

ORIGINAL RESEARCH PAPER

PSYCHOMETRIC INDICATORS OF GENERAL HEALTH QUESTIONNAIRE IN LATVIA

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Abstract

General Health Questionnaire (GHQ) is widely used all over the world to state psychological load and overload, as well as general mental state. Various GHQ versions were used in practice including questionnaires of 12, 28, 30 and 60 questions. GHQ-12 is the most popular and shortest version of the inquiry which is often used as a means to state psychological stress. The aim of the research was to state the psychometric indicators of the General Health Questionnaire -12 for the Latvian Academy of Sport Education student sample (N=225). Students aged 18 – 40 years of the Latvian Academy of Sport Education participated in the research including 41% of the 1st year students, 14% of the 2nd and 45% of the 3rd year students. 44% of the respondents were the representatives of the individual sports, 15% – of the team sports, but 41% did not do any sport. 59% of them were women and 41% – men. The following research methods were used: inquiry-questionnaire (GHQ-12) and mathematical statistics. In data analysis Cronbach's alpha was stated, the dispersion analysis, factor analysis and correlation analysis were made. As a result it was concluded that GHQ-12 can be used in psychological research in Latvia, as the questionnaire has adequate validity (the Cronbach's alpha coefficient is 0.72) and the factorial validity indicators. GHQ-12 three factor structure (“Emotional condition”, “Psychological distress”, “Social function”) is recognized as the most suitable. Mutual correlations ($p < 0.01$) were stated: “Place of residence” ($r = .260$) and “Combining studies and work” ($r = .180$) are weak and positive, but “Relation status” ($r = -.177$) correlates weakly and negatively with the factor “Emotional condition”. A kind of sport correlates weakly and negatively with the factor “Psychological distress” ($r = -.140$). The results of the research differ from the ones obtained by other researchers.

Key words: GHQ-12, validity, factor structure, correlation analysis.

Introduction

General Health Questionnaire (GHQ) is widely used all over the world to state psychological load and overload, as well as general mental state (Werneke, Goldberg, Yalcin, Ustin, 2000). Various GHQ versions were used in practice including questionnaires of 12, 28, 30 and 60 questions. GHQ-12 is the most popular and shortest version of the inquiry which is often used as a means to state psychological stress (Winifield, Goldey, Winifield, Tiggemann, 1989). One, two and three factor structures of GHQ are described in the world practice.

The research carried out in New Zealand (Kalliath, O'Driscoll, Brough, 2004) involved 23 employees of different organizations (both males and females), aged 16 to 74. Participants were required to complete two confidential questionnaires, administered at a 3-month interval. A total of 691 respondents responded to the first questionnaire and 415 of them responded to the second questionnaire. The findings of this study confirmed that the GHQ-12 is not unidimensional. As a result of confirmatory factor analysis 2 factor model was recognized as the most suitable to characterize two dimensions of stress formation: „social dysfunction” and „anxiety/depression”.

A significant research, using GHQ-12, was carried out also in Japan (Doi, Minova, 2003). The study subjects were 1808 randomly selected Japanese adults aged 20 years and over. Participants were required to complete questionnaire. It was concluded that GHQ-12 results decreased with the respondents' age decreasing. The values of the Cronbach's alpha 0.83 of the male group and 0.85 of the female group showed sufficient scale validity. The factor analysis produces a two-factor solution for females. The first factor was designed as „psychological distress” (lose sleep over worry, constantly under strain, hardly overcome difficulties, feel depressed, lose confidence, think yourself worthless). The second factor was designed as „social dysfunction” ((not) concentrate, (not) play a useful part, (not) make decisions, (not) enjoy activities and (not) face up to problems). However, 3 factor structure was recognized as the most suitable for the male group. In the sample of Japanese men the question 12 was separated from the 2nd factor, forming the 3rd factor – „happiness”. This suggests that Japanese men may feel happy especially when they are aware of playing a useful part of their social or family life. The results of the research were similar to the ones obtained when researching industrial workers of Japan, as well as when researching militarists in Turkey. The results support 2 factor distribution for women and 3 factor distribution for men. Similar factor

distribution was obtained by researching young men in Italy (Doi, Minova, 2003).

