoms and filled DSM-IV criteria for depression in the past year (Préville et al., 2008). Using the same data, Grenier et al. (2011) showed that the past year prevalence rate of any anxiety disorder was 5.6% for seniors when using DSM-IV criteria.

Canada has a public managed health care system and all residents have access to primary care. Reports have shown that among the 13% of older adults that suffer from a common mental disorder, fewer than 50% actually receive any treatment (Préville et al., 2008). From a public health perspective, the impact of untreated depression and anxiety is great not only on the individual's physical health but also on the health care system. One recent study showed that, in 2010, the excess annual adjusted health care costs of depression, anxiety and co-morbid depression and anxiety reached $27.4, $80.0 and $119.8 million per 1 million in a population of elderly (Vasiliadis et al., 2013).

Given the aging of the population and the important burden of depression and anxiety on the health care system, as well as on individuals, it is important to effectively detect these disorders in both epidemiological and clinical settings. One way to do so is with screening tools that preferably should be simple and short as opposed to extensive questionnaires given the cognitive decline

with older age (O'Brien and Grayson, 2013). Moreover it has been reported that the elderly have a harder time accurately completing long questionnaires (O'Connor and Parslow, 2010).

Some screening methods presently in use include the Hospital Anxiety and Depression Scale (HADS) which has been validated in French for the population of Quebec, however, the scale's strength in detecting mental disorders is weak (Roberge et al., 2013). Other measures include the 10-item Kessler Psychological Distress Scale (K10) and the 7-item General Anxiety Disorder Scale (GAD-7) (Kessler et al., 2002; Spitzer et al., 2006).

The K10 is a non-specific and concise screening method for psychological distress. There has been a satisfactory evidence of this scale correlating with the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) when looking at anxiety and depression disorders (Andersen et al., 2011; Anderson et al., 2013; Andrews and Slade, 2001; Fassaert et al., 2009; Furukawa et al., 2003, 2008). The majority of these validation studies on the K10 have been done on adult populations. Recently, Anderson et al. (2013) highlighted that these validation studies may not be directly applicable to different older adult populations. Their study focused on an older adult population in Australia and found a significant correspondence between K10 scores and the presence of psychological disorders.

The GAD-7 is also a concise scale with only 7 items aimed at screening for anxiety disorders. Its validity and reliability have been tested in both clinical and general population settings. In both settings it has been shown to be a valid and effective measure of anxiety (Spitzer et al., 2006; Kroenke et al., 2007; Löwe et al., 2008). A study by Wild et al. (2014) validated the GAD-7 screening tool on a population of older individuals in Germany and it was considered effective in this population.

The objective of this study was to determine, in a large sample of community living older adults attending primary care health clinics in Quebec, the cutoff for depression and anxiety disorder when using a French adaptation of the K10 and GAD-7 as a screening tool.

2. Methods

The data for the current study came from the 2011–2013 ESA-service study. This cross-sectional survey was conducted on a sample of older adults, aged 65 years and over, who were recruited in the waiting room of primary health clinics in the Montérégie health region of Quebec. The agency of health and social services collaborating with the study is responsible for 1,325,000 inhabitants. The sampling of individuals was based on the stratification of the type of primary health clinic offering medical services and included: (1) family medicine group, (2) local community service centers, (3) private medical clinic with less than 3 general practitioners and (4) private clinics with 3 or more general practitioners. Of the 744 eligible general practitioners, 409 consented to participate in the study.

2.1. Procedure

Patients in the age group of interest (65 years and over), who were waiting for health services from participating physicians, received a pamphlet describing the study and its objectives as well as inviting them to participate. If the patients agreed to participate they had to provide a telephone number where they could be reached and had to complete 2 short questionnaires, the K10 and the GAD-7 (Kessler et al., 2002; Spitzer et al., 2006). Patients were then phoned to receive an appointment for an interview at home. All interviewers of the study received a1 day training on the computer assisted ESA-service questionnaire. Before the 90 min interview, each patient was asked for his or her written consent to take part in the study. Participants interviewed received $15 CA as compensation. The study was approved by the Ethics Committee of the Charles LeMoyne Hospital.

To ensure accuracy of responses, patients were tested with the mini mental state examination to exclude those with moderate or severe cognitive issues at the beginning of the interview (score less than 22) ($n=46$) (Derouesné et al., 1999). Those demonstrating no cognitive issues continued in the study to answer the computer-assisted ESA-service questionnaire concerning, among others, mental and physical health status as well as predisposing and contextual factors that facilitate the use of health services. From the 1811 patients who were interviewed

at home, those with complete information for the K10 ($n=1661$) and the GAD-7 ($n=1715$) were included in this study.

