VALIDATION OF THE GENERAL HEALTH QUESTIONNAIRE IN FEMALE VIDEO DISPLAY UNIT (VDU) OPERATORS IN SINGAPORE

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ABSTRACT

Fifty-seven Chinese female Video Display Unit operators employed in a multi-national company were asked to complete the 28-item General Health Questionnaire (GHQ-28). This is part of a study on stress and asthenopia in this group of workers. Validity of the GHQ-28 was determined by comparison with the Clinical Interview Schedule (CIS). The GHQ-28 was found to give optimum results with a cut-off score of 5/6. The CIS classified 28.07% as cases and this was comparable to the estimated prevalence of 28.03% derived from the GHQ.

Keywords : VDU operators, general health questionnaire, Chinese female

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INTRODUCTION

With the advent of the computer and the emphasis on information technology, Singapore is fast becoming a computerized society. In certain sectors of industry, most personnel already use a video display unit (VDU). The prevalence of psychological disturbances among VDU operators varies between 14% to 70%[1,2]. Local studies that have been published concentrated on the physical health of these workers and the ergonomics of the computer work-station[3,4]. In order to delineate more clearly and reliably the relationship between stress and asthenopia among VDU operators in Singapore, a study utilizing standardized psychiatric instruments was undertaken.

The General Health Questionnaire (GHQ) is a self-administered screening questionnaire designed to assist doctors in identifying patients with psychiatric morbidity[5]. While other versions of this questionnaire have been validated in different clinical settings, reports on the validity of GHQ-28 have been limited to outpatients with multiple sclerosis[6], to a community study of adolescents[7] and to neurological inpatients[8]. Tarnopolsky et al[9] suggested that the GHQ should be recalibrated on the population where it is going to be applied because validity coefficients obtained in one setting do not necessarily hold in another one. For this reason, it was necessary to validate the GHQ-28 in a sample of female VDU operators before embarking on the main study.

METHODS

Fifty-seven VDU operators in a multi-national company were randomly selected for the study. The sample consisted of 30 operators who spent at least 4 hours per day on VDU work and another 27 operators who spent less than 4 hours per day on VDU work (Table I). The operators, all female and English speaking, were asked to complete the GHQ-28 and a questionnaire designed to collect demographic information. In the same session, they were psychologically assessed in an interview room by one of the authors (LCCL) using the structured Clinical Interview Schedule (CIS)[10].

Table I: Demographic characteristics of sample

	≥ 4 hrs VDU work (N=30)	< 4 hrs VDU work (N=27)	Total (N=57)
Age (yrs)			
Mean	28.73	27.13	27.93
Range	23 - 42	20 - 35	20 - 42
Marital status			
Ever married	17	13	30
Never married	13	14	27
Education			
Primary	1	1	2
Secondary	11	6	17
Tertiary	18	20	38
Years of service			
Mean	4.0	2.8	3.4
Range	1 - 17	1 - 11	1 - 17

The CIS has two kinds of ratings: the score of Reported Symptoms which is the subjective description of their mental condition, and the score of Manifest Abnormalities which is derived from the psychiatrist's own judgement of the respondent's mental state. A patient with a CIS weighted total symptom score of 13 or more was considered a psychiatric 'case'. The binary 0/1 scoring method was used in scoring the GHQ. Goldberg & Hillier[11] recommended the cutting score of 4/5 for the 28-item version. This means that with binary method scores of 5 or higher patients are regarded as psychiatrically disturbed.

RESULTS

The socio-demographic characteristics of the sample is shown in Table I. There was no significant difference in the variables between the two groups. The mean score of the GHQ-28 was 4.21 (S.D. = 4.48, range 0-17).

