The accuracy of HADS in detecting emotional distress in male prisoners

M. R. Krespi Boothby\textsuperscript{a} *, A. Cases\textsuperscript{b}, K. Carrington\textsuperscript{c}, I. Mulholland\textsuperscript{d}, T. Bolger\textsuperscript{e}

\textsuperscript{a}Psychology Department, Istanbul Bilim University, Istanbul, Turkey
\textsuperscript{b} The Queen’s University of Belfast, Belfast, Northern Ireland
\textsuperscript{c} Department of Psychology, London Metropolitan University, UK
\textsuperscript{d} HMP Wandsworth, London UK
\textsuperscript{e} Oakfields (EA) Limited, Publishing and Consultancy, Woodbridge, Suffolk, UK

Received January 1, 2010; revised February 12, 2010; accepted March 14, 2010

Abstract

In forensic settings, it is impractical to expect psychiatrists or psychologists to carry out lengthy clinical interviews to detect emotional distress given the large number of prisoners. Self-report measures offer a better alternative for detecting emotional distress. With a sample of 400 newly incarcerated male prisoners, this study aimed to evaluate the accuracy of the HADS Unitary Scale in detecting emotional distress as compared to the GHQ-12. The optimal threshold on the HADS Unitary Scale for detecting emotional distress was 15 with 88.9% sensitivity, 73.9% specificity, 83% positive predictive value and 17% misclassification rate. The HADS Unitary Scale was effective in identifying prisoners who were emotionally distressed. This may therefore be used as a screening measure in the male prison population.

Keywords: Prisoners, GHQ-12, HADS

1. Introduction

The high incidence of mental health problems among the prison population has been widely documented (Shaw, Baker, Hunt, Moloney, & Appleby, 2004). Mental illness among prisoners also carries with itself the risk of suicide (Shaw et al., 2004). Compared to individuals in the community, more prisoners suffer from mental illness and are at risk of suicide (Singleton, Meltzer, Gatward, Coid, & Deasy, 1998). Although prisoners suffer from a range of mental illness including mood, psychotic and personality disorders, depression is more related to suicide than other types of mental illness (White, Schimmel, & Frickey, 2002).
In the prison setting, overstretched psychiatry and applied psychology resources make it difficult for psychiatrists and psychologists to carry out lengthy clinical interviews to detect emotional distress. Self-report measures offer a better alternative. One such instrument is the General Health Questionnaire (GHQ) (Goldberg & Hillier, 1979). The GHQ has a number of different versions including GHQ-28, GHQ-30 and GHQ-12. Some studies have indicated that the GHQ-12 was better in detecting psychiatric morbidity using Structured Clinical Interview for DSM-III-R (SCID) as a reference (Goldberg, Gater, Sartorious, Ustun, Piccinelli, Gureje, & Rutter, 1997; Hurley & Dunne, 1991). A limited number of studies have used this measure as a screening instrument in the criminal justice system. Whilst the GHQ-12 seems to be considered as the instrument of choice for detecting emotional distress in forensic settings, the relevance of some of its items to the prison population (e.g. ‘have you felt that you are playing a useful part in things’) has, nevertheless, been questioned (Andersen, Sestoft, Lillebaek, Gabrielsen, & Hemmingsen, 2002).

Another measure widely used in male and female prisoners is the Hospital Anxiety and Depression Scale (HADS) (Biggam & Power, 2004; McMurran & Christopher, 2009). However, the accuracy of HADS in detecting psychiatric morbidity in this population has not been evaluated. Therefore, in view of problems presented by the GHQ-12, the aim of the present study was to examine the accuracy of the HADS Unitary Scale in detecting prisoners who were emotionally distressed, compared to the GHQ-12.

2. Method

2.1 Sample

This study was part of routine applied psychology practice in one of largest male prisons in London, UK. Of a total of 526 prisoners approached to take part in the study during their first week in custody, 400 (76%) gave verbal consent and agreed to participate. The mean age was 33.5 years (SD= 9.14). The exclusion criteria consisted of the presence of severe mental and/or physical illness preventing participation.

2.2 Instruments

Instruments used in the present study included the General Health Questionnaire-12 (GHQ-12) and the Hospital Anxiety and Depression Scale (HADS). The GHQ-12 (Goldberg & Hillier, 1979) consists of 12 items measuring emotional distress. Evidence suggests that GHQ-12 could be used in the prison setting with a score of 5 and over indicating clinically significant distress (Smith & Borland, 1999). The Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983) consists of 14 items; 7 items measure the severity of depression and 7 items measure the severity of anxiety.

2.3 Procedure

The prisoners were invited to complete the questionnaires as part of the prison’s routine induction procedures. Once verbal consent was obtained, a member of the applied psychology team administered the questionnaires to the group of willing prisoners in the induction room.

