

Field Study

Loss of Productivity due to Depression among Korean Employees

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Abstracts: Loss of Productivity due to Depression among Korean Employees: Young-Mi LEE. Department of Nursing, Hanbuk University, Korea—

Objectives: The aim of this study was to investigate the difference in productivity between those who are depressed and those who are not. **Methods:** A cross-sectional study of depressive and non-depressive employees at a workplace was performed. Data was collected between April and June 2008 through self-reported questionnaires including the Stanford Presenteeism Scale. One thousand employees participated in this study. Inappropriate responses including missing data or non-relevant responses were excluded. Finally, data of 612 subjects was analyzed using the SPSS program. **Results:** The productivity of employees with depression was lower than that of employees without depression. The difference in productivity loss due to impaired presenteeism was significantly different between the two groups, but the productivity loss due to absenteeism was not. **Conclusions:** From the results of this study, we can deduce that depression among employees leads to productivity loss. Therefore, we must consider the management of depression in the workplace and improve the activities of occupational nurses and doctors during the mental health screening of employees.

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Key words: Absenteeism, Depression, Employee, Presenteeism

According to a national survey conducted in 2001, almost 9% of Koreans reported feeling depressed¹⁾. Furthermore, in another study done on the effects of employees' socio-emotional problems on stress, depression, and self-esteem, Choi and Park reported that 25% of the workers in their study had experienced depression²⁾. These results suggest that depression is

becoming a significant issue in Korea. Depression has a higher prevalence rate compared to other mental problems and is widely reported throughout the world³⁾. Depression not only affects the quality of life of the sufferer but also causes substantial functional limitations and social isolation⁴⁾.

Despite these impairments, many who suffer depressive episodes are currently active in the workforce⁵⁾. Depression among workers is strongly linked to a lack of productivity in the workplace and is the leading cause of this hidden loss of productivity among health problems⁶⁾. In fact, the impact of depression on job performance has been estimated to be greater than that of other chronic conditions such as arthritis, hypertension, back problems and diabetes⁷⁾. Yet, it appears that the issue is being neglected, probably because it is not easy to notice the loss of productivity by simple observation.

In some recent studies⁸⁾, the loss of productivity was estimated by looking at both absenteeism and impaired presenteeism. Impaired presenteeism is defined as the loss of productivity of a worker who is working but showing signs of poor health, or simply as the hidden loss of productivity⁶⁾. On the other hand, absenteeism is the opposite of that and is defined as missed work time and productivity loss caused by absence from work⁹⁾.

Currently, estimates for the United States have placed the cost of depression at US \$ 83.1 billion a year. Not surprisingly, absenteeism and impaired presenteeism accounted for the majority of these costs and were estimated to be around US \$ 51.5 billion¹⁰⁾. Productivity loss in Korea per person has been estimated to be around US \$ 680 a month¹¹⁾. In Korea the idea of productivity loss due to depression is not regarded as something significant and not many studies of it have been carried out. Therefore, the aim of this study was to investigate the difference in productivity between those who are depressed and those who are not.

In Korean culture, a lot of people are reluctant to talk about depression because they view it as something negative which may bring a lot of embarrassment or shame. Because of this, we were compelled to ask about depression in relation to other health problems.

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The reason we chose not to ask about clinical diagnosis is because most people who are clinically depressed might not have admitted it for their own personal reasons. Depression, in this study, means not only the medical diagnosis of it, but also feelings associated with it.

Subjects and Methods

Study subjects

One thousand employees who are currently enrolled in the Group Occupational Health Service provided by the Korean Industrial Health Association participated in this study. Data for the study was collected between April 12th 2008 and June 29th 2008 through self-reported questionnaires. Informed consent and ethical rights were provided to all participants before the start of the study. Trained occupational nurses were informed about the study and were asked to distribute the questionnaires to employees at the workplace. The self-reported questionnaires were placed in sealed envelopes, which were collected and examined by the researchers. Inappropriate responses including missing data or non relevant responses were excluded. In total, data provided by 612 eligible participants were analyzed in this study.

