Int J Public Health (2011) 56:441–448
DOI 10.1007/s00038-011-0232-1

ORIGINAL ARTICLE

Development and validation of the stressful life event questionnaire

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Received: 3 April 2010 / Revised: 22 December 2010 / Accepted: 4 January 2011 / Published online: 15 February 2011

Abstract
Objectives This study evaluates the development of the stressful life event (SLE) questionnaire and tests the validity and reliability of it.
Method In total, 3,951 adults aged over 18 years completed the SLE questionnaire. The General Health Questionnaire (GHQ-12) was used to further validate the SLE questionnaire.
Results Eleven domains, including home life, financial problems, social relation, personal conflict, job conflict, educational concerns, job security, loss and separation, sexual life, daily life, and health concerns were obtained by factor analysis. Correlation coefficient was moderately significant among domains of the SLE questionnaire and moderately between the SLE questionnaire and GHQ-12 score, as well. The results of the discriminate validity analysis were promising. In addition, standardized Cronbach'-α was 92%.
Conclusion The resultant SLE questionnaire is, therefore, suggested to be potential for the stress measurement in both community and primary care setting.

Keywords Stress · Stress measurement · Development · Validity · Reliability

Electronic supplementary material The online version of this article (doi:10.1007/s00038-011-0232-1) contains supplementary material, which is available to authorized users.

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Introduction

Stress, a key concept in health researches, has been measured in two aspects: (1) stressor and (2) stress response (Kenny et al. 2000). Stressor as an environmental condition is so important, which clinical reports and community-based studies carried out in previous decades represented that stressful life events could have special role in precipitating both mental and somatic disorders (Holmes and Rahe 1967; Dohrenwend and Dohrenwend 1974, 1981 Dohrenwend et al. 1978; Sarason et al. 1978; Cooper 1984; Kaplan 1983; Rahe 1990). Not only the frequency of life event, but also the individual's perception of its intensity is very important. Thereby, stress measurement ought to focus on both frequency and intensity of stress (Fliege et al.2005; Belbeisi et al. 2009).

Some quantitative measurement of psychosocial stress has been applied in developed country (Holmes and Rahe1967; Dohrenwend and Dohrenwend 1974, 1981 Dohrenwend et al. 1978; Sarason et al. 1978). One of the best known life event scales is the Social Readjustment Rating Scale in 1967 which its total score is known to have some predictive value to anticipate disease or illness (Holmes and Rahe1967). In addition, this scale resulted in

a weighting of stressors, life issues which were listed as the most stressful down to the least stressful. However, perceived stressors are not considered. Although the life events experienced and stressfulness perceived vary among individuals and across cultures. Degree of stress that is perceived for each kind of stressor is considerable point.

The burden of life events stressors derived from developed and developing countries are different, for instance, work load is the main job stress in developed countries, whereas job insecurity and unemployment were concerned as a main job stress in developing countries (Jamal 2005; Hämäläinen et al. 2007). In addition, more recent studies have demonstrated the sensitivity of the negative life events and individualized scores of stressful life event (SLE) for measuring the health statues changes in developed countries (Dohrenwend et al. 1978; Dohrenwend and Dohrenwend 1981; Sarason et al. 1978; Cooper 1984; Kaplan 1983). However, not much information has been available about this measuring in the other countries, especially developing societies. Thus, these questionnaires could not be generalizable to all communities.

On the other hand, majority of these questionnaires have designed in previous decades. However, global developments and lifestyle changes in numerous societies led to emerge some new stressors. (i.e. some older stressors replaced with these new stressors) (Watson 2006; Pietilä and Rytkönen 2008; McGuire et al. 2009; Dube et al. 2009). Therefore, it is necessary to design novel questionnaire consisted of this new pattern of stressors.

Because the frequency and intensity of life event as well as individual's perception of life event due to culture, race and even geographic region is very various, it seems that with specific stress measurement the more exact data for planning of treatment and evaluating treatment effect would be obtained. With this in mind, the aim of this study was to evaluate the development of the stressful life event questionnaire initially and test the validity and reliability finally.

Method

Questionnaire development process occurred in two ways. At first, the investigators reviewed the MEDLINE, pubmed, and psycINFO systematically. All papers and tools related to stress assessment were reviewed. As a second step simultaneously, 422 persons aged 18–70 years of general population were selected consecutively and unstructurally interviewed by open-ended question about stressful events experienced in their life.

