OPEN

Quickscan Assesses Risk of Long-Term Sickness Absence

A Cross-Sectional Validation Study

Kaat Goorts, MSc, Sofie Vandenbroeck, PhD, Tinne Vander Elst, PhD, Dorina Rusu, MD, Marc Du Bois, MD, and Lode Godderis, MD

Objective: Increasing long-term sickness absence in many countries asks for specific measures regarding return-to work. **Methods:** The risk of long-term sickness absence was assessed using a questionnaire containing work-related, function-related, stressful life-events-related, and person-related factors. Additionally, workers' occupational health physician estimated the worker's chances for work resumption. Reliability, construct, and criterion validity of the questionnaire were measured. **Results:** Two hundred seventy-six patients and 35 physicians participated in the study. The reliability was satisfying ($\alpha > 0.70$) for all scales, except for perfectionism ($\alpha = 0.62$). The results of the CFAs showed that the hypothesized factor models fitted the data well. Criterion validity tests showed that eight predictors significantly related to the estimation of the occupational physicians ($\rho < 0.05$). **Conclusions:** The scales of the questionnaire are reliable and valid, and may be implemented to assess sick-listed workers at risk who might benefit from a rehabilitation program.

Keywords: long-term sick leave, occupational health physician, questionnaire, return-to work

The number of disabled workers has dramatically increased worldwide. Previous studies have shown that long-term sickness absence is a prognostic marker of future absence from work, early retirement due to ill health problems, and mortality. Long-term sickness absence can also be associated with future unemployment, financial difficulties, psychological problems, and social exclusion.[1]

Despite the growing interest in decreasing sickness absence across Europe and many countries that implement promising projects, it remains challenging to dedicate the resources to the people that need it most, that is, sick listed employees with a high risk of not returning to work. Hence, most sick listed employees are returning to work spontaneously within 6 weeks and do not need additional support.[2] Existing instruments do not make a clear distinction between employees who will spontaneously return to work and employees who have a high risk of long-term sickness absence. Early intervention is key, because it is widely acknowledged that the longer an employee is off work, the smaller his chances of ever returning to work.[3]

The occupational physician has the task (among others) to guide reintegration processes within companies (adapted workspace, . . .) in cooperation with the physician of the sickness fund organizations. A screening method to detect high risk of long-term sickness absence among the large group of sick employees might thus be a useful contribution to support both physicians in their tasks. As such, resources (eg, money, services) can be provided in a more efficient way, and the return to work process of employees at high risk can start much earlier.

Existing instruments to screen for long-term sickness absence are merely focused either on a specific medical condition, or implemented in the specific political context of a country. However, international experts agree that more the absence takes longer, less the cause of this absence is related to the initial medical diagnosis.[4]

The aim of the current study is to validate the new, more generic questionnaire that is applicable in all contexts to predict long-term sickness absence. Specifically, we will test the reliability, the construct validity, and the criterion validity of the scales of the screening instrument.

METHODS

Variables and Instruments

Several literature reviews have identified factors predicting long-term sickness absence (eg; sex, age, level of education, marital status, number of children and the strains of private life, perceived health, mental, and psychosomatic complaints, . . .).[5–7] Based on these predictors and on existing validated questionnaires, a new model and questionnaire for early screening of high risk of long-term sickness absence has been constructed.

Two questionnaires were used in this study; one for the patient and one for the occupational health physician. The patients' questionnaire was constructed based on existing questionnaires on (long-term) sickness absence. In a previous study[8] we conducted a literature review and identified both predictors of long-term sickness absence in general and predictors of long-term sickness absence under certain conditions (eg, cancer patients, . . .) or in certain settings (eg, Norway,..). In total, 21 predictors were identified. Based on this selection, we selected questions from validated questionnaires measuring these possible predictors. Current patients' questionnaire thus contains questions from existing questionnaires, sorted in 21 categories that were described in literature. All questions were scored on a six-point Likert scale ranging from (0) f.e. totally disagree to (5) f.e. totally agree, regardless of their original scale range. Patients were also queried on the following

From the Centre for Environment and Health (Ms Goorts, Dr Vandenbroeck, Dr Du Bois, Dr Godderis); Idewe, External Service for Prevention and Protection at Work (Dr Vandenbroeck, Dr Vander Elst, Dr Godderis); Faculty of Psychology and Educational Sciences (Dr Vander Elst), University of Leuven, Leuven; Département des Sciences de la Santé publique, Ecole de santé publique, Université de Liège (Dr Rusu); and SPMT-ARISTA, External Service for Prevention and Protection at Work (Dr Rusu), Liège, Belgium.

Compliance with Ethical Standards: This study was funded by the National institute for health and disability insurance, Belgium. The article has been approved by all authors. The funders of this study had no involvement in the study design, analysis, and writing of submission of this article. Ethical approval was obtained from the social and societal ethics committee with file number S60458.

Clinical Significance: A screening method to detect high risk of long-term sickness absence among the large group of sick employees might help to use resources more efficiently. Physicians will be able to focus on patients with a high risk on long-term sick leave, and the work resumption process can start much earlier.