In 2001 in Belgium Vanheule S. and Bogaerts S. researched GHQ-12 factorial structure with 9442 respondents aged 15-98. One questionnaire was given to the subjects. The authors of the research recognized 2 factor model as the most suitable (Vanheule, Bogaerts, 2005).

The Chinese version of GHQ-12 is widely used in Hong Kong to screen women during pregnancy and in the postnatal period. In the research GHQ-12 psychometric indicators of pregnant women in the 3rd trimester and in the postnatal period were analyzed using confirmatory factor analysis, linear regression analysis and stating of validity. In accordance with the above mentioned researches concerning the application of GHQ-12 during pregnancy period, a sufficient test validity using the Cronbach's alpha coefficient was stated for the Chinese GHQ-12 version however the retest results showed low test validity degree.

The factor structure of the GHQ-12 was extensively investigated and two- and three- factor models offered superior fit to the data compared to the presumed uni-dimensional structure (Ip, Martin, 2006).

In Japan in November 2002 GHQ-12 was applied to state mental health of basketball players in upper secondary school teams. In the research close correlation between “undertaking of responsibility” and “experienced stress” was stated (Kurokawa, Inoue, Oguri, Kato, Matsuoka, 2002).

In 2006 GHQ-12 inner validity and factor structure of 20-60 years old adult sample were tested in Latvia (n=200) for the first time.

As a result it was concluded that GHQ-12 can be used in psychological research in Latvia, as the questionnaire has adequate validity indicator (the Cronbach's alpha coefficient 0.77). GHQ-12 three factor structure was recognized as the most suitable: “psychological distress”, “social dysfunction” and „subjective welfare (Cekule, Kamerāde, Mūrniece, Reinfelds, Urbāns, Vazne, 2006). Similar to other researches, the place of the variables “feeling of happiness” and “concentration” in the factors differed a little in this research, what allowed us conclude that an additional research would be necessary with representative sample in order to make questionnaire factor structure more precise.

The aim of the study

The aim of the research was to state the psychometric indicators of the General Health Questionnaire-12 for the Latvian Academy of Sport Education student sample (N=225).

Material and methods

225 students aged 18 – 40 years of the Latvian Academy of Sport Education participated in the research including 41% of the 1st year students, 14% of the 2nd and 45% of the 3rd year students. 44% of the respondents were the representatives of the individual sports, 15% – of the team sports, but 41% did not do any sport. 59% of them were women and 41% – men.

All respondents anonymously filled out the GHQ-12. They were asked to evaluate how they are feeling and life during the last 2- 3 weeks, as well as to give the following information about themselves: gender, study course, a kind of sport, place of residence, occupation, relation status, present financial situation. The research was carried out in 2012. The inquiry and data collection were held anonymously in accordance with the Vienna Convention on Human Rights.

The following research methods were used: inquiry-questionnaire (GHQ-12) and mathematical statistics (in data analysis Cronbach's alpha was stated, the dispersion analysis, factor analysis and correlation analysis were made, Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity was used to determine research groups match with factor analysis).

Results

223 out of 225 filled out questionnaires were useful and appropriate for further analysis. As a result it was concluded that GHQ-12 as the questionnaire (n=223) has adequate validity indicator (the Cronbach's alpha coefficient is 0.72) (Tab. 1).

Table 1

GHQ-12 validity (LASE, n=223)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.724	.723	12

Research groups match with factor analysis was determined with Kaizer-Maijer-Olkin ($0,745 > 0,7$) and Bartlett's criterions ($p < 0,05$) (Tab. 2).

Table 2

Kaizer-Maijer-Olkin and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.745
Bartlett's Test of Sphericity	Approx. Chi-Square	629,964
	df	66
	Sig.	.000

Analyzing the initial and extracted eigenvalues, it was concluded that all components are adequate to make factor analysis, as each of the used variables explains sufficiently big part of dispersion to be used in further analysis (Tab. 3).

