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Validation of four measures of mental health against depression and generalized anxiety in a community based sample



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ABSTRACT

There is a need to validate screening measures of affective and generalized anxiety disorders for use in epidemiological surveys of mental health in the general population. This study examined the diagnostic accuracy of the Patient Health Questionnaire (PHQ-9), Goldberg Anxiety and Depression Scales (GAS, GDS) and the 12-item Short Form Health Survey (SF-12) Mental Health Component Summary Scale (MCS-12) in a population based longitudinal study in Australia. We report analyses of two narrow age birth cohorts in the Personality and Total Health (PATH) through life study (ages 32–36 and 52–58). Depressive episodes (severe, moderate, and mild), dysthymia and generalized anxiety disorder were diagnosed according to International Classification of Diseases (ICD-10) criteria using the World Health Organisation (WHO) Composite International Diagnostic Interview (CIDI) as a criterion. All scales had high concordance with their target 30-day diagnoses, with area under the Receiver Operating Characteristic (ROC) curve (AUC) ranging between 0.85 and 0.90. The PHQ-9, GDS, GAS and MCS-12 were all valid instruments for identifying possible cases of depression and anxiety, and assessing the severity of these common mental disorders in the general population. We report recommended cut-points for each scale, though note that the optimal cut-point on mental health screening instruments may vary depending on the context of test administration.

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1. Introduction

Mood and anxiety disorders are common psychiatric conditions that have widespread consequences at both individual and societal levels. They are among the leading causes of non-fatal disease burden globally (Whiteford et al., 2013), have substantial economic costs (lost productivity), and disproportionately affect disadvantaged populations. Understanding the social determinants, outcomes and feasibility of community level interventions for these common mental disorders is an important public health challenge that requires the collection of psychiatric data in conjunction with rich longitudinal data that encompasses social, economic, demographic, biological and psychological factors. Equally, it is important to ensure the validity of self-report measures of psychiatric conditions used with the general population. The primary motivation of this study is to validate three commonly used brief mental health scales against well-validated criterion for depressive and anxiety disorders.

The gold standard for identifying common mental disorders in both clinical and research settings is expert diagnosis according to standard classification systems such as the International Classification

of Diseases (ICD) or the American Diagnostic and Statistical Manual (DSM). It is often impractical to conduct semi-structured or fully structured diagnostic interviews in large population based surveys with an extensive array of multifactorial data. Brief mental health assessment scales are regularly used in their place. However, many of these scales have been developed as screening instruments for use in medical or primary care settings. It is often unclear how these measures perform when incorporated into a larger multi-instrument battery in a community based sample (Smith et al., 2007). For example, the nine-item mood module of the Brief Patient Health Questionnaire (PHQ-9) (Spitzer et al., 1999) and the Goldberg Anxiety and Depression Scales (GAS, GDS) (Goldberg et al., 1988) were all validated in a primary care and general patient samples. Additional validation studies of the PHQ-9 have focused on its clinical utility (Kroenke, 2012; Kroenke et al., 2010), reporting optimal cut-points in patient populations (Gelaye et al., 2013; Gilbody et al., 2007; Löwe et al., 2004a, 2004b; Manea et al., 2012; Wittkamp et al., 2007). Studies that have investigated the use of the PHQ-9, GDS and GAS in community based samples reported good convergent validity with other mental health scales such as the SF-36, but were limited as they lacked clinical diagnoses of depression (Koloski et al., 2008; Martin et al., 2006).

The optimal scale cut-points/thresholds for identifying depression or anxiety may differ depending on the context and purpose of the test administration. Whereas higher sensitivity may be

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given greater weight in clinical settings (where the objective is to screen for all possible cases) the accompanying reduction in specificity and overestimation of prevalence makes clinically relevant cut-points inappropriate for epidemiological research. There is therefore a need to validate and identify optimal diagnostic cut-points for brief screening instruments of depression and anxiety used in large epidemiological surveys.

In addition to clinical screening instruments, other brief mental health scales have also been developed specifically for epidemiological research. The 12-item Short Form Health Survey (SF-12) (Ware et al., 1996) is a shortened form of the SF-36 which was designed for use in the general population as a multi-factorial measure of health-related quality of life. The SF-12 assesses general health, functional limitations, and mood and anxiety symptoms experienced over the past 4 weeks. In standard scoring of the SF-12, item weights are used to derive two orthogonal/unrelated factors reflecting physical and mental health. The Mental Health Component Summary (MCS-12) score does not target a specific psychiatric condition but has been used in a range of research contexts to examine mental health more generally. There are no universally accepted cut-points on the MCS-12 to identify probable diagnoses of a common mental disorder. Two studies have investigated the criterion validity of the MCS-12 against diagnoses made by fully structured clinical interviews (Gill et al., 2007; Vilagut et al., 2013).

