

## Short Communication

# Reliability and Validity of the Japanese Version of the Stanford Presenteeism Scale in Female Employees at 2 Japanese Enterprises

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Recent studies have suggested “presenteeism” is a situation often experienced by workers, and it is estimated to be the cause of a large amount of economic loss for enterprises<sup>1,2</sup>. We defined presenteeism as “a self-rated measurable loss of work performance due to health problems in the workplace” in a previous investigation<sup>3</sup>. This represents an important concept for health promotion activities in occupational health. Therefore, measurement tools of presenteeism are required in Japan.

The 13-item Stanford Presenteeism Scale (SPS) was developed in the United States in 2004<sup>4,5</sup> and was designed to determine presenteeism due to a specific health condition over a 4-week period. SPS comprises 4 modules: a) selection of all health conditions and a single primary health condition (PHC) of a worker from a health condition list; b) degree of presenteeism due to the PHC (Work Impairment Score [WIS]); c) effect of the PHC on work output (Work Output Score [WOS]), a single visual analog scale, global assessment that asks the respondent what percentage he/she was able to perform effectively, given their PHC; and d) hours of absenteeism due to the PHC. WIS measures decline in work performance due to the PHC—presenteeism—in a variety of situations and comprises ten questions scored with a five-point Likert scale, ranging from “always” to “never”. WIS, including cognitive, emotional, and behavioral aspects, is able to measure presenteeism among not only production-based workers but also knowledge-based workers. The raw WIS is converted to a 100-point scale, with higher scores indicating a higher level of presenteeism and a lower level of work performance. A previous study by Turpin *et al.*<sup>4</sup> identified two underlying factors of WIS, “completing work” and “avoiding distraction”. Furthermore they found factor loading varied from knowledge-based jobs to production-based

jobs. From these applicable and practical features of the SPS, it might be a useful measurement tool of presenteeism for Japanese workers. Therefore, the objective of the present study was to investigate the reliability and validity of the Japanese version of the SPS.

## Subjects and Methods

Approval for this study was granted by the ethics committees of Osaka University. This study was conducted in 2 surveys. In the first survey, the objective was to examine internal consistency and validity in a sample of female employees in enterprise A. A questionnaire was distributed in June 2006 to 520 female employees affiliated with a trade-union, and 501 responses were obtained (response rate, 96.3%). From these respondents, 359 eligible employees were selected for analysis. Inclusion criteria were presence of some health conditions and answers to all 10 items of the WIS. Numbers of subjects aged 20–29, 30–39, 40–49, and 50+ yr were 56 (15.6%), 90 (25.1%), 89 (24.8%) and 124 (34.5%), respectively. Employment statuses were full-time work 187 (52.1%) and part-time work 172 (47.9%). Full-time employees were comparatively younger than part-time employees. The percentages of full-time employees in each age group, 20–29, 30–39, 40–49, and 50+ yr, were 98.2%, 87.8%, 49.4% and 7.3%, respectively. The proportion of married subjects was 74.2%, and 68.9% of all subjects had children. In addition, 93.6% of part-time workers and 46.5% of full-time workers had children. Subjects held jobs as clerks (51.0%), production-based workers (39.4%), technicians (3.1%) and others (6.5%).

In the second survey, the objective was to examine the reproducibility of the WIS and the WOS in a sample of female employees in an occupational health sector of enterprise B. A test-retest survey was conducted with a 2-wk interval. A questionnaire was distributed in June 2006 to 50 female employees, and 33 responses were obtained (response rate, 66.0%). Inclusion criteria were presence of some health conditions at both time points. From these criteria, 25 employees for analyses of the WIS and 24 employees for the WOS were selected. Mean age ( $\pm$  SD) of the respondents ( $n=25$ ) was 40.6 ( $\pm$  9.8) yr and 80.0% of them ( $n=20$ ) were occupational health staff.