Based on the above-acquired information, 170 stressful life events were established after natural qualitative analysis. After which, to refine questionnaire; three psychiatrists, an epidemiologist, a methodologist and a clinical psychologist as an expert panel reviewed the items, integrated the synonyms and omitted the repeated phrase. In that way, the 83-item questionnaire was developed. The current questionnaire captured the self-perceived frequency and intensity of stressful life events, answered by 6-point Likert scales (0 = never, 1 = very mild, 2 = mild, 3 = moderate, 4 = severe, 5 = very sever). If participants had not experienced the stressful life events, they answered never. But others had stressful life events at 6 months ago, their responses to express stress intensity were rated from 1 = very mild to 5 = very sever. The total score of each domain was the sum of the raw score of the 83 items. Then, we administered the developed 83-item questionnaire in Isfahan Healthy Heart Program (IHHP) to explore the factorial structure and decrease the number of questionnaire items for shortening. IHHP is the large community-based comprehensive interventional program in Iran. Details of the methodology used for the IHHP, including sampling method, survey instruments, data entry and analysis are described comprehensively elsewhere (Sarrafzadegan et al. 2003) and evaluation of IHHP has been explained in detail by Sarrafzadegan et al. (2006). Five phases of annual evaluation were performed on independent samples from 2002 to 2007. IHHP study was approved by the ethics committee of the Isfahan University of Medical Sciences. Thereby, 6,000 person aged over 19 years completed the questionnaire in second evaluation of IHHP. At first, item analysis was performed to reduce the questions. Then, factor analysis was prepared with PCA, and the results were reviewed by expert panel. Items were deleted if they met the following criteria: (1) 30% or more of the responses were "very high" or "very low", (2) items which loaded in the single group in factor analyses (Cousineau et al. 2006). After item analyses, as final check, expert panel reviewed the items again to determine item relevancy and content validity. Finally 46-item questionnaire was established.

The goal of the second phase was to examine the validity and reliability of the 46-item questionnaire. For this reason, we used another sample of participant. Up to 6,000 individuals from context of fourth survey of IHHP were investigated.

In addition, the General Health Questionnaire 12-item (GHQ-12) was concurrently applied with the stressful life event questionnaire for further evaluation and validity assessment. The GHQ-12 is a well established screening instrument to measure psychological distress that it can be used in general population (Goldberg and Hillier 1979; Montazeri et al. 2003). Each item in this questionnaire is rated on a 4-point scale (less than usual, no more than usual, fairly more than usual, or much more than usual). The GHQ score method (0-0-1-1 method) was used to score the questionnaires. In this way, a participant could score between 0 and 12 and a cutoff point 4 is considered for high and low stress.

Validity

Factor analysis was completed on the 46 items originally meant to describe the constructs of stressful life event questionnaire. All items were subjected to a principal components analysis with varimax rotation. Statistical criteria guiding the decision of a final component structure were the scree plot, eigenvalues greater than 1.0, percent of variance explained, and component loadings greater than 0.40 (Dunteman 1989).

In addition for discriminant validity, the comparison group test was composed of low and high stress group defined by GHQ-12 score. It was important to know whether the questionnaire could discriminate the population with high stress from low stress level. The two sample *t* test was used for the comparison of stress scale between the high and low GHQ stress groups. To gain evidence for relationships between domains of SLE scale were tested using the Pearson correlation coefficient.

The correlation between domains of questionnaire and total score of GHQ-12 confirmed concurrent criterion validity.

Reliability

The estimated internal consistency of the subscale and the total scales of stressful event questionnaire were assessed through Cronbach's-α coefficients. The intra-class correlation was calculated for total score, too. We used Cicchetti's (1994) classification for interpreting intraclass correlation coefficients (poor < 0.4, fair 0.41–0.59, good 0.6–0.74 and excellent > 0.75. The 95% confidence interval was declared for Cronbach's-α and intraclass correlation. The factor analysis in the construct validity confirmed the internal consistency.

Data were analyzed using the Statistical Package for the Social Sciences (version 15.0 for Windows, SPSS Inc., Chicago, IL, USA).

Results

Of the completed questionnaire ($n = 6{,}000$), 5,892 were deemed useable with 98.2% of the total population responding. Of the all participants who responded about half were women (50.8%).The mean age of them were 40.3 ± 15.2 in men and 40.5 ± 15.4 in women.