2.4 Statistical analyses

The accuracy of the HADS Unitary Scale in identifying clinically significant emotional distress was tested against the GHQ-12 by using the Receiver Operating Characteristic (ROC) Curve and by checking its sensitivity, specificity, positive predictive value and misclassification rate (Fawcett, 2006; MEDCALC, 2008).

3. Results

The prevalence of clinically significant anxiety and depression or emotional distress across different measures and thresholds is given in Table I. This ranged from 53% to 75% depending on the measure and threshold used. Out of 400 prisoners, 395 prisoners (99%) completed the GHQ-12 and 342 (86%) completed the HADS. The
comparisons across GHQ-12 and HADS included the data available for both measures, amounting to 337 out of 400 prisoners (84%).

The accuracy of the HADS Unitary Scale in identifying emotional distress was examined by checking its sensitivity, specificity, misclassification rate and positive predictive value. In doing so, a number of cut-off points were examined. A cut off score of ≥ 12, 13 or 14 on the HADS Unitary Scale had 94.5%, 92.0% and 90.5% sensitivity but 53.6%, 61.6% and 65.9% specificity, respectively. The positive predictive values for these thresholds were 75%, 76% and 79% respectively and the misclassification values were 22%, 20% and 20%, respectively. Overall increasing the threshold decreased the sensitivity but improved the specificity. The optimal threshold was a score of ≥ 15 with 88.9% sensitivity and 73.9% specificity. The positive predictive value was 83% and the misclassification rate was 17% (Table II).

### Table I. The prevalence of clinically significant anxiety and depression across different measures.

| Measure            | Threshold | Total | Emotional Distress (%) |
|--------------------|-----------|-------|------------------------|
| GHQ-12             | ≥5        | 395   | 235 (59%)              |
| HADS Unitary Scale | ≥19       | 342   | 181 (53%)              |
| HADS Unitary Scale | ≥18       | 342   | 190 (56%)              |
| HADS Unitary Scale | ≥17       | 342   | 202 (59%)              |
| HADS Unitary Scale | ≥16       | 342   | 213 (62%)              |
| HADS Unitary Scale | ≥15       | 342   | 218 (64%)              |
| HADS Unitary Scale | ≥14       | 342   | 232 (68%)              |
| HADS Unitary Scale | ≥13       | 342   | 241 (70%)              |
| HADS Unitary Scale | ≥12       | 342   | 257 (75%)              |

### Table II. Screening Performance of the HADS Unitary Scale as compared to the GHQ-12 (score ≥5), N = 337

| Confidence Intervals | Threshold | Sensitivity % | N on GHQ-12 | N False -ves | Specificity % | N on GHQ-12 | N False +ves | PPV % | MI |
|----------------------|-----------|---------------|-------------|--------------|---------------|-------------|--------------|--------|----|
| 74 (0.68-0.80)       | ≥12       | 94.5          | 199         | 11           | 53.6          | 138         | 64           | 75     |    |
| 77 (0.71-0.82)       | ≥13       | 92.0          | 199         | 16           | 61.6          | 138         | 53           | 76     |    |
| 78 (0.73-0.84)       | ≥14       | 90.5          | 199         | 19           | 65.9          | 138         | 47           | 79     |    |
| 81 (0.76-0.86)       | ≥15       | 88.9          | 199         | 22           | 73.9          | 138         | 36           | 83     |    |
| 80 (0.75-0.86)       | ≥16       | 86.9          | 199         | 26           | 73.9          | 138         | 36           | 83     |    |
| 81 (0.76-0.86)       | ≥17       | 84.4          | 199         | 31           | 78.3          | 138         | 30           | 85     |    |
| 82 (0.77-0.87)       | ≥18       | 81.4          | 199         | 37           | 81.9          | 138         | 25           | 87     |    |
| 83 (0.78-0.87)       | ≥19       | 79.4          | 199         | 41           | 85.5          | 138         | 20           | 89     |    |

### 4. Discussion

The present study examined the accuracy of the HADS Unitary Scale in detecting emotional distress. The prevalence of clinically significant anxiety and depression or emotional distress across different measures and thresholds ranged from 53% to 75%. This finding is in line with the observed high rates of psychological problems among prisoners (Andersen et al., 2002; McGilloway & Donnelly, 2004).