2.2. Measures

K10. The Kessler 10 item scale used to asks questions concerning psychological distress symptoms in the past 4 weeks on a 5 point Likert scale ranging from none of the time to all of time. The range of scores is between 10 and 50 where higher scores indicate higher distress (Andersen et al., 2011; Andrews and Slade, 2001). Suggested score categories are: 10–19 (individual is likely well), 20–24 (indicate mild mental disorder), 25–29 (indicate moderate mental disorder) and 30–50 (indicate severe mental disorder) (Australian Bureau of Statistics [ABS], 2001). The 1661 participants who had completed the K10 survey did not differ from those who had not in terms of sex ($p=0.31$) and minor depression ($p=0.13$). However, non participants were less likely to be older (>75 years of age) ($p=0.002$), to have major depression ($p=0.02$) and anxiety disorders ($p=0.01$).

GAD-7. The GAD 7 item scale focuses on anxiety symptoms using a 4 point Likert scale ranging from not at all to nearly every day. Total scores range between 0 and 21 where higher scores are indicative of higher severity. Scores below 5 are indicative of minimal anxiety, scores between 5 and 9 indicate mild anxiety, scores between 10 and 14 indicate moderate anxiety and scores between 15 and 21 indicate severe anxiety (Spitzer et al., 2006). Participants who completed the GAD-7 questionnaire did not differ from those who did not regarding age ($p=0.114$), sex ($p=0.827$) and presence of major depression ($p=0.083$), minor depression ($p=0.699$) or anxiety ($p=0.153$).

The diagnostic module of the ESA-service questionnaire, which is similar to the DIS and CIDI with satisfactory reliability and validity, was used in this study to identify individuals who met criteria for major or minor depressive disorders or an anxiety disorder.

2.2.1. Major or minor depressive disorder

Major depression was defined according to criteria from the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V). Thus, subjects who reported more than 5 of the 9 associated symptoms of depression including at least one of the essential features of depression (either depressive mood or loss of interest or pleasure in usual daily activities) were classified as having a probable major depression. Symptoms should have been present during at least 2 consecutive weeks nearly all day and nearly every day and impairment in at least one area of social functioning had to be reported. We also considered in the analyses individuals who reported between 3 and 4 of the associated symptoms of depression, including at least one of the features of depression and impairment in functioning, as having minor depression. Finally, subjects who were told by their doctor that their symptoms were attributable to a physical disease, to a drug, were excluded from the major and minor depression categories.

2.2.2. Anxiety disorder

In this study, the anxiety disorders that were considered following DSM-IV criteria were specific phobias, panic disorders, agoraphobia, obsessive compulsive disorder and generalized anxiety disorder. For a detailed account of the classification used for the disorders in this study, refer to Préville et al. (2008).

2.3. Data analysis

Statistical analyses for this study were performed using IBM SPSS Statistics version 21. Student t-tests were performed to compare means of the screening tools for gender and age groups. Chi squared (χ^2) tests were also used to compare proportions of individuals in different diagnoses and subgroups.

Receiver operating curve (ROC) analyses were performed to verify the K10's ability to screen for both major and minor depression, which could also present with significant distress, and the GAD-7's ability to screen for an anxiety disorder. Analyses also considered gender and age subgroups. Areas under the curve (AUC) of each ROC analysis gave an estimate of the scale's ability to distinguish between cases and non-cases. The AUCs were provided by the SPSS output along with a ROC curve and its coordinates. SPSS also computes a statistical test with a 95% confidence interval to determine whether or not the AUC is equal to 0.5, where the screening scale would be worthless. Gender specific AUCs were also compared using χ^2 statistics. The formula used for the comparison of the AUC was as follows:

$$\chi^2 = \frac{(AUC_1 - AUC_2)^2}{(s_1^2 - s_2^2)}$$

To find an optimal cutoff value where sensitivity and specificity were maximized, we used Excel version 11. The method used to choose a cutoff was finding the point from which there is the shortest distance to coordinates (0,1) on the plot, which is considered optimal to balance sensitivity (s_n) and specificity (s_p). The distance (d) was calculated as follows:

$$d = \sqrt{\left[(1-s_n)^2 + (1-s_p)^2\right]}$$