At first, item analysis was performed to reduce the questions. Then, factor analysis was prepared with principal component analysis (PCA), and the results were reviewed by expert panel. Twenty-seven factors were extracted by factor analysis that had allocated themselves the 53.2% of variance. Figure 1 shows the scree plot of factor analysis. The Cronbach's-α estimated of internal consistency for the total 83 items was 85.8 % (95% CI 85.2–86.3).

In this phase, 3,951 of the total completed questionnaire (4,000) were useable and corresponding rate was 98.7%. Women consisted 51% of the sample with the mean age of 40.3 ± 15.3 years, whereas the mean age of the men was 40.1 ± 14.4.

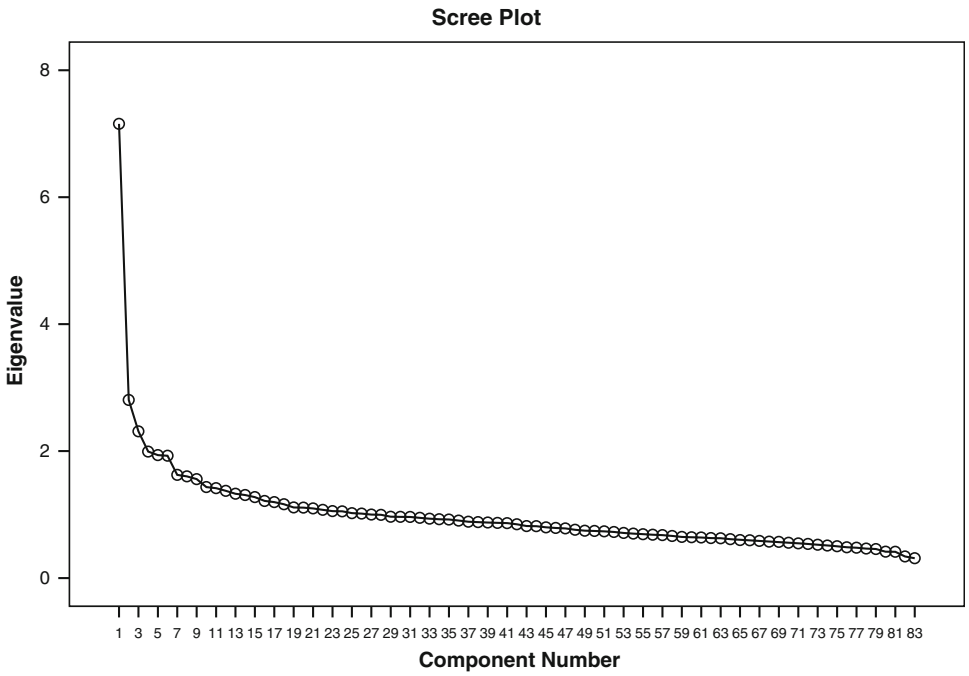

Fig. 1 The scree plot of the 83-item questionnaire (Isfahan Healthy Heart Program, Iran 2000–2007)

Validity of the stressful life events questionnaire

Table 1 showed the factor analysis of 46-item questionnaire to cluster questions in defined groups. Eleven factors were derived which accounted for 56.7% of the variance in measured variable. According to the content of questions, we named each derived factors that adjusted to our presumptions. It confirmed construct validity.

As a result, the stressful life events questionnaire was finalized with a total of 46 items under the eleven domains. There were 7 items under the Home life domain, 5 items under the Financial problems domain, 4 items under the Social Relations domain, 5 items under the Personal Conflicts domain, 4 items under the Job Conflicts domain, 4 items under the Educational Concerns domain, 5 items under the Job Security domain, 4 items under the Loss and Separation domain, 4 items under the Sexual life domain, 2 items under the Daily life domain, and 2 items under the Health Concerns domain.

The mean score of stressful life events questionnaire was higher in high stress group (GHQ-12 > 4) than low stress one (35.4 ± 30.2 vs. 23.5 ± 22.2, $P < 0.0001$). It has been carried out for discriminant construct validity (Table 2). Correlation between domains of the SLE questionnaire was statistically significant. Table 3 shows this correlation matrix.

Concurrent criterion validity of the stressful life events questionnaire was computed by correlating the total scores of each domain with GHQ-12. The correlation between stressful life events questionnaire and GHQ-12 score was moderately significant ($r = 0.31$, $P < 0.001$). Table 4 declared the correlation matrix related to concurrent criterion validity.