The authors report no conflicts of interest.

Address correspondence to: Kaat Goorts, MSc, Centre for Environment and Health, University of Leuven, Kapucijnenvoer 35/5, 3000 Leuven, Belgium (kaat.goorts@kuleuven.be).

DOI: 10.1097/JOM.0000000000001512

TABLE 1. Structure, Content, Source-Questionnaires, and Scoring* of the Questionnaire Divided in Four Categories (Work-Related Factors, Stressful Life-Event Factors, Functioning Factors, and Person-Related Factors) (Adapted from Different Validated Questionnaires)

Work-Related Factors	Stressful Life-Events	Functioning	Person-Related Factors
Autonomy (five items) Absenteeism screening questionnaire For example, I can adjust number and heaviness my of tasks Learning and development opportunities (four items)-2 Vragenlijst beleving en beoordeling van de arbeid [questionnaire perception and assessment of labor] For example, personal growth and development Social support management (two items) Vragenlijst arbeidsreïntegratie [questionnaire re-integration] For example, My employer understands my situation Social support colleagues (two items) Vragenlijst arbeidsreïntegratie [questionnaire re-integration] For example, I feel appreciated by my colleagues Physical workload (seven items) Vragenlijst beleving en beoordeling van de arbeid [questionnaire perception and assessment of labor] For example, need physical power for your job Workload (six items) Vragenlijst arbeidsreïntegratie/ vragenlijst beleving en beoordeling van de arbeid [questionnaire re-integration/ questionnaire perception and assessment of labor] For example, I work under time pressure Terms of employment (one items) Vragenlijst arbeidsreïntegratie [questionnaire re-integration] Emotional burden (one item) Vragenlijst beleving en beoordeling van de arbeid [questionnaire perception and assessment of labor] Turnover intention profession (one item) Vragenlijst arbeidsreïntegratie [questionnaire re-integration] Job satisfaction (one item) Vragenlijst arbeidsreïntegratie [questionnaire re-integration] Work expectations (one item) ORO-questionnaire(obstacles to return to work questionnaire)	Stressful life-events (eight items) Vragenlijst arbeidsre-integratie [questionnaire re-integration] For example, it is hard to find energy to work since my social situation is bad	Health perception patient (two items) Disability risk questionnaire For example, general health Psychological distress (seven items) SPOC-NL (somatic pre-occupation and coping questionnaire)/brief illness perception questionnaire For example, how concerned are you about your illness? Pain perception (three items) SF-36/ALBPSQ-NL (acute low back pain screening questionnaire-NL) For example, pain in past 4 weeks Work-health-interference perception (one item) Vragenlijst arbeidsreïntegratie [questionnaire re-integration] Return to work needs (one item) Vragenlijst arbeidsreïntegratie [questionnaire re-integration] Return to work expectations (one item) Vragenlijst beleving en beoordeling van de arbeid [questionnaire perception and assessment of labor] Recovery expectations (one item) SPOC-NL (somatic pre-occupation and coping questionnaire—NL) For example, my treatment will be effective for the cure of my disease.	Fear of colleagues expectations (one item) ORO-questionnaire (obstacles to return to work questionnaire) Perfectionism (four items) Vragenlijst arbeidsreïntegratie [questionnaire re-integration] It's hard to say no to colleagues

Demographic characteristics: Gender (M/F), age (birth-year), educational level (five levels), Sector, Profession (ISCO), diagnosis (ICD-10).
*All questions are scored on a six-point Likert scale.

demographic characteristics: sex, age, educational level (ISCED scale), sector, profession (ISCO scale), French/Dutch speaking, diagnosis (ICD-10 scale), and duration of the sickness absence. Table 1 illustrates the structure and content of the patients' questionnaire, the source-questionnaires, and the number of items measuring each factor, and how items or scales were scored.

To deal with low factor loadings or weak internal consistency for multiple items, we omitted items with factor loadings below 0.40[9] or items for which Cronbach α coefficients of the corresponding scale significantly increased when deleting the item. In total, two items were dropped for further analysis, both from the learning and development scale; one item because a double question was created due to bad translation, and one because the internal consistency improved when deleting the item (0.781 → 0.807). All other items loaded on the corresponding hypothesized latent variable.

The occupational health physicians' questionnaire contained only one question: ''What is your estimation for this patient concerning re-integration?'' with following possible answers: (1) the patient will resume independently without adjustments to the workstation. (2) The patient will resume independently, but adjustments to the workstation are necessary. (3) The resumption of the current job is not possible for the patient, and another job within the company must be sought. (4) The resumption of the current job is not possible for the patient; another job needs to be found within another company. (5) The patient is definitively unsuitable for any work. The occupational health physician was asked to select one of five responses.

