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***Reliability and predictive validity of PMSW18-Ad scale
(Physical, Mental and Social Wellbeing scale – Adolescent version):
Polish and Lithuanian experiences***

**Rzetelność i trafność predykcyjna skali PMSW18-Ad
(skala Fizycznego, Psychicznego i Społecznego Samopoczucia – wersja przeznaczona
dla młodzieży): polskie i litewskie doświadczenia**

In Health Promotion Department of the National Institute of Hygiene in Warsaw a prospective study focused on subjective health was carried up in 2003. According to commonly accepted definition, subjective or perceived health may be defined as that which is based upon an individual's experience of mental, physical and social events as they impinge feelings of wellbeing [2, 8]. The purpose of the study was to examine the influence of wellbeing and life events upon adolescents' health disorders and unhealthy behaviours. In 2004 Public Health Research Department of the Institute of Hygiene in Lithuania, Vilnius, joined to the study. This article presents reliability and predictive validity of wellbeing scale elaborated in Health Promotion Department of the National Institute of Hygiene.

METHODS

PMSW18-Ad is intended as basic scale, i. e., should be as short as possible, include as much information as possible, and give possibility for transformation into larger and more specific scales. The scale contains three dimensions: physical, psychical and social. Physical dimension included the most common somatic complaints: 1) headache, 2) abdominal pain, 3) backache, 4) sickness, 5) dizziness, and 6) tiredness. Psychical or mental wellbeing contained emotional symptoms that were recognised as closely associated with somatic disorders, and, on the other hand, with the process of socialisation. This dimension was assumed to be a core of the wellbeing scale, and consisted of seven indicators: 1) anxiety, 2) fear, 3) depression, 4) guiltiness, 5) self-dissatisfaction, 6) helplessness, and 7) loneliness. Social dimension of wellbeing was measured by social support from: 1) social surroundings, 2) mother, 3) father, 4) friends, and 5) teacher. Each of the items was measured by five-point Likert scale and coded in the same direction. Most negative answer was ranged as one point and most positive answer as five points. Therefore, PMSW18-Ad scale was ranged from 18 to 90 points, physical dimension – from 6 to 30 points, psychical dimension – from 7 to 35 points, and social dimension – from 5 to 25 points. Lower scores mean low-being and higher scores mean well-being.

The six indicators of health and health disorders were assumed as criterion indicators for analysis of predictive validity: 1) self-assessment of health, 2) staying at home or in hospital during the previous month because of health disorders (number of days), 3) frequency of staying at home or in hospital during the previous year, 4) frequency of being in contact with physicians because of health disorders,

5) suffering from chronic health disorders that require continuous medical care, 6) frequency of use legal drugs prescribed by physician or given by parents.

The data were collected from three groups of adolescents by self-reported method. The first group was surveyed in March - May 2003, and the second and third groups in 2004 in the same months. Participants of 2003 study were the stratified-cluster sample of 762 students (boys – 48,3%, girls – 51,7%) aged 13-14 years from ten randomly selected secondary schools (gymnasiums) of Warsaw (“younger Warsaw sample”). The second group consisted of 783 students aged 14-15 years (boys – 50,6%, girls – 49,4%) from the same schools of Warsaw (“elder Warsaw sample”). Vilnius adolescents of seven schools were the third group. This sample consisted of 640 students (boys – 49,5%, girls – 50,2%, unknown gender – 0,3%) aged 14-15 years (“Vilnius sample”).

The coefficient of α Cronbach was used for measuring reliability of the scales. There was assumed that α Cronbach $\geq 0,70$ confirms internal consistency [4]. The coefficient of product moment correlation (Pearson r_{xy}) measured correlation between the scales and criterion indicators, except suffering from chronic health disorders that require continuous medical care, where point-biserial coefficient of correlation (r_{pbi}) was applied. The following criteria were assumed for strength of correlation: [$r < 0,10$] – none, [$0,10 \leq r < 0,15$] – weak, [$0,15 \leq r < 0,25$] – moderate, $r > 0,25$ – strong correlation [6]. Statistical significance was accepted at level $p < 0,01$, where $r \geq 0,10$.