Assessing health risk behavior, perception, social support and stress of subjects

The questions regarding health risk behavior required that participants checked the relevant smoking and drinking box options on the questionnaire. The questions on perception (i.e life satisfaction, current health conditions, job satisfaction) were rated on a 5-point scale where 1 meant very satisfied and 5 meant very dissatisfied. The questions regarding social support, including both supervisor and co-worker support, were taken from the Job Content Questionnaire and the questions about family support and friends' support were obtained from Lim¹³. The questionnaire of daily hassles reported by Yamashita¹² was used to assess the stress levels of the employees. This questionnaire consists of 12 questions including life-related stress questions and job-related stress questions. Internal reliability was compared with the previous study of Yamashita¹² in which a Cronbach's α was 0.76. In the present study, our value of Cronbach's α was 0.79. The questions on stress and social support were rated on a 4-point scale where 1 indicates minimal support and 4 indicates higher support. Reliability of social support had a Cronbach's α of 0.75 in the present study.

Assessing health problems and loss of productivity

We used the SPS (Stanford Presenteeism Scale)-13 version for assessing health problems and loss of productivity. The health problems of SPS-13 include

depression among other health problems. Participants checked the depression box if they were diagnosed with depression or had depressive feelings. Participants were then divided into two groups, the depressive group and the non-depressive group.

The SPS was used to assess the productivity loss for both impaired presenteeism and absenteeism in the last 4 wk. Impaired presenteeism was calculated from the responses given to 10 SPS items. Each item was scored using a 5-point scale where 1 indicated always and 5 indicated never. Individual responses about impaired presenteeism were summed and normalized to a percentage by the formula of: $(\text{total score}-10)*40/100$. The validity and reliability of the SPS has been reported previously^{14,15}. The reliability in the present study had a Cronbach's α of 0.74. Absenteeism at work due to health problems was investigated by the following question: Because of your primary health condition, how many work hours did you miss in the past 4 wk? The measurement of absenteeism in the original SPS-13 was done via a single question, but in the present study, we added more descriptive space to be able to collect exact data including the number of days absent, the number of days on vacation, the number of times lateness was reported and the number of times subjects had to leave work early due to depression.

Data analysis

The employees were divided into two groups, consisting of those with depression and those without depression. Life satisfaction, current health conditions, and job satisfaction were grouped according to their scores: satisfaction group ≤ 2 , moderate group = 3, and dissatisfaction group ≥ 4 . General characteristics, health risk behavior and perception among the two groups were determined as percentages and numbers (Table 1). Homogeneity of the groups was assessed with the χ^2 -test. The differences in social support and stress between the two groups were analyzed with the *t*-test, and the difference in productivity was analyzed using two-way ANOVA. To check for depression and relative variables affecting others, age and gender were adjusted. Social support and stress were divided into low and high groups based on the means of each variable (Table 2).

Results

Demographic characteristics, health risk behavior and perception of subjects

Out of the 612 participants, 115 participants reported they felt depressive. The average age of the employees with depression was 30.9 yr. The average age of the employees without depression was 36.0 yr. Females having depressive feelings were more numerous than males (Table 1).

Table 1. Demographic characteristics, health risk behavior and perception of subjects

		Total		Depressive		Non-depressive		χ^2 test
		N	%	N	%	N	%	
Demographics								
Gender	Male	364	100.0	50	13.7	314	86.3	15.039**
	Female	248	100.0	65	26.2	183	73.8	
Age	<35	302	100.0	80	26.5	222	73.5	21.399**
	≥35	300	100.0	35	11.7	265	88.3	
Health risk behavior								
Drinking	Drinker	424	100.0	80	18.9	344	81.1	0.005
	Non-drinker	188	100.0	35	18.6	153	81.4	
Smoking	Smoker	211	100.0	32	15.2	179	84.8	2.773
	Non-smoker	401	100.0	83	20.7	318	79.3	
Perception								
Life satisfaction	Satisfaction	199	100.0	17	8.5	182	91.5	35.426**
	Moderate	337	100.0	68	20.2	269	79.8	
	Dissatisfaction	76	100.0	30	39.5	46	60.5	
Perception of their current health	Good	238	100.0	30	12.6	208	87.4	14.599**
	Moderate	313	100.0	65	20.8	248	79.2	
	Poor	61	100.0	20	32.8	41	67.2	
Job satisfaction	Satisfaction	148	100.0	37	25.0	111	75.0	7.013*
	Moderate	285	100.0	42	14.7	243	85.3	
	Dissatisfaction	179	100.0	36	20.1	143	79.9	
Total		612	100.0	115	18.8	497	81.2	

Table 2. Differences of social support and stress between depressive workers and non-depressive workers