Design and Sample

A cross-sectional data collection was organized in cooperation with 35 voluntary occupational health physicians from eight Belgian external and one internal occupational health and safety services. Data were collected from June to October 2017. Occupational health physicians were recruited via Co-Prev, the association of occupational health and safety (OHS) services in Belgium.[10] Eight out of 11 external services were represented in the study. The sample represented about 3.5% of the total population of occupational health physicians in Belgium ($N = 1002$) and show similar characteristics with the total population.[11] 37% of the physicians in our sample were men, 63% were women (compared with 44% and 56%, respectively, in the Belgian population of occupational health physicians). Most physicians in Belgium are working for an external service (94%), which is comparable to our sample (34 out of 35 physicians worked for an external service). The Dutch speaking physicians (77%) were overrepresented compared with the Belgian occupational health physicians (61%).[11]

The inclusion criteria for the patients were: (1) being on sick leave, (2) made an appointment with an occupational physician to discuss reintegration, and (3) French or Dutch speaking. Exclusion criteria were: (1) does not receive sickness benefits, (2) made an appointment with occupational physician for any other reason than to discuss re-integration, (3) does not speak French or Dutch (cannot understand the questionnaire).

Statistical Analysis

Analyses were performed with SPSS 24 (IBM SPSS Statistics for Windows, Version 24.0, Armonk, NY) and AMOS 24 (IBM SPSS AMOS for Windows, Version 24.0, Armonk, NY). Preliminary data screening on multicollinearity (bivariate correlations between the observed variables higher than $r = 0.85$ or variance inflation factor = 4) and non-normality (skewness index greater than 3; kurtosis index higher than 10) showed no evidence for potential problems for their use in the subsequent analysis.[12]

Descriptive statistics, more precisely frequencies, means and standard deviations (SDs), were performed to describe the study sample.

First, the reliability of the study scales was evaluated using Cronbach α coefficients. The generally agreed upon criteria for scale reliability is its cut-off value 0.7.[13]

Second, construct validity was evaluated through a series of confirmatory factor analyses. Because of the small sample ($n = 276$), the complexity of the study model and the large number of study scales, we tested a measurement model for each category of factors (ie, work-related factors, functioning factors, stressful life-events, and person-related factors). Model fit of these hypothesized measurement model was evaluated using the following fit indices: the Comparative Fit Index (CFI), the Non-Normed Fit Index (NNFI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Residual (SRMR). The chi-squared difference test was used to compare the hypothesized measurement model with alternative, nested models. The hypothesized measurement models concerning ''Stressful life-events'' and ''person-related factors'' were not compared with alternative models because these models respectively only had one latent factor and one of two latent factors had only one item.

Third, path analysis was applied to investigate the criterion validity. We tested multiple models including interrelationships between the explanatory variables from the patients' questionnaire and physicians' estimation of patients' return to work. The first model (1st quadrant) included relationships from the work-related factors (as described in Table 1) to the estimation of the occupational health physician concerning return to work. In the second model (2nd quadrant), relationships between the functioning related factors (as described in Table 1) and the estimation of the occupational health physician concerning to return to work were modeled. The third model (3th quadrant) reflected the relationship between the stressful life-events factor and the estimation of the occupational health physician concerning return to work. Finally, the fourth model (4th quadrant) included paths from the person-related factors to physicians' estimation of patients' return to work.

Missing values in the data were handled using mean substitution.

Procedure

The occupational physicians were asked to include every patient whose consult concerned a return-to-work support process, during an inclusion period of 3 weeks. Individual reminders were sent twice, after the inclusion period of 3 weeks to the occupational health physicians.

The printed versions of the questionnaire were delivered to the occupational health physician via regular mail. An informed consent form for the patient was provided. After 3 weeks, the occupational physician was asked to send back all questionnaires. The questionnaires were scanned using special scanner software.

RESULTS

Two hundred seventy-six respondents met the inclusion criteria and participated in the survey. About 65% were women. The mean age of the respondents was 44.8 years (standard deviation [SD] = 10.5). Most respondents were Dutch speaking (86.2%); the French speaking part of Belgium was not equally represented (13.8%). In Belgium the French speaking part (Brussels excluded) is 37.7% of the total population (French + Flemish without Brussels). Professionals (according to the international standard classification of occupations definition) were the largest group in our sample (39%), followed by elementary occupations (20.9%). Managers were the least represented group (2.4%). About 40% of the respondents were working in health care services. Most respondents (38.4%) had an upper secondary diploma, 25.4% had a bachelor degree, and only 7.2% had a university degree.

About half of the respondents (53.6%) suffered from musculoskeletal diseases (International Statistical Classification of

TABLE 2. Main Results on Reliability Testing Within the Different Scales (Cronbach α) and Means, Standard Deviation (SD), and Correlations (Pearson Correlation and Covariance) Between the Different Scales Used in the Instrument ($N = 276$)