RESULTS

Table 1 presents internal consistency of PMSW18-Ad scale and its dimensions. Reliability of PMSW18-Ad and psychical subscale, which was intended to be core of the scale, is very high for all groups (from 0.85 to 0.88). Internal consistency of physical and social dimensions of the scale, in general, was confirmed. Only for Vilnius sample value of α Cronbach coefficient for social subscale is placed slightly below the accepted level (0,68).

Table 2 shows predictive validity of PMSW18-Ad scale. Statistically significant associations were found for correlation between wellbeing scale and all indicators of health and its disorders. Respondents, who have higher scores on PMSW18-Ad scale, higher evaluated their health, less day during the previous month and rarely during the previous year they stayed at home or in hospital because of health disorders, rarely were in contact with physicians, suffered from chronic health disorders and used legal drugs. Correlation between PMSW18-Ad scale and self-assessment of health was strong for all samples. Strength of other associations, in general, was moderate.

Predictive validity of physical, psychical and social subscales were presented in table 3. Physical and psychical dimensions significantly correlated with all criterion indicators, except correlation between psychical subscale and suffering from chronic health disorders in respect to elder Warsaw sample. Mostly of associations were strong or moderate. Low correlation was found between social subscale and health indicators. Moderate correlation between social dimension and self-assessment of health was statistically significant for all samples. As regards other criterion indicators, only three weak associations were found (two for Warsaw elder sample and one for Vilnius sample).

DISCUSSION

Our findings showed that reliability of PMSW18-Ad scale and its dimensions reached acceptable level independently on age and country specificity. The previous studies indicate that there is very difficult to elaborate a scale of health related quality of life presenting simultaneously high reliability and validity. Ware and Gandek [7] noticed that although eight subscales of SF36 scale presented high reliability (from 0,77 to 0,93), but they weakly or moderately correlated with criterion variable (from 0.10 to 0.23). Moreover, Physical Functioning subscale presented highest internal consistency (α Cronbach=0,93), but lowest predictive validity (r Pearson with criterion variables = 0,10), and only three of ten items creating this subscale demonstrated weak correlation with criterion variable, while the other items showed none correlation. International comparison of SF 36 construction (IQOLA Project) showed that reliability of the same subscale varied from country to country [1]. Also the procedures of adaptation the quality of life questionnaires for use in different social and cultural population may show their lower reliability and validity [3].

Our study found out that social dimension of wellbeing in comparison to psychical and physical dimensions presented lowest reliability and showed weak or none correlation with health indicators. In opposite to these findings, up to date studies have confirmed association between social support, and subjective health and occurrence of disease [5]. The lack of correlation between social support and health disorder indicators in our study requires taking up more detail analysis.

CONCLUSIONS

The study confirmed that: 1) PMSW18-Ad scale as well as its physical, psychical and social dimensions demonstrate high internal consistency; 2) PMSW18-Ad scale may be used as one of the subjective health measures in survey study focused on health determinants; 3) physical, psychical and social subscales give possibility for measuring similarities and differences related to health determinants among adolescents, who differ by age and nationality.

REFERENCES

1. Gandek B., et al.: Test of data quality, scaling assumption, and reliability of the SF-36 in eleven countries: results from the IQOLA Project. *Journal of Clinical Epidemiology* 1998 vol.51 p. 1149-1158.
2. Hunt S.: Subjective health indicators and health promotion. *Health Promotion* 1988 vol. 3 p. 23-34.
3. Majkowicz M., et al.: Ból a jakość życia w przewlekłym zapaleniu trzustki. Cz.I: Narzędzia badawcze. *Psychoonkologia* 1998 nr 3 s. 21-30.
4. Nunnally J.: *Psychometric theory*. New York 1978 McGraw-Hill.
5. Pedersen M., et al.: Family and health. In: Currie C. et al. (eds.): *Young people's health in context. Health Behaviours in School-age Children (HBSC) study: international report from 2001/2002 survey*. Copenhagen 2004 WHO p. 173-177.
6. Samdal O., Dur W.: The school environment and health of adolescents. In: Currie C., et al. (eds.): *Health and health behaviour among young people. Health Behaviour in School-aged Children: a WHO cross-national study (HBSC). International reports*. Copenhagen 2000 WHO p. 49-64.
7. Ware J. E., Gandek B.: Methods for testing data quality, scaling assumptions, and reliability: the IQOLA Project approach. *Journal of Clinical Epidemiology* 1998 vol. 51 p. 945-952.
8. WHOQOL Group: *The World Health Organisation Quality of Life assessment (WHOQOL): position paper from the World Health Organisation*. *Social Science and Medicine* 1995 vol. 41 p.1403-1409.