When the performance of the HADS Unitary Scale was compared to GHQ-12, the findings suggested that the optimal threshold was ≥15 with 88.9% sensitivity, 73.9% specificity, high positive predictive value (83%) and low misclassification rate (17%). The fact that this threshold had high sensitivity and low misclassification rate is encouraging because this means that the number of false negatives will be kept as low as possible. In other words, the risk of missing prisoners who are actually emotionally distressed and would, thus, benefit from psychological/psychiatric help is reduced. Moreover, the positive predictive value of the optimal threshold was also high. This means that a lower number of prisoners will be misidentified as emotionally distressed and that the likelihood of unnecessarily burdening the clinical staff will be reduced. Overall, these findings suggest that the HADS Unitary Scale may be considered as an alternative screening instrument to detect emotional distress in prison settings, using the threshold of ≥15.
Traditionally, in order to identify a cut-off point for a measure, this is compared to a gold standard which can identify cases and non-cases with no misclassifications and in the field of mental health, the gold standard is usually a standardised DSM based interview (Kelly, Dunstan, Lolyd, Fone, 2008). Nevertheless, the GHQ-12 seems to be a good alternative and it has been used to evaluate cut-off points for other scales (Kelly et al., 2008). Future research should also examine the accuracy of HADS in detecting psychiatric morbidity as compared to DSM based interviews. Further limitations of the present study concern three main areas. First, one cannot be sure whether or not the sample was biased as basic demographic information was not collected for the prisoners who refused to take part in the study. Second, for prisoners who did not have sufficient English, adapted versions of the questionnaires were not used. This was due to the linguistic diversity of the foreign nationals who took part in the study. The use of adapted versions of the GHQ-12 and HADS would help improve the reliability and the validity of the findings. Third, the findings may not be generalised across the UK prison estate, given that the present study was undertaken in male prisoners and in only one London prison. Furthermore, some participants were from different cultural and ethnic backgrounds. Therefore, future research in other UK and non-UK prison settings will also be helpful in examining the ways in which the findings converge or diverge.

References

Andersen, H.S., Sestoft, D., lillebaek, T., Gabrielsen, G., & Hemmingsen, R. (2002). Validity of the General Health Questionnaire (GHQ-28) in a prison population: data from a randomised sample of prisoners on remand. International Journal of Law & Psychiatry, 25 (6), 573-580.

Biggam, F.H., & Power, K.G. (2004). Social problem-solving skills and psychological distress among incarcerated young offenders: the issue of bullying and victimization. Cognitive Therapy & Research, 23 (3), 307-326.

Fawcett, T. (2006). An introduction to ROC Analysis. Patterns Letters Recognition, 27 (8), 861-874.

Goldberg, D.P., & Hillier, V.F. (1979). A scale version of the General Health Questionnaire. Psychological Medicine, 9 (1), 139-145.

Goldberg D.P., Gater, R., Sartorious, N., Ústun, T.B., Piccinelli, M., Gureje, O., & Rutter, C. (1997). The validity of two versions of the GHQ in the WHO study of mental illness in the general health care. Psychological Medicine, 27 (1), 191-197.

Hurley, W., & Dunne, M.P. (1991). Psychological distress and psychiatric morbidity in women prisoners. Australian & New Zealand Journal of Psychiatry, 25 (4), 461-470.

Kelly, M.J., Dunstan, F.D., Lolyd, K., Fone, D.L. (2008). Evaluating cutpoints for the MHI-5 and MCS using the GHQ-12: a comparison of five different methods. BMC Psychiatry, 8. Retrieved August 9, 2010, from http://www.biomedcentral.com/1471-244X/8/10

McGilloway, S., & Donnelly, M. (2004). Mental illness in the UK criminal justice system: A police liaison scheme for mentally disordered offenders in Belfast. Journal of Mental Health, 13 (3), 263-275.

McMurrain, M., & Christopher, G. (2009). Social problem solving, anxiety and depression in adult male prisoners. Legal & Criminological Psychology, 14 (1), 101-107.

MEDCALC (2008). ROC curve analysis: introduction. Retrieved January 10, 2008, from http://www.medcalc.be/manual/roc.php.

Shaw J., Baker, D., Hunt, L.M., Moloney, A., & Appleby, L. (2004). Suicide by prisoners. British Journal of Psychiatry, 184 (3), 263-267.

Singleton N., Meltzer H., Gatward, R., Coid J., & Deasy D. (1998). Survey of psychiatric morbidity among prisoners in England and Wales. London: HMSO.

Smith C., & Borland (1999). Minor psychiatric disturbance in women serving a prison sentence: The use of the General Health Questionnaire in the estimation of the prevalence of non-psychotic disturbance in women prisoners. Legal & Criminological Psychology, 4 (2), 273-284.

White T.W., Schimmel, D.J., & Frickey, R. (2002). A comprehensive analysis of suicide in federal prisons: a fifteen-year review. Journal of Correctional Health Care, 9 (3), 321-343.

Zigmond, A.S., & Snaith, R.P. (1983). Hospital Anxiety and Depression Scale. Acta Psychia Scandinavica, 67 (6), 361-370.