Table 3

Initial and extracted eigenvalues

	Initial	Extraction
Concentration on work to be done	1.000	.629
Effect of anxiety on sleep	1.000	.640
Awareness of oneself as a significant part of society	1.000	.315
Ability to make decisions	1.000	.553
Feeling stress	1.000	.629
Ability to overcome difficulties	1.000	.550
Joy of everyday activities	1.000	.457
Problem solving	1.000	.448
Feeling depressed	1.000	.676
Self-confidence	1.000	.616
Self-perception as an insignificant individual	1.000	.456
Feeling of happiness	1.000	.532

In the analysis of the obtained data, using the extraction method (Extraction Method: Principal Component Analyses), it was concluded that the component 1 explains 28.26%, the second component – 14.88% and the third component – 11.05%, in total they make 54% (Tab. 4). Thus, the results show that 3 factor structure can be extracted.

Table 4

Total Variance Explained

Component	Extraction Sums of Squared Loadings		Rotation Sums of Squared Loadings		
	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	28.259	28.259	2.645	22.039	22.039
2	14.876	43.135	2.179	18.162	40.201
3	11.049	54.184	1.678	13.983	54.184

In Figure 1 it is seen that only three factors has an eigenvalue which is bigger than one what affirms 3 factor structure.

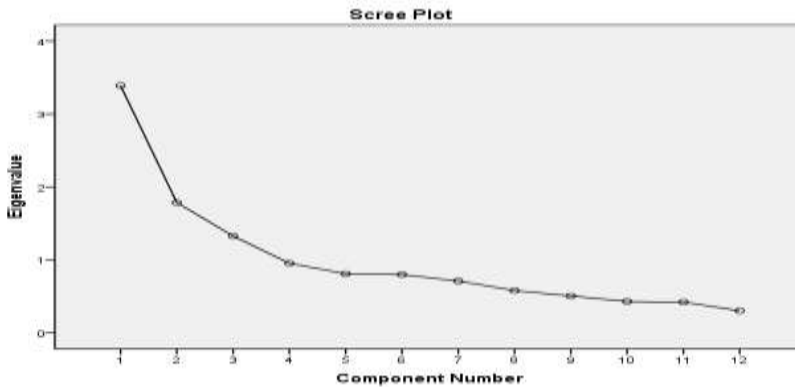


Figure 1. Point diagram

The extraction method was used in data analysis: principal component analyses and rotation method: varimax with Kaiser normalization. The factor structure has been acquired after the fifth rotation. Table 5 presents the correlation between variables and each of the factors.

Table 5

Factor rotation matrix

		Component		
		1	2	3
1.	Feeling depressed	.758	.305	.093
2.	Self-confidence	.755	.216	-.005
3.	Feeling of happiness	.669	.042	.287
4.	Self-perception as an insignificant individual	.669	.044	-.102
5.	Joy of everyday activities	.585	-.139	.309
6.	Effect of anxiety on sleep	.082	.795	.035
7.	Feeling stress	.138	.779	.061
8.	Ability to overcome difficulties	.191	.704	.131
9.	Awareness of oneself as a significant part of society	-.347	.424	-.123
10.	Ability to make decisions	.019	-.047	.742
11.	Concentration on work to be done	.285	.316	.669
12.	Problem solving	.038	.031	.668

When analyzing the obtained data it was concluded that “Feeling depressed” (.758), „Self-confidence” (.755) „Feeling of happiness” (.669), „Self-perception as an insignificant individual” (.669), „Joy of everyday activities” (.585) correlate positively with the first factor. This factor could be called „Emotional condition”.

„Effect of anxiety on sleep” (.795), „Feeling stress” (.779), „Ability to overcome difficulties” (.704), and „Being aware of oneself as a significant part of society” (.424) correlate positively with the second factor which is called by authors as “Psychological distress”. That is true that the last component has low score in the second factor (.424). Thus, it is a contraversial issue whether to include it in the “Psychological distress” factor.