Reliability of the stressful life events questionnaire

Cronbach's-α was computed for the 11 domain scores and the total score (ranging between 0.65 and 0.83 for each 11 domain and 0.92 for the total score). Table 5 showed the Cronbach's-α and 95% confidence interval and Cicchetti's classification of all domains.

Discussion

This study was an attempt to develop and validate a questionnaire assessing frequency and intensity of stressor of individuals. The SLE questionnaire is not only a measurement of symptoms of life events, but also is a quantitative measurement of stressor load. Despite focusing only on specific components of stressors, the broad domains of individual's life events have been driven by this questionnaire through taking to people. Eleven domains were identified by factor analysis for all response items of the SLE questionnaire.

The first factor labeled home life was broadly characterized by statements of conflict within the home and domestic situation and reflected the importance of family values. Home- and family-related stresses have an important effect on individuals' life; hence, it is not surprising that this domain emerged as a prominent part of the scale (Zheng and Lin 1994).

Although financial problem has significant role worldwide, it is also of crucial importance in developed and developing countries (Wrosch et al. 2000; Nafikov and Simonova 2002). In this study, high frequency of stressor is considerable. For this reason, it was identified as the second domain.

The third domain was labeled social relation to investigate social stressors and social pressure added to the body of the society. The forth domain labeled personal conflict reflected the social stresses which could affect individuals. Overall, rapid social changes in developing countries and political events influencing it could be as a concern for the people living in these countries (Gillies 1998). In addition, people in developed countries experience social stressors due to economic growth and globalization, so this item mentioned as an important stressor event (Cheung and Leung 2010; Pappa et al. 2009).

Job stress is a known term in all societies. However, in one developed country, workload and improper working place are more important, whereas people living in developing countries knew job stress as insecurity, unemployment and concern about job future. When considering this fact, these stressors were categorized in two domains, including job conflicts and job security (Djankov and Ramalho 2009).

Because educational concerns have an important role in people's life, the sixth factor was labeled as educational concerns, including failure in major examinations, participation major examinations, high educational expenses, and educational problems of children.

Sexual life defined the focus of the ninth domain which was presented sexual life. Four items represented in this domain, included pregnancy, untoward pregnancy, birth of the child and sexual relationship problems (Bodenmann et al. 2010).

Air pollution and traffic as the results of increased rate of urbanization without considering of facilitating factors for urban life could be important stressor events (Taylor and Dorn 2006: Waszkowska 2009; Wiwanitkit 2010). For this reason, the tenth factor labeled daily life defined by these factors and major changes in sleeping and eating habits.

Because the checklist includes a limited number of events, stressful life events may have happened, but not be

Table 1 Factor analysis of stressful life event questionnaire (Isfahan Healthy Heart Program, Iran 2000–2007)

1. Home life (eigenvalue = 9.62, accounted for 20.9% of variance)		
Q46	Addiction (self or family member)	0.679
Q50	Divorce or separation	0.627
Q47	Concern about addiction of a family members	0.605
Q49	Quarrels with spouse	0.568
Q41	Being accused	0.463
Q42	Legal problems	0.457
Q6	Troubles with children	0.447
2. Financial problems (eigenvalue = 3.170, accounted for 6.9% of variance)		
Q33	Get in to debt	0.789
Q35	Major financial problems	0.759
Q32	Low income	0.721
Q34	Taking on a mortgage	0.717
Q31	Financial inflation	0.672
3. Social relations (eigenvalue = 2.467, accounted for 5.4% of variance)		
Q9	Social discrimination	0.799
Q8	Major social changes	0.787
Q10	Social insecurity	0.737
Q7	Concern about your future	0.660
4. Personal conflicts (eigenvalue = 2.081, accounted for 4.5% of variance)		
Q13	Lack of social support	0.730
Q14	Cultural alienation	0.685
Q15	Not having an intimate friend	0.673
Q12	Failure in achieving the life goals	0.629
Q11	Loneliness	0.545
5. Job conflicts (eigenvalue = 1.588, accounted for 3.5% of variance)		
Q27	Quarrel with colleagues / boss	0.752
Q26	Dealing with customers	0.722
Q29	Increased working hours	0.713
Q28	Improper working place and environment	0.692
6. Educational concerns (eigenvalue = 1.346, accounted for 2.9% of variance)		
Q18	Failure in major examinations	0.786
Q17	Participation major examinations	0.772
Q19	High educational expenses	0.668
Q16	Educational problems of children	0.476
7. Job security (eigenvalue = 1.295, accounted for 2.8% of variance)		
Q24	Job lay off	0.672
Q25	Long lasting unemployment	0.639
Q22	Concern about job future	0.573
Q21	High responsibility job	0.427
Q20	Low salary	0.402
8. Loss and separation (eigenvalue = 1.201, accounted for 2.6% of variance)		
Q1	Death of close family member	0.651
Q2	Major disease of family members leading to hospitalization	0.631
Q3	Death of parents, spouse or siblings	0.615
Q5	Children's separation from family	0.410
9. Sexual life (eigenvalue = 1.158, accounted for 2.5% of variance)		
Q39	Pregnancy	0.727
Q40	Unwanted pregnancy	0.606
Q4	Birth of a child	0.469