## Stanford presenteeism scale

Merck & Co., Inc., the owner of the SPS, permitted us to make a Japanese translation and study of SPS in June 2005. Japanese occupational specialists examined the contents of the SPS after 2 professional translators translated the SPS into Japanese. To apply to occupational health activities in Japan, disturbance of liver function, insomnia and hyperlipidemia were added to the list of health conditions. Back translation of the Japanese version of the SPS was performed, and the contents were

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**Table 1.** Factor analysis of work impairment score items ( $N=360$ )

No	Work Impairment Score Item	1.Completing Work	2.Avoiding Distraction
3	Were you able to focus on achieving work goals?	<b>0.80</b>	0.26
4	Did you feel energetic enough to complete your work?	<b>0.72</b>	0.41
7	Were you able to focus on finding a solution when unexpected problems arose in your work?	<b>0.69</b>	0.36
1	Were you able to finish hard tasks?	<b>0.68</b>	0.16
9	Were you able to work with other people on shared tasks?	<b>0.67</b>	0.19
5	Were the stresses of your job hard to handle?	0.38	<b>0.70</b>
6	Did you feel hopeless about finishing your work?	0.35	<b>0.68</b>
8	Did you need to take breaks from your work?	0.08	<b>0.53</b>
10	Were you tired because you lost sleep?	0.15	<b>0.50</b>
2	Did you find your attention wandering?	0.34	<b>0.46</b>
Cronbach's alpha		0.88	0.75
Cumulative Contribution		29.7	50.8

Principal factor method using varimax rotation. Factor loading (in bold) identified two underlying factors. Responses were scored on a five-point Likert-type scale.

confirmed by the original owner of the SPS in December 2006.

### Questionnaire

The questionnaire consisted of the SPS, the Medical Outcomes Study 36-Item Short Form Health Survey (SF-36)<sup>6,7)</sup>, the Job Content Questionnaire (JCQ [22 items])<sup>8)</sup>, questions on daily hassles (financial affairs, home-related problems and so on [10 items]) and job satisfaction (1 item).

### Statistical analysis

In the first survey, the descriptive statistics of the SPS were assessed: prevalence rate of health condition, mean ( $\pm$  SD) of WIS, WOS, and hours of absenteeism.

Cronbach's alpha was used to determine the internal consistency of WIS. The validity of the WIS, factor structure and relationships with 2 job types (knowledge-based workers and production-based workers) and 2 employment statuses (full-time workers and part-time workers) were examined by factor analysis (principal factor method, varimax rotation). Then comparisons among classification of age groups and employment statuses were examined. Pearson's correlation coefficients were estimated to show the relationships among WIS, SF-36 items, WOS, JCQ items, daily hassles, and job satisfaction.

In the second survey, the reproducibility of WIS was estimated by Spearman's correlation coefficient, the intraclass correlation coefficient (ICC), and the perfect and  $\pm 1$  concordance rates of repeated WIS. The perfect and  $\pm 5$  concordance rates of WOS were performed

because WOS is a 5-point interval scale. All statistical analyses were undertaken using SPSS 14.0J software.

### Results

In the first study, health conditions of high prevalence were back or neck disorder (73.6%), allergies (43.9%), stomach or bowel disorder (33.9%), migraines/chronic headaches (33.1%) and depression, anxiety or emotional disorder (30.0%). Means ( $\pm$  SD) of WIS, WOS and hours of sickness absenteeism were  $30.8 \pm 17.1$ ,  $80.2 \pm 13.1$  and  $5.2 \pm 9.9$  h, respectively.

Cronbach's alpha coefficient for WIS was 0.87 (0.88 in full-time workers and 0.85 in part-time workers). To assess factorial validity, factor analysis was used on WIS data. Two factors were identified: "completing work"; and "avoiding distraction" (Table 1). No significant trends were observed in factor loadings for job type (knowledge-based workers, production-based workers) and employment status (full-time, part-time). The cumulative contribution of these 2 factors was 50.8% (49.9% for full-time workers and 51.9% for part-time workers).