Cronbach α		Mean	SD		PWL	SSC	SSM	LD	WL	AU	SLI	PF	HPP	PP	PD	JS	TOE	TIP	WHI	RTWN	EB	FCE	WE	RTWE	RE
PWL	0.90	2.65	1.28	Pearson correlation	1																				
				Sig. (2-tailed)																					
SSC	0.01	3.28	1.41	Pearson correlation	−0.151*	1																			
				Sig. (2-tailed)	0.012																				
SSM	0.88	3.27	1.16	Pearson correlation	−0.122*	0.498**	1																		
				Sig. (2-tailed)	0.042	0.000																			
LD	0.81	2.62	1.41	Pearson correlation	−0.177**	0.412**	0.444**	1																	
				Sig. (2-tailed)	0.003	0.000	0.000																		
WL	0.89	2.60	1.18	Pearson correlation	0.398**	−0.260**	−0.463**	−0.176**	1																
				Sig. (2-tailed)	0.000	0.000	0.000	0.003																	
AU	0.84	2.02	1.26	Pearson correlation	−0.218**	0.305**	0.442**	0.384**	−0.360**	1															
				Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000																
SLI	0.87	2.15	1.22	Pearson correlation	0.245**	−0.196**	−0.224**	−0.169**	0.421**	−0.118*	1														
				Sig. (2-tailed)	0.000	0.001	0.000	0.005	0.000	0.049															
PF	0.62	3.71	0.89	Pearson correlation	0.207**	−0.002	−0.033	0.031	0.192**	−0.066	0.127*	1													
				Sig. (2-tailed)	0.001	0.975	0.583	0.609	0.001	0.274	0.035														
HPP	0.79	3.24	1.02	Pearson correlation	−0.315**	0.198**	0.227**	0.158**	−0.406**	0.157**	−0.234**	−0.168**	1												
				Sig. (2-tailed)	0.000	0.001	0.000	0.008	0.000	0.009	0.000	0.005													
PP	0.72	2.30	1.21	Pearson correlation	0.592**	−0.139*	−0.090	−0.147*	0.326**	−0.081	0.164**	0.176**	−0.400**	1											
				Sig. (2-tailed)	0.000	0.020	0.138	0.014	0.000	0.182	0.006	0.003	0.000												
PD	0.92	2.41	1.32	Pearson correlation	0.366**	−0.294**	−0.415**	−0.240**	0.621**	−0.284**	0.530**	0.262**	−0.522**	0.361**	1										
				Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000											
JS	/	3.19	1.48	Pearson correlation	−0.058	0.430**	0.654**	0.366**	−0.328**	0.374**	−0.217**	0.069	0.192**	−0.093	−0.334**	1									
				Sig. (2-tailed)	0.334	0.000	0.000	0.000	0.000	0.000	0.000	0.254	0.001	0.122	0.000										
TOE	/	3.29	1.26	Pearson correlation	−0.184**	0.357**	0.810**	0.344**	−0.373**	0.346**	−0.216**	−0.046	0.155**	−0.105	−0.319**	0.488**	1								
				Sig. (2-tailed)	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.443	0.010	0.083	0.000	0.000									
TIP	/	2.93	1.93	Pearson correlation	−0.075	0.340**	0.507**	0.295**	−0.292**	0.250**	−0.224**	0.012	0.145*	−0.040	−0.269**	0.534**	0.395**	1							
				Sig. (2-tailed)	0.212	0.000	0.000	0.000	0.000	0.000	0.000	0.847	0.016	0.510	0.000	0.000	0.000								
WHI	/	2.75	1.66	Pearson correlation	0.442**	−0.283**	−0.264**	−0.232**	0.411**	−0.205**	0.244**	0.168**	−0.496**	0.532**	0.565**	−0.220**	−0.222**	−0.230**	1						
				Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000							
RTWN	/	1.51	1.47	Pearson correlation	0.360**	−0.374**	−0.444**	−0.344**	0.407**	−0.262**	0.198**	0.022	−0.379**	0.359**	0.450**	−0.402**	−0.387**	−0.400**	0.574**	1					
				Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.718	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
EB	/	1.26	1.59	Pearson correlation	0.090	−0.096	−0.042	−0.058	0.015	0.023	−0.045	0.164**	−0.066	0.202**	0.087	0.015	−0.045	−0.019	0.151*	0.085	1				
				Sig. (2-tailed)	0.134	0.111	0.490	0.335	0.806	0.703	0.458	0.006	0.274	0.001	0.148	0.807	0.454	0.749	0.012	0.161					
FCE	/	2.30	1.87	Pearson correlation	0.107	−0.086	−0.144*	0.005	0.269**	−0.098	0.315**	0.304**	−0.196**	0.050	0.401**	−0.157**	−0.077	−0.166**	0.170**	0.019	0.021	1			
				Sig. (2-tailed)	0.077	0.152	0.017	0.928	0.000	0.106	0.000	0.000	0.001	0.405	0.000	0.009	0.204	0.006	0.005	0.749	0.731				
WE	/	2.40	1.86	Pearson correlation	0.044	−0.140*	−0.188**	0.017	0.407**	−0.122*	0.116	0.107	−0.200**	0.139*	0.284**	−0.122*	−0.041	−0.126*	0.123*	0.176**	0.007	0.232**	1		
				Sig. (2-tailed)	0.467	0.020	0.002	0.784	0.000	0.043	0.053	0.075	0.001	0.021	0.000	0.042	0.496	0.037	0.042	0.003	0.904	0.000			
RTWE	/	2.22	1.88	Pearson correlation	−0.274**	0.226**	0.250**	0.161**	−0.360**	0.161**	−0.196**	−0.041	0.415**	−0.350**	−0.427**	0.268**	0.212**	0.309**	−0.596**	−0.511**	−0.023	−0.094	−0.090	1	
				Sig. (2-tailed)	0.000	0.000	0.000	0.008	0.000	0.007	0.001	0.502	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.707	0.120	0.138		
RE	/	2.75	1.54	Pearson correlation	−0.351**	0.153*	0.142*	0.188**	−0.146*	0.167**	−0.100	−0.103	0.435**	−0.344**	−0.253**	0.098	0.205**	0.172**	−0.421**	−0.362**	0.043	−0.103	0.010	0.391**	1
				Sig. (2-tailed)	0.000	0.011	0.018	0.002	0.015	0.005	0.096	0.086	0.000	0.000	0.000	0.104	0.001	0.004	0.000	0.000	0.475	0.086	0.865	0.000	