	Depressive Mean ± SD	Non-depressive Mean ± SD	t-test
Social support			
Supervisor support	10.4 ± 2.3	10.7 ± 2.0	1.773
Co-worker support	10.2 ± 2.6	10.8 ± 2.7	1.989*
Family support	10.2 ± 3.0	10.7 ± 2.9	1.700
Friend support	9.3 ± 2.5	9.3 ± 2.6	0.023
Stress			
Life stress	12.4 ± 2.3	11.5 ± 2.5	3.427**
Job stress	13.4 ± 2.7	12.4 ± 2.5	3.980**

* $p < 0.05$, ** $p < 0.01$.*Social support and stress differences between depressive and non-depressive employees*

Social support among the workers having depressive feelings was generally lower than among those without them. Only co-workers' support was significantly different among the two groups ($t=1.989$, $p=0.047$). Life stress ($t=3.427$, $p=0.001$) and job stress ($t=3.980$, $p=0.000$) of the depressive workers were significantly higher than those of workers without depression (Table 2).

Productivity loss in relation to health risk behavior, perception, social support and stress

Tables 3 and 4 show productivity loss in relation to health risk behavior, perception, social support and stress between the employees with and without depression and the results of two-way ANOVA.

Impaired presenteeism among workers having depressive feelings was significantly higher than that among workers who didn't having depressive feelings for all the variables, but there was no interaction between depressive episodes and between variables in impaired

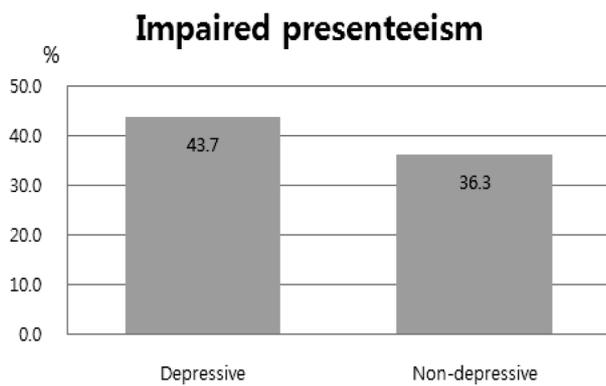


Fig. 1. Impaired presenteeism among employees showing signs of depression versus those showing no signs of depression.

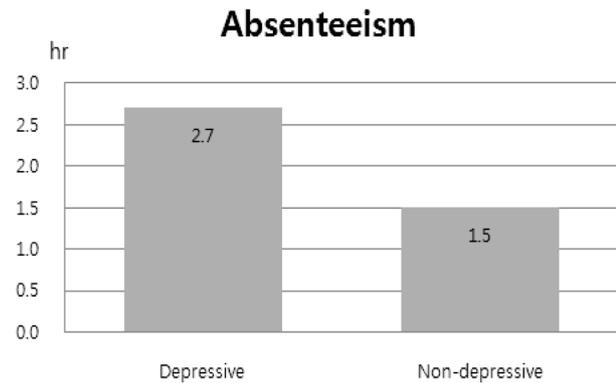


Fig. 2. Absenteeism among employees showing signs of depression versus those showing no signs of depression.

Table 3. Impaired presenteeism and absenteeism according to health risk behavior and perception among Korean workers with and without depression

