



# Factor structure and reliability of the 30-item Sinhala version of General Health Questionnaire (GHQ)

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## ABSTRACT

**Objective:** To determine the factor structure and the reliability of the Sinhala version of the General Health Questionnaire-30 (GHQ-30).

**Methods:** This was a descriptive study including 368 patients with in the age range of 18–75 years, attending the Out Patient Department (OPD) of Colombo North Teaching Hospital, Ragama, Sri Lanka during the period between June 2009 and September 2010. Sinhala version of GHQ-30 was given to be completed by the participants. Each item of the GHQ was rated on a four-point scale (0–1–2–3). Factor analyses were performed by applying Generalized Least Squares method using oblimin rotation. The internal consistency was assessed by calculating Cronbach's  $\alpha$  coefficient.

**Results:** Median age of the study population was 32.5 years (Inter quartile range [IQR] = 21 years) and the median GHQ score was 9 (IQR 7). GHQ-30 produced a five factor solution which accounted for 51.6% of the total variance (TV). Factor I (Depression) accounted for 38% of TV, Factor II (Loss of confidence) 5%, Factor III (Insomnia) 4%, Factor IV (Social dysfunction) 2.7% and Factor V (Anxiety) 2%. The Cronbach's alpha coefficients of GHQ-30 was 0.94 indicating satisfactory internal consistency.

**Conclusions:** GHQ-30 comprises five factors/subscales and it displayed adequate reliability for assessment of psychiatric disorders among Sinhala speaking primary care attendees in Sri Lanka.

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## 1. Introduction

The General Health Questionnaire (GHQ) is a self-administered questionnaire widely used to detect potential non-psychotic psychiatric disorders. The original questionnaire consists of 60-items but subsequently 30, 28 and 12 items versions have been derived from it.

Validity is the extent to which a test measures what it claims to measure. It is vital for a test to be valid in order for the results to be accurately applied and interpreted. Construct validity is the extent to which a particular measure relates to other measures consistent with theoretically derived hypothesis concerning the concepts or constructs that are being measured (Abramson and Abramson, 1992). This can be assessed by examining psychometric properties and factor structure for GHQ-30.

The GHQ has been validated in different languages and cultures (Huppert et al., 1989; Jakob et al., 1997). The studies that assessed the factor structure had reported it to vary between three and eight factors across the studies (Frydecka et al., 2010; Iwata et al., 1994;

Ohta et al., 1995; Shek and Tsang, 1995; Shigemi et al., 2000). The Sinhala translation of it is a commonly used instrument in Sri Lanka and even though it has been reported to be validated and hence widely used for research purposes, the psychometric properties of the instrument have not been published. Thus, the objective of this study was to describe the factor structure of the Sinhala version of the GHQ-30 and to assess its reliability.

## 2. Methods

A descriptive cross sectional study was conducted at the Out Patient Department (OPD) of the Colombo North Teaching Hospital (CNTH), Ragama, Sri Lanka between June 2009 and September 2010. The study participants included both males and females aged 18–75 years who were able to read and understand the Sinhala language.

The minimal sample size for factor analysis depends on the number of items in the questionnaire and what is recommended is five participants per question item. Therefore, the minimum required for the GHQ-30 was 150 participants, but a sample size of 323 was computed which will include, on average, 10 participants per item which is preferable.

All patients registered for OPD visits at the CNTH and who consented to participate in the study and were eligible for inclusion were recruited until the required sample size was

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**Table 1**  
Factor loadings of the Sinhala version of GHQ-30.