AU, autonomy; EB, emotional burden; FCE, fear of colleagues expectations; HPP, health perception patient; JS, job satisfaction; LD, learning and development opportunities; PD, psychological distress; PF, perfectionism; PP, pain perception; PWL, physical workload; RE, recovery expectations; RTWE, return to work expectations; RTWN, return to work needs; SLI, stressful life-events; SSC, social support colleagues; SSM, social support management; TIP, turnover intention profession; TOE, terms of employment; WE, work expectations; WHI, work-health interference; WL, workload.

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

TABLE 3. Main Results of Confirmatory Factor Analysis, Containing Latent Factors, Chi-Square Results, Degrees of Freedom, CFI (Comparative Fit Index), NNFI (Non Normed Fit Index), RMSEA (Root Mean Square Error of Approximation), SRMR (Standardized Root Mean Residual), and a Model Comparison With Their Delta Chi-Square and Degrees of Freedom ($n = 276$)

Model	No. Latent Factors	Latent Factors	χ^2	df	CFI	NNFI	RMSEA	SRMR	Model Comparison	$\Delta\chi^2$	Δdf
	Work-related factors										
1	11 factors	JS, TOE, EB, PWL, AU, SSC, SSM, LD, TIP, WL, WE	826.14**	355	0.90	0.87	0.07	0.06	/	/	/
2	1 factor	General factor	3031.79**	405	0.42	0.37	0.15	0.15	2 vs 1	2205.65**	50
3	6 factors	PWL, AU, SS, LD, WL, GJP	1173.72**	390	0.83	0.81	0.09	0.08	3 vs 1	347.65**	35
4	7 factors	PWL, AU, SSC, SSM, LD, WL, GJP	904.67**	384	0.89	0.87	0.07	0.07	4 vs 1	78.75**	29
	Stressful life-events										
1	1 factor	General factor	121.30**	20	0.90	0.86	0.14	0.07	/	/	/
	Functioning-related factors										
1	7 factors	PD, HPP, PP, RTWE, WHI, RTWN, RE	257.30**	87	0.93	0.90	0.08	0.06	/	/	/
2	1 factor	General factor	733.90**	104	0.73	0.69	0.15	0.11	2 vs 1	476.60**	17
3	4 factors	PD, PP, RTW, H	291.60**	98	0.92	0.90	0.09	0.06	3 vs 1	34.30**	11
4	5 factors	PD, PP, HPP, RE, RTW	267.50**	95	0.93	0.90	0.08	0.06	4 vs 1	10.20 $\rho = 0.98$	8
	Person-related factors										
1	2 factors	FCE, PF	10.08*	5	0.97	0.93	0.06	0.037	/	/	/

AU, autonomy; EB, emotional burden; FCE, fear of colleagues expectations; GJP, general job perception; H, health; HPP, health perception patient; JC, job content; JS, job satisfaction; LD, learning and development opportunities; PD, psychological distress; PF, perfectionism; PP, pain perception; PWL, physical workload; RE, recovery expectations; RTW, return to work; RTWE, return to work expectations; RTWN, return to work needs; SS, social support; SLI, stressful life-events; SSC, social support colleagues; SSM, social support management; TIP, turnover intention profession; TOE, terms of employment; WE, work expectations; WHI, work-health interference; WL, workload.

*$P < 0.01$.

**$P < 0.001$.

Diseases and Related Health Problems 10–13), about a quarter (25.5%) suffered from mental and behavioral disorders (ICD 10–5), 12 respondents (4.6%) had multiple diagnoses, and 17 respondents did not provide a (clear) diagnosis (6.2%). Similar to the national data in Belgium, fewer male than female patients are on sick leave (47.1% vs 52.9%) in primary sickness absence (>28 days). These numbers confirm the most important causes of invalidity (more than 1 year) in the total population, which are musculoskeletal diseases (34.33%) and mental problems (27.84%). The same causes count for primary sickness absence. Although we did not aim to have a representative sample of the population of employees in sickness absence, we seem to have a more or less good reflection of the Belgian population of employees in sickness absence in our sample.