Variables		Impaired presenteeism			Absenteeism		
		Depressive Mean \pm SD	Non-depressive Mean \pm SD	<i>p</i> -value	Depressive Mean \pm SD	Non-depressive Mean \pm SD	<i>p</i> -value
Health risk behavior							
Drinking	Drinker	43.9 \pm 14.7	34.6 \pm 16.4	a<0.01, b>0.05	1.9 \pm 5.0	1.4 \pm 5.6	a>0.05, b>0.05
	Non-drinker	43.1 \pm 13.0	40.0 \pm 16.1	a*b>0.05	3.9 \pm 10.6	1.9 \pm 10.2	a*b>0.05
Smoking	Smoker	45.0 \pm 13.9	36.5 \pm 16.3	a<0.01, b>0.05	2.9 \pm 6.1	2.4 \pm 10.8	a>0.05, b>0.05
	Non-smoker	43.2 \pm 14.3	36.0 \pm 16.6	a*b>0.05	2.4 \pm 7.5	1.0 \pm 3.8	a*b>0.05
Perception							
Life satisfaction	Satisfaction	40.8 \pm 13.9	32.8 \pm 16.6	a<0.01, b<0.01	4.3 \pm 11.0	1.2 \pm 4.8	a>0.05, b>0.05
	Moderate	42.6 \pm 15.0	37.3 \pm 16.0	a*b>0.05	2.5 \pm 7.1	1.3 \pm 6.1	a*b>0.05
	Dissatisfaction	47.6 \pm 11.7	43.9 \pm 15.6		1.6 \pm 3.8	4.4 \pm 16.0	
Perception of health	Good	38.3 \pm 16.1	36.2 \pm 15.8	a<0.01, b<0.05	2.3 \pm 5.2	1.5 \pm 7.2	a>0.05, b>0.05
	Moderate	44.3 \pm 13.5	35.7 \pm 16.7	a*b>0.05	2.7 \pm 8.6	1.3 \pm 5.7	a*b>0.05
	Poor	49.8 \pm 10.4	40.0 \pm 18.1		2.4 \pm 4.3	2.9 \pm 3.5	
Job satisfaction	Satisfaction	41.2 \pm 16.1	34.3 \pm 15.6	a<0.01, b>0.05	2.6 \pm 11.6	2.5 \pm 7.3	a>0.05, b>0.05
	Moderate	45.8 \pm 15.2	35.0 \pm 16.9	a*b>0.05	1.4 \pm 6.2	1.7 \pm 6.7	a*b>0.05
	Dissatisfaction	43.7 \pm 10.2	39.9 \pm 15.9		0.8 \pm 2.8	1.0 \pm 3.4	

The mean and standard deviation (SD) were obtained by two-way ANOVA adjusted for gender and age. a, comparison of the statistical difference between depressive workers and non-depressive workers; b, comparison of the statistical difference among sub-variables; a*b, the interaction effect between a depressive episode and the variables.

presenteeism. However, absenteeism was not significantly different the groups for any of the variables.

Loss of productivity between depressive employees and non-depressive employees

The mean number of hours of absence for employees experiencing depressive feelings was 2.7 h, and the mean percentage of those with impaired presenteeism was

43.7%. The employees who were absent due to depression accounted for 13.8%, and the employees who could not work due to depression were 96.7% of the depressive employees.

To better illustrate the differences in total productivity loss between the two groups, graphs were drawn in Fig. 1 and Fig. 2. The productivity loss of employees with depression was higher. The difference in productivity

Table 4. Impaired presenteeism and absenteeism according to social support and stress among Korean workers with and without depression

Variables	Impaired presenteeism				Absenteeism		
	Depressive	Non-depressive	<i>p</i> -value	Depressive	Non-depressive	<i>p</i> -value	
	Mean ± SD	Mean ± SD		Mean ± SD	Mean ± SD		
Social support							
Supervisor	Low	46.2 ± 11.2	37.3 ± 16.4	a<0.01, b>0.05	2.5 ± 5.5	2.5 ± 10.9	a>0.05, b>0.05
	High	41.7 ± 16.0	35.6 ± 16.5	a*b>0.05	2.6 ± 8.3	1.0 ± 3.8	a*b>0.05
Co-worker	Low	44.9 ± 14.0	37.7 ± 16.2	a<0.01, b>0.05	2.3 ± 6.8	1.3 ± 5.6	a>0.05, b>0.05
	High	42.1 ± 14.4	35.1 ± 16.6	a*b>0.05	2.8 ± 7.7	1.7 ± 8.3	a*b>0.05
Family	Low	44.9 ± 13.6	38.1 ± 15.8	a<0.01, b>0.05	2.4 ± 6.6	1.9 ± 8.2	a>0.05, b>0.05
	High	42.1 ± 14.9	34.5 ± 16.9	a*b>0.05	2.7 ± 7.8	1.2 ± 6.2	a*b>0.05
Friend	Low	45.3 ± 14.2	35.8 ± 17.3	a<0.01, b>0.05	2.4 ± 6.7	1.5 ± 7.3	a>0.05, b>0.05
	High	41.7 ± 14.0	36.6 ± 15.5	a*b>0.05	2.7 ± 7.8	1.6 ± 7.2	a*b>0.05
Stress							
Life stress	Low	41.0 ± 15.3	34.1 ± 17.3	a<0.01, b<0.05	0.5 ± 1.9	0.9 ± 3.9	a>0.05, b<0.05
	High	44.7 ± 13.7	37.9 ± 15.6	a*b>0.05	3.3 ± 8.2	2.0 ± 8.9	a*b>0.05
Job stress	Low	39.7 ± 15.5	33.5 ± 17.3	a<0.01, b<0.01	1.3 ± 4.1	0.9 ± 3.9	a>0.05, b<0.05
	High	45.5 ± 13.2	38.9 ± 15.2	a*b>0.05	3.1 ± 8.1	2.2 ± 9.4	a*b>0.05