Table 1 continued

Q38	Sexual relationship problems	0.401
10. Daily life (eigenvalue = 1.082, accounted for 2.4% of variance)		
Q44	Air pollution and traffic	0.635
Q43	Major changes in sleeping and eating habits	0.634
11. Health concerns (eigenvalue = 1.059, accounted for 2.3% of variance)		
Q36	Mild illness	0.704
Q37	Major physical disease leading to hospitalization	0.686

Table 2 Scores of the stressful life event questionnaire in high and low stress group (Isfahan Healthy Heart Program, Iran 2000–2007)

Domain	Low stress (GHQ < 4) Mean ± SD	High stress (GHQ ≥ 4) Mean ± SD	*P*
Home life	1.49 ± 0.75	2.88 ± 1.84	<0.001
Financial problems	7.14 ± 1.40	8.79 ± 2.80	0.010
Social relation	2.95 ± 0.93	4.50 ± 1.90	<0.001
Personal conflict	2.27 ± 0.83	4.82 ± 2.23	<0.001
Job conflict	3.02 ± 0.91	4.43 ± 2.10	<0.001
Education concerns	1.30 ± 0.59	1.92 ± 1.45	<0.001
Job security	0.94 ± 0.52	1.68 ± 1.34	<0.001
Loss and separation	2.01 ± 0.68	2.57 ± 1.38	0.001
Sexual life	0.48 ± 0.33	0.70 ± 0.75	<0.001
Daily life	0.84 ± 0.34	1.46 ± 0.82	<0.001
Health concerns	0.97 ± 0.40	1.63 ± 0.89	<0.001
All domain	23.47 ± 4.56	35.43 ± 11.15	<0.001

GHQ General Health Questionnaire

Table 3 Pearson's correlations of the stressful life event questionnaire domains ($P < 0.001$) (Isfahan Healthy Heart Program, Iran 2000–2007)

	1	2	3	4	5	6	7	8	9	10	11	12
1. Home life	1											
2. Financial problems	0.304*	1										
3. Social relation	0.399*	0.337*	1									
4. Personal conflict	0.456*	0.321*	0.517*	1								
5. Job conflict	0.424*	0.444*	0.344*	0.426*	1							
6. Education concerns	0.447*	0.313*	0.312*	0.389*	0.451*	1						
7. Job security	0.397*	0.319*	0.283**	0.283**	0.537*	0.390*	1					
8. Loss and separation	0.425*	0.244**	0.154**	0.248*	0.301*	0.368*	0.245**	1				
9. Sexual life	0.494*	0.203**	0.197**	0.305*	0.375*	0.363*	0.351*	0.359*	1			
10. Daily life	0.437*	0.278**	0.336*	0.427*	0.402*	0.420*	0.416*	0.262**	0.369*	1		
11. Health concerns	0.421*	0.328*	0.185**	0.332*	0.344*	0.393*	0.308*	0.411*	0.339*	0.393*	1	
12. All domain	0.595*	0.632*	0.514*	0.597*	0.635*	0.470*	0.506*	0.421*	0.442*	0.450*	0.442*	1

* $P < 0.001$, ** $P < 0.01$

counted in the checklist. One of our study limitations was that we could not test current questionnaire for normalization. The questionnaire should compare with other questionnaire and test in different community and racial group.