In Table 2 an overview is given of the reliability (Cronbach α) of the different scales, together with their mean, standard deviation, and intercorrelations with other scales. In the final reduced measurement model the Cronbach α for the latent factor perfectionism is 0.62, which is below the threshold of 0.70, but still acceptable.[14] For all other scales, the reliability is good (>0.70).

The results of the confirmatory factor analyses that were used to assess the construct validity of the scales are shown in Tables 3 and 4. All four hypothesized models with the latent factors linked to one of the four categories (ie, work-related factors, stressful life-events, functioning factors, and person-related factors) fitted the data well and demonstrated a better fit compared with the other alternative models. Table 4 gives an overview of all items and their factor loadings in the final reduced measurement model. All items have acceptable factor loadings (more than 0.40).[9]

The results of the path analysis (criterion validity) indicating relationships of the work-related factors, functioning factors, stressful life-events factors, and variables reflecting individual characteristics (person-related factors) on the one hand with the estimation of the occupational health physician on the other hand are presented in Fig. 1. The significant work-related factors physical workload ($\beta = 0.19$, $P = 0.001$) and workload ($\beta = 0.15$, $P = 0.02$) were positively related to the estimation of the occupational physician. Negative significant relations were observed between social support colleagues ($\beta = -0.16$, $P = 0.01$), learning and development opportunities ($\beta = -0.15$, $P = 0.01$), and physicians' estimation of patients' return to work. Stressful life-events had a strong positive relation with the estimation of the occupational health physician ($\beta = 0.21$, $P < 0.001$). Significant functioning factor return to work needs ($\beta = 0.58$, $\rho < 0.001$) was positively related to the estimation of the occupational physician. A negative relation was found with health perception patient ($\beta = -0.11$, $\rho = 0.032$), and return to work expectations ($\beta = -0.10$, $\rho = 0.05$). Both person-related factors were non-significantly related to the estimation of the occupational physician.

DISCUSSION

This study found that the screening tool is an instrument with reliable scales (except for the perfectionism scale). The construct validity was satisfying: we found that the hypothesized measurement models with the theoretical factors fitted the data well, and showed a better fit in comparison with a number of alternative measurement models. However, both work-related factors and

TABLE 4. Reduced Measurement Model: Description of All Latent Factors Including Their Items and Factor Loadings ($n = 276$)

Latent Factor: Function-Related	Item	Factor Loading	Latent Factor: Work-Related	Item	Factor Loading
Psychological distress	PD1	0.65	Job satisfaction	/	/
	PD2	0.77	Terms of employment	/	/
	PD3	0.78	Emotional burden	/	/
	PD4	0.78	Physical workload	PWL1	0.84
	PD5	0.85		PWL2	0.74
	PD6	0.81		PWL3	0.71
	PD7	0.86		PWL4	0.67
Health perception patient	HPP1	0.79		PWL5	0.83
	HPP2	0.83		PWL6	0.74
Pain perception	PP1	0.73		PWL7	0.78
	PP2	0.74	Autonomy	AU1	0.55
	PP3	0.60		AU2	0.76
Work-health interference	/	/		AU3	0.83
Return to work needs	/	/		AU4	0.77
Return to work expectations	/	/		AU5	0.68
Recovery expectations	/	/	Social support colleagues	SSC1	0.91
Latent factor: person-related factors	Item	Factor loading		SSC2	0.91
Perfectionism	PF1	0.43	Social support management	SSM1	0.85
	PF2	0.66		SSM2	0.92
	PF3	0.55	Learning and development opportunities	LD1	0.80
	PF4	0.55		LD2	0.85
Fear of colleagues expectations	/	/	Turnover intention profession	/	/
			Workload	WL1	0.71
Latent factor: stressful life-events	Item	Factor loading		WL2	0.50
Stressful life-events	SLI1	0.61		WL3	0.79
	SLI2	0.51		WL4	0.88
	SLI3	0.62		WL5	0.65
	SLI4	0.84		WL6	0.83
	SLI5	0.91		WL7	0.77
	SLI6	0.70	Work expectations	/	/
	SLI7	0.50			
	SLI8	0.64			