Compared by mean values of age groups and employment statuses, WIS was the lowest in the 50+ age group of full-time and part-time workers, and was highest in the 30–39 age group of part-time workers (Table 2).

WIS was significantly correlated with most variables (Table 3); *e.g.*, WIS correlated significantly to all 8 subscores of SF-36 (negative correlation), WOS (negative correlation), 2 JCQ subscores (demand [positive correlation] and support [negative correlation]), daily hassles (positive correlation), and job satisfaction

**Table 2.** Comparison of WIS for age and employment status

	All subjects		Full-time workers		Part-time workers	
	n (%)	Mean ± (SD)	n (%)	Mean ± (SD)	n (%)	Mean ± (SD)
Age (yr) <sup>a)</sup>	359(100.0)	30.8 ± 17.1	187 (52.1)	33.8 ± 17.1	172 (47.9)	27.4 ± 16.5
	F=5.3**		F=0.85		F=2.71 <sup>b)</sup>	
≤29	56 (15.6)	33.1 ± 17.8	55 (98.2)	33.1 ± 17.8	1 (1.8)	35
30–39	90 (25.1)	35.0 ± 17.1	79 (87.8)	34.5 ± 16.7	11 (12.2)	38.2 ± 20.4
40–49	89 (24.8)	31.4 ± 15.8	44 (49.4)	35.2 ± 16.7	45 (50.6)	27.8 ± 13.9
≥50	124 (34.5)	26.2 ± 17.0	9 (7.3)	25.6 ± 20.5	115 (92.7)	26.2 ± 16.8

\*\* $p < 0.01$ . a) Analysis of variance (ANOVA) by age groups. b) ANOVA among part-time workers was performed by excluding a subject under 30 yr.

**Table 3.** Pearson's Correlation Coefficients between WIS and SF-36 and work and home-related variables

SF-36 subscores	<i>r</i>	Variables	<i>r</i>
Physical functioning	-0.13*	WOS	-0.66**
Role-physical	-0.37**	Job Content Questionnaire	
Bodily pain	-0.32**	Demand	0.13*
Social functioning	-0.38**	Control	-0.03
General health perceptions	-0.38**	Support	-0.22**
Vitality	-0.46**	Daily hassles	0.29**
Role-emotional	-0.46**	Work satisfaction	-0.39**
Mental health	-0.43**		

\* $p < 0.05$ , \*\* $p < 0.01$ . SF-36, The Medical Outcomes Study 36-Item Short Form Health Survey; WIS, Work Impairment Score; WOS, Work Output Score.

(negative correlation).

On test-retest, Spearman's correlation coefficient ( $r$ ) and ICC of the WIS were 0.83 ( $p < 0.001$ ) and 0.86. The perfect concordance rate of the WIS was 47.1%, and  $\pm 1$  rate was 89.6%. Spearman's correlation coefficient ( $r$ ) and ICC of WOS were 0.79 ( $p < 0.001$ ) and 0.91. The perfect concordance rate of the WOS was 29.2%, and  $\pm 5$  rate was 58.3%.

## Discussion

It should be noted that our study population was not representative of the Japanese working population. The respondents of this study were only female and included part-time workers in enterprise A in the first survey, and most respondents were medical employees in enterprise B in the second survey. Furthermore, most clerks in the study subjects were categorized as knowledge-based workers, although they don't require high knowledge, and the numbers of technicians, who require high knowledge, were very few. Such sampling may explain why this study failed to identify a relationship between job type and WIS factors which the original SPS study

reported.

Internal consistency and reproducibility were examined to demonstrate the reliability. In the first survey, adequate internal consistency was indicated from Cronbach's alpha. In the second survey, test-retest indicated moderate reproducibility from correlation coefficients, ICC and concordance rates of WIS and WOS data. Because many PHC are chronic conditions, and respondents chose the condition in one month, the presenteeism influenced by PHC was presumed to be stable.