SUMMARY

The article presents reliability and predictive validity of wellbeing scale (PMSW18-Ad scale) elaborated in Health Promotion Department of the National Institute of Hygiene in Warsaw. The study was carried on in 2003 and 2004 among Warsaw and Vilnius adolescents. Reliability of PMSW18-Ad scale and its physical, psychical and social dimensions reached the acceptable level for younger Warsaw sample, elder Warsaw sample and Vilnius sample. PMSW18-Ad scale and its physical and psychical subscales moderately or strongly correlated with health indicators. Social subscale showed significant correlation for all three samples only with self-assessment of health.

STRESZCZENIE

Artykuł przedstawia rzetelność i trafność predyktywną skali samopoczucia (PMSW18-Ad), opracowanej w Zakładzie Promocji Zdrowia Państwowego Zakładu Higieny w Warszawie. Badania przeprowadzono w roku 2003 i 2004 wśród młodzieży warszawskiej i wileńskiej. Rzetelność skali PMSW18-Ad osiągnęła akceptowany poziom w przypadku młodszej próby warszawskiej, starszej próby warszawskiej i próby wileńskiej. Skala PMSW18-Ad i jej subskale fizyczna i psychiczna korelowały w sposób umiarkowany lub silny z miernikami zdrowia. Społeczna subskala wykazała znaczącą korelację w przypadku wszystkich trzech prób jedynie z samooceną zdrowia.

Table 1. Reliability of PMSW18-Ad scale, and physical, psychical and social dimensions of the scale (α Cronbach's coefficient)

Scale	Warsaw sample		Vilnius sample
	13-14 years old	14-15 years old	14-15 years old
PMSW18-Ad			
Dimensions:			
Physical	0,88	0,88	0,86
Psychical	0,78	0,76	0,76
Social	0,86	0,87	0,87
	0,71	0,78	0,68

Table 2. Predictive validity of PMSW18-Ad scale (Pearson's r coefficient)

Health indicators	Warsaw samples		Vilnius sample
	13-14 years old	14-15 years old	14-15 years old
1. Self-assessment of health	0,37	0,49	0,43
2. Staying at home because of health disorders (days)	-0,14	-0,20	-0,23
3. Frequency of staying at home during the last year	-0,22	-0,31	-0,25
4. Frequency of being in contact with physicians	-0,24	-0,27	-0,40
5. Chronic health disorders*	-0,12	-0,18	-0,21
6. Use of legal drugs	-0,22	-0,27	-0,27

$p < 0,01$ if $r \geq [0,10]$

* point-biserial coefficient of correlation (r_{pbi})

Table 3. Predictive value of physical, psychical and social wellbeing subscales (Pearson's r coefficient)

Health indicators ¹	Warsaw samples						Vilnius sample		
	13-14 years old			14-15 years old			14-15 years old		
	Physical	Psychical	Social	Physical	Psychical	Social	Physical	Psychical	Social
1.	0,38	0,31	0,19	0,45	0,37	0,27	0,46	0,37	0,22
2.	-0,17	-0,12	-0,04	-0,26	-0,18	-0,05	-0,25	-0,16	-0,00
3.	-0,28	-0,19	-0,05	-0,34	-0,22	-0,13	-0,26	-0,18	-0,04
4.	-0,32	-0,20	-0,06	-0,33	-0,19	-0,09	-0,40	-0,31	-0,07
5.*	-0,17	-0,12	-0,04	-0,23	-0,08	-0,10	-0,25	-0,16	-0,10
6.	-0,29	-0,19	-0,04	-0,30	-0,23	-0,09	-0,32	-0,22	-0,01

$p < 0,01$ if $r \geq [0,10]$

¹ Health indicators – see table 2

* point-biserial coefficient of correlation (r_{pbi})