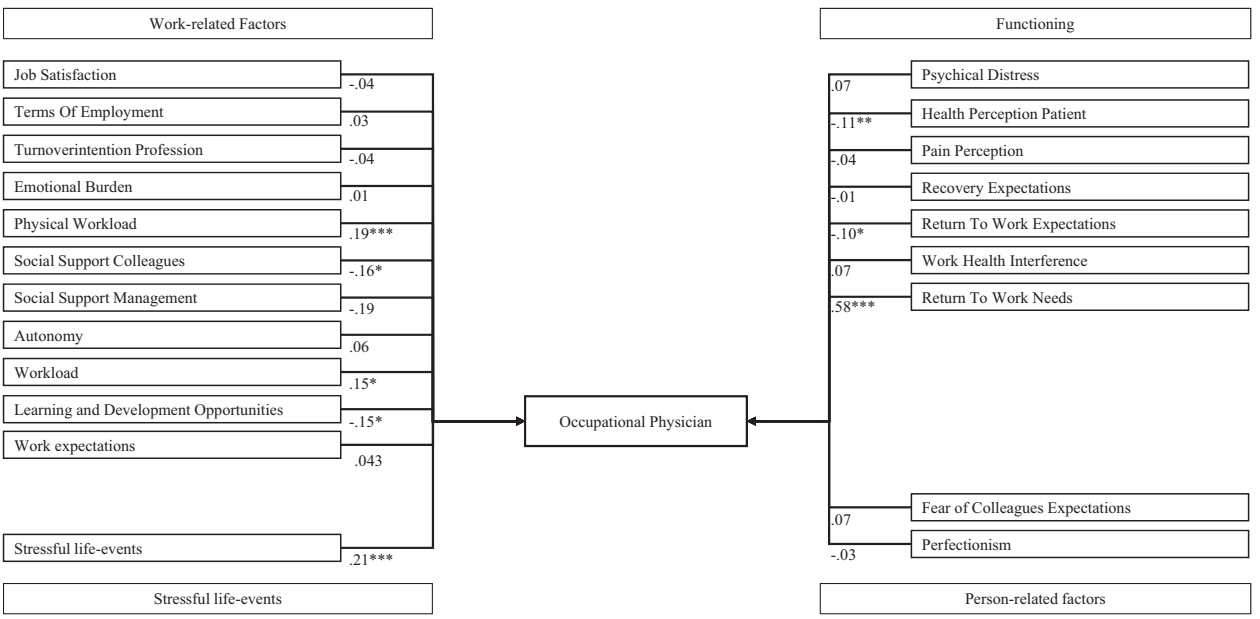

FIGURE 1. Results path analysis with all latent factors included in the measurement model with their significance levels ($^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$) ($n = 276$) and their betas.

stressful life-events showed some minor issues in their model fit (NNFI and RMSEA).

For the criterion validity, we found a significant relation between eight out of 20 latent factors and the estimation of the occupational physician about the probability of return-to work for the patient. The work-related factors comprising physical workload, social support colleagues, workload and learning, and development opportunities showed a significant ($P < 0.05$) relation with the estimation of the occupational physician.

The positive relation with physical workload and workload means that the higher the physical workload or workload is according to the patient, the higher the risk according to the occupational health physician for long-term sickness absence. According to Beemsterboer et al[5] perceived physical and mental workload and work contents (among which workload), are independent determinants for the duration of the sick leave. According to the cohort studies of Airaksinen et al[15] ''job strain'' is one out of 17 predictors for sickness absence lasting more than 9 days. However, according to this study, job strain is not predictive for sickness absence lasting more than 90 days. According to the researchers, future research should determine whether applying predictive tools for long-term sickness absence offer benefit in particular for people in the ''grey zone,'' that are those with a medium-level risk, because accurate assessment of the risk of prolonged sickness absence could inform the healthcare personnel to target them with timely interventions. Predictive tools may provide less benefit in studying high-risk people with known health problems who already participate in preventive interventions implemented by healthcare professionals. This adds a very interesting perspective to our current study, since this has the purpose to identify the high-risk people.

The negative relation of social support colleagues and learning and development opportunities means that the less support of colleagues or the less learning and development opportunities according to the patient, the higher is the risk of long-term sickness absence according to the occupational physician. This seems to converge with the results of the literature review of Dekkers-Sánchez et al[6] where two factors ''lack of skill discretion'' and ''perception of not being welcomed back to work'' are described as factors associated with long-term sick leave.

The functioning related factors comprising a positive relation with the estimation of the occupational health physician are the return to work needs. This means that estimation of the occupational health physician about the return to work probability of the patient is strongly related to the estimation of the patient concerning needs for return to work. The factor described as ''Assessed to be in need of comprehensive rehabilitation'' in the systematic literature review of Sanchez et al[6] also was a factor associated with long-term sick leave. Also in this case, the findings of the literature review, however uncertain, are confirmed in this study.

The negative significant relations with return to work expectation and health perception mean that the stronger the patient beliefs he or she is in a bad medical condition, or he or she think it is impossible to return to work within 4 weeks, the stronger the occupational health physician beliefs that there is a high risk for long-term sickness absence. The ''poor general health'' factor and ''own prediction of non-return to work'' factor in the review paper of Sanchez et al[6] were also a factor associated with long-term sick leave.

The positive relation with the stressful life-events means that the more negative stressful life-events are perceived by the patient, the more pessimistic the occupational health physician estimates a possible return to work. Beemsterboer et al[5] came to the same conclusion as they described the strains of private life as a determinant of sick leave duration.

From all above, we can conclude that this study strongly cooperates in supporting theories from different literature reviews and a recent Finnish study. In literature today, factors related with long-term sick leave are always described with a lot of uncertainty. Most factors are not significantly (enough) related to the outcome to make statements. Therefore, this study can contribute to the field of research concerning these factors, and in supporting the physicians to screen for long-term sickness absence.