„Ability to make decisions” (.742), „Concentration on work to be done” (.669) and „Problem solving” (.668) make the third factor „Social function”.

When making the Pearson correlation analysis, the obtained 3 factor interconnection with the following indicators: place of residence, kind of sport, combining studies and work and relation status was studied. The following statistically significant mutual correlations ($p < 0.01$) were stated: “Place of residence” ($r = .260$) and “Combining studies and work” ($r = .180$) are weak and positive, but “Relation status” ($r = -.177$) correlates weakly and negatively with the factor “Emotional condition”. A kind of sport correlates weakly and negatively with the factor “Psychological distress” ($r = -.140$).

Discussion

Comparing the obtained research results to the ones gained in other countries, we can conclude that unlike the research of New Zealand, Belgium and Japan, where 2 factor model was pointed out to be the most suitable, the authors have recognized 3 factor structure model as the most adequate in Latvia. Comparing the results of this research to the one done in Latvia in 2006 about GHQ-12 validity and factor structure of 20-60 years old adult sample in Latvia (Cekule, Kamerāde, Mūrniece, Reinfelde, Urbāns, Vazne, 2006), it can be concluded that, although 3 factor structure model was obtained in both researches, differences are observed. The authors of the carried out research obtained different component correlation with the factors (Tab. 6).

Table 6

Comparison of the component correlation with the factors
(2012 and 2006)

		Author research (2012)			Research of 2006		
		1	2	3	1	2	3
1.	Feeling depressed	.758			.658		
2.	Self-confidence	.755			.546	.586	
3.	Feeling of happiness	.669					.463
4.	Self-perception as an insignificant individual	.666				.629	
5.	Joy of everyday activities	.585					.710
6.	Effect of anxiety on sleep		.795		.708		
7.	Feeling stress		.779		.665		
8.	Ability to overcome difficulties		.704		.657		
9.	Awareness of oneself as a significant part of society		.424			.629	
10.	Ability to make decisions			.742		.641	
11.	Concentration on work to be done			.669			.772
12.	Problem solving			.668		.639	

Essential differences in question correlation in factors have been stated. In the authors' research the 9th question "Awareness of oneself as a significant part of society" correlation (0.424) is significantly lower than the one in the research of 2006 (0.629). At the same time the correlation coefficient of "Feeling of happiness" in the authors' research is 0.669, but in the results of the research of 2006 – 0.463. In the research of 2006 the 2nd question "Self-confidence" did not have a close mutual connection with some of the factors. However, in the authors' research the 2nd question closely correlates (0.755) with the 1st factor – "Emotional condition". In the authors' research the 9th question "Awareness of oneself as a significant part of society" has a lower correlation than other questions, what can be explained by the fact that students were the subjects of the research, they are aware of their identity and they are determined to reach their aims in sport and life in general.

Conclusions

GHQ-12 can be used in psychological research in sport environment in Latvia, as the questionnaire has adequate validity (the Cronbach's alpha coefficient is 0.72) and the factorial validity indicators.

GHQ-12 three factor structure ("Emotional condition", "Psychological distress", "Social function") is recognized as the most suitable. The first factor is „Emotional condition”, which includes the following components: „Feeling depressed” (.758), „Self-confidence” (.755) „Feeling of happiness” (.669), „Self-perception as an insignificant individual” (.669), „Joy of everyday activities” (.585). The second factor is „Psychological distress” including the components: „Effect of anxiety on sleep” (.795), „Feeling stress” (.779), „ Ability to overcome difficulties” (.704), and „Awareness of oneself as a significant part of society” (.424). The third factor is „Social function”, which is made of „Ability to make decisions” (.742), „ Concentration on work to be done” (.669) and „Problem solving” (.668).

Mutual correlations ($p < 0.01$) were stated: “Place of residence” ($r = .260$) and “Combining studies and work” ($r = .180$) are weak and positive, but “Relation status” ($r = -.177$) correlates weakly and negatively with the factor “Emotional condition”. A kind of sport correlates weakly and negatively with the factor “Psychological distress” ($r = -.140$).

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