

Workplace Violence Experienced by Substitute (Daeri) Drivers and Its Relationship to Depression in Korea

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Workplace violence is related to various health effects including mental illness such as anxiety or depression. In this study, the relationship between the experience of workplace violence and depression in substitute drivers in Korea, namely, daeri drivers, was investigated. To assess workplace violence, questions regarding types and frequency of the experience of violence over the past year were asked to the daeri drivers. In order to assess the risk of depression, the Center for Epidemiological Studies Depression Scale was used. Odds ratios with 95% confidence intervals of depression were estimated using multiple logistic regression analysis. All of the daeri drivers had experienced instance of verbal violence while driving and 66 of the drivers (34.1%) had been in such a situation more than once in the past quarter of a year. Sixty-eight daeri drivers (42.2%) had experienced certain type of physical violence over the past year. Compared to daeri drivers who had experienced workplace verbal violence less than 4 times and who had not experienced workplace physical violence over the past year, higher odds ratio was observed in daeri drivers who had experienced workplace verbal violence or physical violence, more than 4 times and more than one time respectively, after adjustment. Experience of verbal or physical type of workplace violence over the past year increased the risk of depression in the daeri drivers. Because violence against drivers can compromise the safety of the driver, the customer, and all the passengers, it is imperative that the safety and health of daeri drivers be highlighted.

Keywords: Workplace Violence; Depression; Automobile Driving; Accidents; Prevention

INTRODUCTION

One of the emerging jobs in Korea is that of a “daeri” driver. In Korean, “daeri” means substitute or proxy. Daeri drivers provide driving services to people who, for various reasons, require a driver to drive their cars. It is well known that some Koreans are heavy alcohol consumers (1), and drinking is almost an integral part of business and social life in Korea. In 2009, in Korea, driving under the influence of alcohol (DUI) resulted in the injury of 104 in every 100,000 people and in the death of 2 in every 100,000 people (2). To curb the social costs incurred due to DUI, in Korea, many efforts are being made to discourage it, for example, policemen have started conducting random inspections on drivers. The government’s crackdown on drinking and driving involves different penalty levels according to the alcohol concentration in the person’s blood (3): an alcohol concentration below 0.2% entails a fine of USD 5,000 and a concentration above 0.2% entails a fine of USD 10,000 along with the revocation of the driver’s license. The increasing rate of alcohol consumption and the sobriety tests being conducted on the road have given rise to the need for daeri drivers in Korea. For exam-

ple, if a salesperson is drunk and wants to return home in his car, in order to avoid DUI, he would have to hire a daeri driver to drive his car instead of driving it himself. Hence, daeri drivers usually work at night, drive other people’s cars to the required destination and, most often have to do so while dealing with a drunk customer. A qualitative study reported that daeri drivers suffered from low income, were looked down upon socially, worked in an unsafe environment, were treated unfairly by the call service office, and had to engage in emotional labor in relation to drunk customers (4).

Recently, workplace violence has become an important issue in Korea. News reports on service workers who have experienced workplace violence are omnipresent. According to an article wherein the experience of workplace violence experienced by 30,000 workers in Korea was analyzed, almost 6% of all the workers had experienced workplace violence and among the service workers, 10% had experienced workplace violence (5). Workplace violence is also a severe problem for health care workers. A study on nurses revealed that 71% of the nurses had experienced workplace violence during the past year (6). The prevalence of physical violence and sexual harassment were

also high, with 22% of the nurses having experienced physical violence and 20% of them having experienced sexual harassment (6). Jobs that involve dealing with customers involve the risk of workplace violence. However, although daeri drivers are prone to experiencing workplace violence, there is a dearth of studies elucidating the risk of workplace violence faced by daeri drivers.

Workplace violence is related to various health effects including mental illness such as anxiety and depression (7). In the association between workplace violence and mental illness, certain job characteristics are known to aggravate the risks of developing such conditions (8). Furthermore, mental illness and job stress are related to occupational injuries and accidents (9). In that sense, workplace violence and its relationship to mental illness in the case of daeri drivers can be a very important social problem because the injuries of daeri drivers are closely linked with car accidents. However, no studies have been conducted on mental illness in daeri drivers. Therefore, in this study, the relationship between the experience of workplace violence and depression in daeri drivers was investigated by conducting the first ever survey on daeri drivers' mental health.