The validity was examined by factorial and construct validity. Among both full-time and part-time workers, two factor structures were extracted, as in the original SPS<sup>4)</sup>, by the factor analysis.

WIS was the lowest in the 50+ age of workers, and this result was compatible with the original SPS study<sup>4)</sup>. Among part-time workers in this study, WIS was the highest in the 30–39 age group in contrast with the result of females in the original SPS study. Among Japanese female workers, Seto<sup>9)</sup> showed that part-time workers reported more burdens about housework and picking up their children from pre-school than full-time workers did.

The family-to-work conflict had a negative relation with job performance<sup>10)</sup>. Most of the part-time workers in this study had children, and 30–39 yr old part-time workers' children might be infants. On conjecture, we consider that the conflict between work and home might have influenced their higher WIS.

In the relationships between WIS and self-rated quality of life, WIS was negatively correlated to all subscores of SF-36, indicating that as quality of life decreased, presenteeism increased. In particular, mental health categories correlated more strongly than physical health categories, the same as reported by the original SPS study<sup>4)</sup>. Furthermore, WOS, demand, support, daily hassles, and job satisfaction showed appropriate correlations with WIS: as output decreases, demand increases, support decreases, daily hassles increases, and job satisfaction decreases, presenteeism increases. These results reflect that as employees' personal and occupational burdens increased, presenteeism increased and agreed with the idea of presenteeism. Consequently, it indicates construct validity.

The reliability and validity of Japanese version of SPS were partially acknowledged among female workers. However various groups should be further investigated to validate the scale.

## References

- 1) Goetzel RZ, Long SR, Ozminkowski RJ, Hawkins K, Wang S and Lynch W: Health, absence, disability, and presenteeism cost estimates of certain physical and mental health conditions affecting U.S. employers. *J Occup Environ Med* 46, 398–412 (2004)
- 2) Hemp P: Presenteeism: at work—but out of it. *Harv Bus Rev* 82, 49–58, 155 (2004)
- 3) Yamashita M and Arakida M: Concept analysis of presenteeism and its possible applications in Japanese occupational health. *San Ei Shi* 48, 201–213 (2006) (in Japanese)
- 4) Turpin RS, Ozminkowski RJ, Sharda CE, Collins JJ, Berger ML, Billotti GM, Baase CM, Olson MJ and Nicholson S: Reliability and validity of the Stanford Presenteeism Scale. *J Occup Environ Med* 46, 1123–1133 (2004)
- 5) Koopman C, Pelletier KR, Murray JF, Sharda CE, Berger ML, Turpin RS, Hackleman P, Gibson P, Holmes DM and Bendel T: Stanford presenteeism scale: health status and employee productivity. *J Occup Environ Med* 44, 14–20 (2002)
- 6) Fukuhara S, Ware JE Jr., Kosinski M, Wada S and Gandek B: Psychometric and clinical tests of validity of the Japanese SF-36 Health Survey. *J Clin Epidemiol* 51, 1045–1053 (1998)
- 7) Fukuhara S, Bito S, Green J, Hsiao A and Kurokawa K: Translation, adaptation, and validation of the SF-36 Health Survey for use in Japan. *J Clin Epidemiol* 51, 1037–1044 (1998)
- 8) Kawakami N, Kobayashi F, Araki S, Haratani T and Furui H: Assessment of job stress dimensions based on the job demands- control model of employees of telecommunication and electric power companies in Japan: reliability and validity of the Japanese version of the Job Content Questionnaire. *Int J Behav Med* 2, 358–375 (1995)
- 9) Seto M, Morimoto K and Maruyama S: Work and family life of childrearing woman in Japan: comparison of non-regular employees with short working hours, non-regular employees with working hours, and regular employees. *J Occup Health* 48, 183–191 (2006)
- 10) Witt LA and Carlson D: The work-family interface and job performance: moderating effects of conscientiousness and perceived organizational support. *J Occup Health Psychol* 11, 343–357 (2006)