The screening tool developed in this study might be useful to screen for the risk for long-term sickness absence in an early stage of the sickness process. The patient can use the questionnaire as a self-assessment instrument to evaluate his risk for long-term sickness absence. Automatic feedback for the patient can be provided, to explain the different scales and the scores he got on each one. The physician assessing the disability, can use the information of the screening tool to invite patients with a high risk for long-term sickness absence for an evaluation moment and to provide support and feedback on return to work possibilities. With a decreasing number of physicians assessing disability, the screening tool might facilitate their job by selecting the high-risk profiles. The patients on the other hand can profit from a close follow up, and support during their sickness and revalidation process. Occupational physicians at last can use the questionnaire results to make an estimation about the main factors that hinder patients to return to work and subsequently provide better feedback and support.

However, a few limitations to this study seem worth mentioning.

First, selection bias of participating occupational physicians cannot be completely excluded, since the participation was voluntary. This study might have attracted specifically physicians working in specific settings, which does not necessarily represent the total patient population.

A second limitation is the assessment of the physicians, which does not necessarily represent an unbiased estimation of the actual situation of the patient. However, we choose this criterion to test for concurrent validity, because this type of validation needs a criterion that exists at the same time as the measure (at the moment of the questionnaire). Consequently, we consider carefully our eight significant factors as being important factors for return to work. In a follow-up study, we will measure the time until return to work of patients who filled out the questionnaire after 6 weeks of sickness absence, and thus measure the predictive validity of the instrument.

Lastly, it should be mentioned that the ultimate test of this tool will be the comparison to the actual outcomes of return to work. Results of other tools will be compared with the results of the quickscan as well.

In addition, the questionnaire should be evaluated by patients themselves to test for content validity. Both validation processes have already been started.[16]

ACKNOWLEDGMENTS

The authors would like to thank F. Perl, S. Decuman and Professor Dr. Bart Meuleman for providing feedback and support during this research. The authors would also like to thank all occupational physicians who participated in this research project and who therefore provided the researchers with these new insights. In addition, they thank the editor and anonymous reviewers for their efforts and feedback.

REFERENCES

1. Kausto J, Pentti J, Oksanen T, et al. Length of sickness absence and sustained return-to-work in mental disorders and musculoskeletal diseases: a cohort study of public sector employees. *Scand J Work Environ Health*. 2017; 43:358–366.
2. Tompa E, de Oliveira C, Dolinschi R, Irvin E. A systematic review of disability management interventions with economic evaluations. *J Occup Rehabil*. 2008;18:16–26.
3. Wiencke M, Cacace M, Fischer S. *Healthy at Work Interdisciplinary Perspectives.* Switzerland: Springer International Publishing; 2016.

4. Mairiaux P, Schippers N, Kéfer F, Cornélis S, Donceel P, Somwille PR. *Werkhervatting na een langdurige afwezigheid [Work-resumption after long-term sickness absence];* 2012.
5. Beemsterboer W, Stewart R, Groothoff J, Nijhuis F. A literature review on sick leave determinants (1984–2004). *Int J Occup Med Environ Health*. 2009;22:169–179.
6. Dekkers-Sanchez PM, Hoving JL, Sluiter JK, Frings-Dresen MH. Factors associated with long-term sick leave in sick-listed employees: a systematic review. *Occup Environ Med*. 2008;65:153–157.
7. Mairiaux P, Somville PR. Incapacité de travail prolongée. Revue des facteurs de risque professionnels et des stratégies d'intervention [Extended inability to work: Review of occupational risk factors and intervention strategies]. *Archives des maladies professionnelles et de l'environnement*. 2015;76: 458–467.
8. Goorts K, Duchesnes C, Vandenbroeck S, et al. Is langdurig ziekteverzuim voorspelbaar en meetbaar? [Can long-term sickness absence be measured and predicted?]. *TBV – Tijdschrift voor Bedrijfs- en Verzekeringsgeneeskunde*. 2017;25:59–62.
9. Bowen NK, Guo S. *Structural Equation Modeling.* New York: Oxford University Press; 2011.
10. Co-prev, 2017 [Available at: http://www.co-prev.be/]. Accessed March 30, 2018.
11. Pauwels S, De Schryver A, Ronsmans S, et al. *PROBE studie: onderzoek naar de blootstelling van de Belgische werknemers aan gevaarlijke chemische producten via peilpraktijken [Research to the exposure of Belgian workers to hazardous chemical products through sentinel approach];* 2018.
12. Weston R, Gore Jr PA. A brief guide to structural equation modeling. *Counseling Psychol*. 2006;34:719–751.
13. Nunnally JC. *Psychometric Theory.* New York: McGraw-Hill; 1978.
14. Moss S, Prosser H, Costello H, et al. Reliability and validity of the PAS-ADD Checklist for detecting psychiatric disorders in adults with intellectual disability. *J Intellect Disabil Res*. 1998;42:173–183.
15. Airaksinen J, Jokela M, Virtanen M, et al. Prediction of long-term absence due to sickness in employees: development and validation of a multifactorial risk score in two cohort studies. *Scand J Work Environ Health*. 2018;44: 274–282.
16. Goorts K, Vandenbroeck S, Rusu D, Du Bois M, Godderis L. Screening for the risk on long-term sickness absence. *J Public Health Res*. 2018;7:2.