Although existing questionnaires tend to emphasize on stressors separately, the questionnaire which categorized stressors in domain framework could provide comprehensive view from environmental stressors and such view helps us in performing accurate stress management

Table 4 Pearson's correlation coefficients (r) between the stressful life event questionnaire domain and general health questionnaire score (Isfahan Healthy Heart Program, Iran 2000–2007)

Domain	r*
Home life	0.306
Financial problems	0.599
Social relation	0.381
Personal conflict	0.361
Job conflict	0.445
Education concerns	0.209
Job security	0.391
Loss and separation	0.417
Sexual life	0.381
Daily life	0.359
Health concerns	0.321
All domain	0.314

* $P < 0.001$

Table 5 Internal consistency of the stressful life event questionnaire (Isfahan Healthy Heart Program, Iran 2000–2007)

Domain	α*	95% Confidence interval	Cicchetti's classification
Home life	0.77	0.75–0.78	Excellent
Financial problems	0.83	0.83–0.84	Excellent
Social relation	0.82	0.81–0.83	Excellent
Personal conflict	0.81	0.80–0.83	Excellent
Job conflict	0.76	0.75–0.78	Excellent
Education concerns	0.71	0.69–0.73	Good
Job security	0.70	0.68–0.71	Good
Loss and separation	0.73	0.71–0.76	Good
Sexual life	0.74	0.71–0.76	Good
Daily life	0.65	0.61–0.69	Good
Health concerns	0.75	0.73–0.79	Excellent
All domain	0.92	0.91–0.93	Excellent

* $P < 0.001$

intervention. Similarly, the adolescent stress questionnaire has been designed by Byrne et al. (2007) based on the domain for better measurement of stressors. Notably, however, given that the 11 emergent domains clearly described recognized dimensions of stressor experience both form a theoretical perspective and in relation to the presented empirical literature on stress.

Some modest correlation emerged between domains. It represented that some of the experienced stressor domains were overlapped. This result is recognized in the previous literature describing stressors (Swindle and Moos 1992). For instance, experience of financial problem is positively correlated with the experience of job security. Weakly positive correlations, however, suggest that stress experienced in some domains is not completely consistent with the stresses experienced in other domains. In addition, this is broadly in line with notions of stressor domain interdependence.

In conclusion, the SLE questionnaire formed to have a significant high reliability and validity. This instrument possesses as good psychometric properties that allows it to be useful as a research tool in community and primary care setting. We can profess that have presented a new tool for assessing life events in public health in new world.

Acknowledgments This study was supported by the Isfahan Cardiovascular Research Center. We would like to thank our expert panel for their cooperation: Hamid Mirzaee, Abbas Attari, Payam Kabiri, and Ahmad Pedram. We also thank all questioners who helped us in performing this study.

Conflict of interest The authors declare that they have no competing interests.

References

Belbeisi A, Zindah M, Walke HT, Jarrar B, Mokdad AH (2009) Health related quality of life measures by demographics and common health risks, Jordan 2004. Int J Public Health 54(Suppl 1):106–110

Bodenmann G, Atkins DC, Schär M, Poffet V (2010) The association between daily stress and sexual activity. J Fam Psychol 24:271–279

Byrne DG, Davenport SC, Mazanov J (2007) Profiles of adolescent stress: the development of the adolescent stress questionnaire (ASQ). J Adolesc 30:393–416

Cheung CK, Leung K (2010) Ways that social change predicts personal quality of life. Soc Indic Res 96:459–477

Cicchetti DV (1994) Guidelines, criteria, and rules of thumb for evaluating normal and standardized assessment instruments in psychology. Psychol Assess 6:284–290

Cooper CL (1984) Stress research. Wiley, New York

Cousineau TM, Green TC, Corsini EA, Barnard T, Seibring AR, Domar AD (2006) Development and validation of the infertility self-efficacy scale. Fertil Steril 85:1684–1696

Djankov S, Ramalho R (2009) Employment laws in developing countries. J Comp Econ 37:3–13

Dohrenwend BS, Dohrenwend BP (1974) Stressful life events: their nature and effects. Wiley, New York

Dohrenwend BS, Dohrenwend BP (1981) Stressful life events and their contexts. Prodist, New York

Dohrenwend BS, Krasnoff L, Askenasy AR, Dohrenwend BP (1978) Exemplification of a method for scaling life events: the PERI Life Events Scale. J Health Soc Behav 19:205–529