Sensitivity is the proportion of cases correctly identified by GHQ whereas specificity is the proportion of non-cases correctly identified. The Positive Predictive Value (PPV) is

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the proportion of high scorers who can be expected to be cases. An Overall Misclassification Rate (OMR) is defined as the proportion of false positive and false negatives in the total sample. In all instances, the CIS interviews were used as indicators of true 'caseness'. Table II illustrates the relationship between the different cut-off score and the range of misclassification rate, positive predictive value, sensitivity and specificity. The best performance was achieved using a cut-off score of 5/6. For this score, the overall misclassification rate was 10.97%, the positive predictive value was 63.16%, the sensitivity was 75.00% and specificity was 82.93%.

The significant correlations of +0.50 in the present study between the GHQ and CIS scores provide additional evidence to the validity of the GHQ-28. This finding is comparable to other reported studies on the validity of GHQ-28 (Table III).

DISCUSSION

The use of GHQ-28 has so far been limited to clinical settings. This study has shown that the GHQ is a valid and useful screening instrument of psychological morbidity in VDU operators. Its use has to be recalibrated in different social and cultural settings[9,12].

Our data has shown that the best results were obtained with a higher threshold score than that recommended in the manual[5]. Although a higher threshold score resulted in a reduction in the sensitivity of the GHQ, it improved its specificity and positive predictive value (Table II). The VDU operators have more physical health complaints such as pain, stiffness, fatigue and tremors than conventional office workers[3,13,14]) and this could account for the higher threshold score. This finding is consistent with other studies which have found that patient with physical symptoms tend to score higher on the GHQ[5,6,15,16] (Table III).

Table II: Validity of the GHQ-28 for different cutting score

GHQ	Sensitivity (%)	Specificity (%)	PPV * (%)	OMR # (%)
1/2	87.50	51.22	41.18	21.99
2/3	87.50	60.98	46.67	17.99
3/4	81.25	70.73	52.00	15.00
4/5	81.25	75.61	56.52	12.99
5/6	75.00	82.93	63.16	10.97
6/7	43.75	82.93	50.00	15.97
7/8	43.75	85.37	53.85	15.15
8/9	37.50	85.37	51.11	16.15

* PPV = Positive Predictive Value

\# OMR = Overall Misclassification Rate

The strength of GHQ as a screening instrument is in its apparent resistance to the effects of socio-economic status and cultural background. However the sex of the respondent affects the response[17]. Women reported symptomatology more openly than men[18] and this could account for the lower sensitivity in our study of female VDU operators.

Using a cut off score of 5/6 in the GHQ, a 'probable case' rate of 28.03% was reported. This compares favourably with the case rate of 28.07% based on the CIS. The Kendall's tau coefficients of correlation of 0.50 between GHQ scores and the CIS scores suggests that the GHQ is not so useful in assessing the severity of psychological morbidity. Our result is lower than those obtained in studies of general practice population where tau was reported to be as high as 0.77[19]. The differences in the variety and extent of psychological morbidity in the two samples probably account for this discrepancy.

In using the GHQ as a screening instrument in psychiatric epidemiological survey, careful preparation is necessary. The sensitivity, specificity and cut-off score have first to be determined in a representative sample from the study population. This paper shows that the GHQ is a useful and valid instrument for determining the probable prevalence of psychiatric disorder in VDU operators in Singapore. However the GHQ does not provide diagnostic precision and should not substitute the clinical assessment of patients by the clinician.

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Table III: Comparison of the validity of GHQ-28 in different studies

Author	Study	Cut-off point	Kendall's tau	Spe* (%)	Sen# (%)	OMR (%)
Goldberg (1972)	General Practice	4/5	+0.77	87	91.4	11
Goldberg & Hillier (1979)	General Practice	4/5	+0.76	84.2	88	14.5
Tarnopolsky et al (1979)	Household Survey	4/5	+0.45	72	78	26
Banks (1983)	Community Survey	5/6	+0.74	100	84.5	15
Cheng (1985)	Community Survey	4/5	+0.63	93.5	73.7	11.3
Present study	Industrial Sample	5/6	+0.50	75	82.9	10.97

* Spe = Specificity

\# Sen = Sensitivity

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