The Personality and Total Health (PATH) through life study is a community based longitudinal study that tracks changes in mental health of Australians (Anstey et al., 2011). All the above mentioned measures are collected longitudinally in the PATH study and have been used as continuous measures of the severity of depression or anxiety, or used cut-points to identify possible psychiatric cases (Butterworth et al., 2012, 2009; Jacka et al., 2014; Jorm et al., 2003). Wave four of the PATH study introduced the World Mental Health Composite International Diagnostic Interview (WMH-CIDI) (Kessler and Ustun, 2004) for depressive disorders and generalized anxiety disorder. The CIDI is a fully structured lay-administered diagnostic interview and considered an imperfect gold standard for identifying psychiatric illness (Brugha et al., 2001). The wave four data provides an opportunity to compare the utility of the mental health scales collected longitudinally in the PATH study against a well validated and comprehensive criterion for depression and anxiety.

A distinctive feature of the fourth wave of PATH study data is the focus on respondents from two mid-life cohorts. Midlife represents a critical point in the lifecourse at which work, family and personal achievements and responsibilities coalesce. Common mental disorders are the leading cause of disability from early- to mid-adulthood. Unlike most chronic physical conditions, the 12-month prevalence of depression and anxiety disorders peak during this period (Kessler et al., 2007) and most disorder onset also occur in this age range. Early- to mid-adulthood is when most people establish social and familial relationships, develop careers, and accrue responsibilities. Thus, research is needed to investigate mental health at this stage of the lifespan.

The purpose of this study is to evaluate the use of the CIDI in the PATH study and validate three mental health scales commonly used in psychiatric epidemiological research. Initially we compare the prevalence estimates of depression and generalized anxiety disorders derived from the CIDI in the PATH study with those from a recent nationally representative survey. The main focus of the study, however, is to assess scale cut-points that yield optimal diagnostic accuracy (i.e. sensitivity and specificity) in the general population for two brief screening instruments of depression, one screening instrument for generalized anxiety disorders and a general measure of mental health. The mental health scales assessed were the PHQ-9, GAS, GDS, MCS-12, and RAND MCS-12.

Table 1
ICD-10 World Health Organisation Composite International Diagnostic Interview (CIDI version 2.1.12) diagnoses for the PATH study wave four, 20s and 40s cohorts (N=2061) compared to national survey prevalence estimates (ages 32–37, and 52–58).

	Lifetime			12-month			30-day								
	PATH			NSMHWB			PATH			NSMHWB					
	n	%	(95% CI)	%	(95% CI)	n	%	(95% CI)	n	%	(95% CI)	n	%	(95% CI)	
ICD 10															
Severe depressive episode	257	12.5	(11.0, 13.9)	10.2	(8.0, 12.5)	103	5.0	(4.1, 5.9)	3.7	(2.5, 4.9)	47	2.3	(1.6, 2.9)	2.0	(1.1, 2.9)
Moderate depressive episode	181	8.8	(7.6, 10.0)	5.9	(3.9, 7.9)	47	2.3	(1.6, 2.9)	1.3	(0.6, 2.0)	11	0.5	(0.2, 0.8)	0.2	(0.0, 0.4)
Mild depressive episode	40	1.9	(1.3, 2.5)	1.1	(0.6, 1.6)	9	0.4	(0.2, 0.7)	0.3	(0.0, 0.6)	4	0.2	(0.0, 0.4)	0.0	(0.00, 0.1)
Dysthymia	97	4.7	(3.8, 5.6)	3.3	(2.2, 4.3)	56	2.7	(2.0, 3.4)	2.1	(1.3, 2.9)	29	1.4	(0.9, 1.9)	1.0	(0.0, 1.6)
Any ICD 10 depression	485	23.5	(21.7, 25.4)	18.1	(15.3, 21.0)	163	7.9	(6.7, 9.1)	6.1	(4.6, 7.6)	62	3.0	(2.2, 3.7)	2.5	(1.6, 3.5)
ICD generalized anxiety disorder	189	9.2	(7.9, 10.4)	8.6	(6.9, 10.6)	88	4.3	(3.3, 5.1)	4.6	(2.85, 6.35)	45	2.2	(1.6, 2.8)	2.0	(0.7, 3.3)

NSMHWB: 2007 National Survey Mental Health and Wellbeing.

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