The mean and standard deviation (SD) were obtained by two-way ANOVA adjusted for gender and age. a, comparison of the statistical difference between depressive workers and non-depressive workers; b, comparison of the statistical difference among sub-variables; a*b, the interaction effect between a depressive episode and the variables.

loss due to impaired presenteeism was significantly different between the two groups ($t=4.412$, $p=0.000$), but productivity loss due to absenteeism was not ($t=1.375$, $p=0.170$). Thus, the results indicate that impaired presenteeism leads to the loss of productivity.

Discussion

Depression is recognized as a problem throughout the world and can also be a cause of loss of productivity⁶. Depression also affects employee turnover or causes impaired presenteeism and absenteeism⁹. It is the 10th most serious health problem in relation to loss of productivity in the U.S⁸. Similar results have been reported for Korea^{11, 16}. Depression has a stronger influence on impaired presenteeism unlike other health problems because it is often not outwardly apparent.

Previous studies⁹ have illustrated that depressed employee show higher impaired presenteeism than employees who do not suffer from depression. The current research has shown that depressed employees have significantly higher rates of impaired presenteeism than employees who are not depressed (Tables 3 and 4). As shown in Fig.1, depressed employees were approximately 7.4% less productive than non-depressed employees due to the effect of impaired presenteeism. This means that an employee with tendencies towards depression resulted in a US\$ 135 economic loss per month in 2008 when the standard wage of a Korean employee was calculated as US\$ 1,828 (currency conversion US

\$1: 1246.70 won on July 27, 2009)¹⁷. However, loss due to absenteeism as shown in both Tables 3, 4 and Fig. 1 did not show a marked difference between the two groups. Depression in employees is not usually apparent, but it is evident that depression has a strong relationship with loss of productivity. In this research, absenteeism did not show significant differences in any of the variables between the two groups, however, impaired presenteeism showed a significant difference in all of the variables between depressed employees and non-depressed employees. This result was same as that obtained in a previous study¹⁸. Some previous studies have argued that there are no significant differences in absenteeism or presenteeism between drinkers and non-drinkers or smokers and non-smokers^{19, 20}, while other studies have concluded the opposite¹⁸. The results of the present study show drinking and smoking had significant differences in relation to impaired presenteeism between the two groups. This difference is due in part to the fact that our study targeted employees who had experienced a particular health problem, notably depression, which correlates with poor health habits such as drinking¹⁸. A study on employees working in emotional fields including financial services¹⁸ found that smoking had an influence on presenteeism. This may indicate that depressed employees require a health plan different from that of employees who are not depressed. The plan should include coverage for mental health counseling and activities to improve health and reduce risky behavior.

Studies have also concluded that social support groups can significantly aid improvements in mental and physical health²¹⁾ and therefore productivity. It would be beneficial for employers to encourage their employees to seek help from social support groups.²¹⁾

As employees fell deeper into depression, their loss of productivity increased to the point where economic loss in the job increased as well⁵⁾. The impaired presenteeism of depressed employees has a greater negative effect on time limitation, mental limitation and output limitation than on physical limitation⁶⁾. In other words, there is more loss due to invisible limitations that include time, mental and output limitations.

Ritto²³⁾ maintained that mental health should be improved through early intervention before employee depression becomes severe depression or results in anxiety and productivity loss. The ability to recognize depression so that treatment can be given must be improved for performance improvement. Based on the results of this study as well as those of others in the literature, it would be wise to screen employees' depression early and to follow a custom mental health plan based on individuals' particular state of depression. Treatment can be more effective in the early stages of depression if it can be detected.

As mentioned above, we relied on people checking boxes to indicate if they had experienced feelings of depression and didn't use other standardized depression questionnaires because we wanted to focus on actual subjective feelings. This may be a limitation of this study. Future studies can investigate depression and absenteeism via other standardized depression questionnaires and should include gender studies because gender and depression is known to be associated.

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