	Factor				
	F1 Depression	F2 Loss of confidence	F3 Insomnia	F4 Social dysfunction	F5 Anxiety
25. Felt that life is entirely hopeless?	<b>0.886</b>	−0.011	0.080	−0.066	0.008
24. Been thinking of you as a worthless person?	<b>0.816</b>	−0.003	0.009	−0.057	0.098
23. Been loosing confidence in you?	<b>0.675</b>	0.158	0.052	−0.183	0.266
29. Felt that life is not worth living?	<b>0.642</b>	−0.111	0.125	0.190	−0.009
26. Been feeling hopeful about your own future?	<b>0.563</b>	0.087	0.055	0.142	0.032
21. Found everything getting on top of you?	<b>0.486</b>	0.102	−0.087	−0.012	0.348
30. Found at times that you could not do anything because your nerves were too bad?	<b>0.434</b>	0.042	0.034	0.278	0.185
7. (Not) Felt on the whole you were doing things well?	−0.054	<b>0.911</b>	0.063	−0.133	0.061
8. (Not) Been satisfied with the way you have carried out your task?	0.029	<b>0.749</b>	0.051	0.023	0.003
17. (Not) Been able to enjoy your day to day activities?	−0.029	<b>0.454</b>	−0.079	0.271	0.223
1. (Not) Been able to concentrate on whatever you are doing?	−0.032	<b>0.367</b>	0.165	0.110	0.184
12. (Not) Felt that you are playing a useful part in things?	0.265	<b>0.362</b>	−0.009	0.198	−0.177
2. Lost much sleep over worry?	0.002	0.078	<b>0.755</b>	0.022	0.066
3. Been having restless disturbed nights?	0.118	0.014	<b>0.695</b>	0.000	0.036
6. Been managing as well as most people would in your shoes?	0.067	0.244	0.269	0.256	−0.007
10. Been finding it easy to get on with other people?	0.040	0.000	0.089	<b>0.598</b>	0.038
11. Spent much time chatting with people?	−0.044	−0.070	0.091	<b>0.536</b>	0.037
13. Felt capable of making decisions about things?	0.055	0.197	−0.147	<b>0.501</b>	0.097
20. Been able to face up to your problems?	0.249	0.074	−0.098	<b>0.487</b>	0.067
4. Been managing to keep your self busy and occupied?	0.122	0.218	0.159	<b>0.365</b>	−0.136
5. Been getting out of the house as much as usual?	−0.056	0.065	0.097	<b>0.332</b>	0.133
9. Did you develop love and fondness to your dear ones?	0.112	0.149	−0.099	0.227	0.003
18. Been taking things hard?	−0.007	0.058	0.162	−0.003	<b>0.682</b>
19. Been getting scared or panicky for no good reason?	0.143	0.055	−0.016	0.031	<b>0.545</b>
22. Been feeling unhappy and depressed?	0.284	0.077	0.186	0.022	<b>0.488</b>
28. Been feeling nervous and strung up all the time?	0.183	0.092	0.136	0.116	<b>0.468</b>
14. Felt constantly under strain?	0.097	−0.014	0.221	0.230	<b>0.448</b>
15. Felt you could not overcome your difficulties?	0.193	0.092	−0.082	0.183	<b>0.406</b>
16. Been finding life a struggle all the time?	0.268	−0.027	0.111	0.139	<b>0.388</b>
21. Found everything getting on top of you?	0.168	0.130	0.101	0.264	<b>0.304</b>

Extraction method: Generalized Least Squares. Rotation method: Oblimin with Kaiser Normalization.

Factor loading >0.3 were bolded.

reached using convenience sampling. The number of participants recruited per day was between 10 and 15.

The main study instruments used were a questionnaire on general information to determine relevant socio demographic data and the Sinhala version of the GHQ-30, which is a self-administered questionnaire. It was completed during the OPD visit. Each item of the GHQ was rated on a four-point Likert scale (0-1-2-3) instead of the conventional bi-modal scale (0-0-1-1) designed for the GHQ, to enable the statistical procedure in relation to factor analysis.

Data was entered to EPI info and then converted to SPSS file and analysed. Factorability of the GHQ-30 was assessed with the Bartlett's test of sphericity (<0.001) and Kaiser–Meyer–Olkin (0.95) measure of sampling adequacy. We applied Generalized Least Squares method with Oblimin rotation, because it produced five distinct interpretable factors. The internal consistency was assessed by calculating Cronbach's  $\alpha$  coefficient of the instrument for the overall sample as well as for selected socio-demographic variables and individual factors/subscales.

Informed consent was obtained from all the research participants and confidentiality of data obtained were assured by concealing the identity using a coding system. Ethical clearance was granted by the Ethics Review Committee, Faculty of Medicine, University of Kelaniya.

### 3. Results

Total number of OPD patients who were invited to the study during the period between May 2009 and January 2011 was 432. Of them 22 patients were not willing to participate which gave a non-participant rate of 5.0%. Therefore, the total patients recruited to the study was 410. Of them 42 (10%) had missing data for one or

more items of the GHQ-30, which left a study sample of 368 for the final analysis.

Median age of the study population was 32.5 years (inter quartile range [IQR] = 21 years). The highest proportion (28.5%;  $n = 117$ ) of them was in the age group of 21–30 years. The number of males among the study participants was 133 (35%). Fifty nine percent ( $n = 242$ ) of the study population was Buddhists and 26.6% ( $n = 110$ ) Catholics or Christians. Two hundred and twenty two (54%) had studied up to General Certificate Examination (Ordinary Level) [GCEOL].

#### 3.1. Factor structure of the GHQ-30

The median score (based on the Likert's scale) of the GHQ-30 was 22 (IQR 15) for the total sample and 21 for both males (IQR 21) and females (IQR 13) when analyzed separately. For the age group <32 years, it was 20 (IQR 14) and  $\geq 32$  years, 23 (IQR 16). For the low (up to GCEOL) and high educational categories it was 23 (IQR 16.5) and 19 (IQR 13.5) respectively.

Factor analysis produced a five factor solution (Table 1). The five factors together accounted for 51.6% of the total variance (TV). Considering the contribution of individual factors, Factor I (Depression) accounted for 38% of the TV, Factor II (Loss of confidence) 5%, Factor III (Insomnia) 4%, Factor IV (Social dysfunction) 2.7% and Factor V (Anxiety) 2%. Apart from item 21 (Found everything getting on top of you), there was a clear distinction between the items that loaded on the five factors. The item 21 loaded on both depression and anxiety (Table 2).

#### 3.2. Internal consistency of GHQ-30

The Cronbach's  $\alpha$  coefficient of GHQ-30 for the overall sample was found to be 0.94 indicating satisfactory internal consistency of

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