Dube SR, Caraballo RS, Dhingra SS, Pearson WS, McClave AK, Strine TW et al (2009) The relationship between smoking status and serious psychological distress: findings from the 2007 Behavioral Risk Factor Surveillance System. Int J Public Health 54(Suppl 1):68–74

Dunteman GH (1989) Principal components analysis. Quantitative applications in the social sciences series, no. 69. Sage Publications, Thousand Oaks

Fliege H, Rose M, Arck P, Walter OB, Kocalevent RD, Weber C et al (2005) The Perceived Stress Questionnaire (PSQ) reconsidered:

validation and reference values from different clinical and healthy adult samples. Psychosom Med 67:78–88
Gillies P (1998) Effectiveness of alliances and partnerships for health promotion. Health Promot Int 13:99–120
Goldberg DP, Hillier VF (1979) A scaled version of the General Health Questionnaire. Psychol Med 9:139–145
Hämäläinen P, Takala J, Saarela KL (2007) Global estimates of fatal work-related diseases. Am J Ind Med 50:28–41
Holmes TH, Rahe RH (1967) The social readjustment rating scale. J Psychosom Res 11:213–218
Jamal M (2005) Burnout among Canadian and Chinese employees: a cross-cultural study. Eur Manage Rev 2:224–230
Kaplan HB (1983) Psychosocial stress. New York Academic Press, New York
Kenny DT, Carlson JG, McGuigan FJ, Sheppard JL (2000) Stress and health: research and clinical applications. Harwood Academic, Amsterdam
McGuire LC, Strine TW, Vachirasudlekha S, Anderson LA, Berry JT, Mokdad AH (2009) Modifiable characteristics of a healthy lifestyle and chronic health conditions in older adults with or without serious psychological distress, 2007 Behavioral Risk Factor Surveillance System. Int J Public Health 54(Suppl 1):84–93
Montazeri A, Harirchi AM, Shariati M, Garmaroudi G, Ebadi M, Fateh A (2003) The 12-item General Health Questionnaire (GHQ-12): translation and validation study of the Iranian version. Health Qual Life Outcomes 13:66. doi:10.1186/1477-7525-1-66
Nafikov RG, Simonova NI (2002) Chronic and acute stress in financial activities. Med Tr Prom Ekol 5:45–48
Pappa E, Kontodimopoulos N, Papadopoulos AA, Niakas D (2009) Assessing the socio-economic and demographic impact on health-related quality of life: evidence from Greece. Int J Public Health 54:241–249
Pietilä I, Rytkönen M (2008) Coping with stress and by stress: Russian men and women talking about transition, stress and health. Soc Sci Med 66:327–338
Rahe RH (1990) Life change, stress responsively, and captivity research. Psychosom Med 52:373–396
Sarason IG, Johnson JH, Siegel JM (1978) Assessing the impact of life changes: development of the life experiences survey. J Consult Clin Psychol 46:932–946
Sarrafzadegan N, Sadri G, Malekafzali H, Baghaei M, Mohammadi-Fard N, Shahrokhi S et al (2003) Isfahan healthy heart program: a comprehensive integrated community-based program for cardiovascular disease prevention and control. Acta Cardiol 58:309–320
Sarrafzadegan N, Baghaei A, Sadri GH, Kelishadi R, Malekafzali H, Boshtam M et al (2006) Isfahan healthy heart program: evaluation of comprehensive, community-based interventions for non-communicable disease prevention. Prev Control 2:73–84
Swindle RW, Moos RH (1992) Life domains in stressors, coping and adjustment. In: Walsh WB, Craik KH, Price RH (eds) Person-environment psychology: models and perspectives. Lawrence Erlbaum Associates, Hillsdale, p 33
Taylor AH, Dorn L (2006) Stress, fatigue, health, and risk of road traffic accidents among professional drivers: the contribution of physical inactivity. Annu Rev Public Health 27:371–391
Waszkowska M (2009) Temperament and perceived stress in road traffic. Med Pr 60:137–144
Watson P (2006) Stress and social change in Poland. Health Place 12:372–382
Wiwanitkit V (2010) Traffic noise, toxin, emotional stress: how to control? Noise Health 12:283
Wrosch C, Heckhausen J, Lachman ME (2000) Primary and secondary control strategies for managing health and financial stress across adulthood. Psychol Aging 15:387–399
Zheng YP, Lin KM (1994) A nationwide study of stressful life events in Mainland China. Psychosom Med 56:306–307