MATERIALS AND METHODS

Data source and study population

The survey was conducted in September 2014, using a structured, self-administered questionnaire. Since daeri drivers do not have a fixed workplace, the survey was conducted on a downtown road, namely Sinnonhyeon station, for 10 days, from 2:00 am to 4:30 am. The road on which the survey was conducted is close to the center of Seoul, where the demand for daeri drivers is high. More than 1,000 daeri drivers pass through that road, because it connects them to the other parts of the city. A total of 166 daeri drivers participated in the survey; however, the data of 5 participants who failed to complete all the questions on the questionnaires were excluded. Hence, the data of 161 participants were used for the final analysis.

Questionnaire and study variables

The questionnaire used in the study was developed based on the results of face-to-face interviews with daeri drivers. The questions representing demographic and occupational characteristics pertained to age, marital status, educational level, household income, length of time worked at the job, daily working hours, and number of working days per month. To assess workplace violence, questions regarding the type of violence (verbal or physical) experienced and the frequency of violent experiences over the past year were asked. In each types of violence, relatively minor events such as simple arguments, disturbing behaviors, or unreasonable requests from customers were not included but only verbal abuse such as swearing or threatening

and direct physical assault was included. In the case of daily working hours, standard working hours presented in the Labor Standards Act which is 8 hr per day (40 hr per week) was applied and working days per month were categorized as five-day and six-day work week. In order to assess the risk of depression in the daeri drivers, the Center for Epidemiological Studies Depression Scale (CES-D) was used. The CES-D is a tool that is widely used in many epidemiological studies to screen for depression (10), and since the CES-D comprises simple questions and evaluates the severity of depression based on the duration of each symptom, it is known to be suitable for community-based epidemiological studies (11). At first, when the tool was developed, a cut-off score of 16 was proposed, to differentiate depressed people from non-depressed ones (12); however, in the CES-D, the cut-off score for the screening of depression varies according to the subjects and the purpose of each study (13). In addition, the respondents' reports regarding the severity and frequency of depressive symptoms differ according to their socioeconomic status (SES) and environmental factors (14). At the same time, differences in culture and language are also an important factor influencing the reporting of depressive symptoms (15). Furthermore, since study subjects were actively engaged in occupation activity, they were not likely suffering from clinical depression. As a result, for this research, which was a community-based study involving the screening of depression in Korea, a cut-off score of 21 was proposed (16). Based on this cut-off score, the daeri drivers who participated in the study were divided into two groups.

Statistical analysis

The demographic and occupational characteristics of the drivers were evaluated and the differences in the prevalence of depression as evaluated by the CES-D according to these independent variables were assessed by a chi-square test. In the case of the independent variables representing workplace violence, odds ratio (OR) with 95% confidence intervals (95% CI) for depression were estimated using multiple logistic regression analysis. Model I was adjusted for demographic characteristics such as age, marital status, educational level, and household income. Model II was additionally adjusted for occupational characteristics such as length of time worked at the job, daily working hours, and number of working days per month. The risks were expressed as ORs in relation to reference groups of daeri drivers who had experienced verbal violence during work less than once in the past quarter and those who had never experienced physical violence at the workplace over the past year. All the analyses were 2-tailed and *P* values less than 0.05 were regarded as statistically significant. All the analyses were performed using SAS software, version 9.3 (SAS Institute, Cary, NC, USA).

Ethics statement

All of the participants provided written informed consent for their voluntary participation in the study. The identifying information of all of the participants was deleted before the analyses. This survey was approved by the institutional review board of the Yonsei University Graduate School of Public Health (IRB number: 2-1040939-AB-N-01-2015-303).

RESULTS

Demographic and occupational characteristics of the daeri drivers

The mean age of the daeri drivers was 53 yr and all of them were male. Among the 161 drivers, 91 of them (56.5%) were in their 50s, which is the age at which people in Korea typically retire from their jobs. A majority of the daeri drivers (108 daeri driv-

Table 1. Prevalence of depression, by demographic and occupational characteristics of substitute (daeri) drivers

Characteristics	No.(%) drivers		P value
	Normal	Depression*	
Age (yr)			0.343
30-39	4 (80.0)	1 (20.0)	
40-49	42 (80.8)	10 (19.2)	
50-59	75 (82.4)	16 (17.6)	
60-69	13 (100.0)	0 (0.0)	
Marital status			0.700
Married and living together	89 (82.4)	19 (17.6)	
Never married	21 (80.8)	5 (19.2)	
Married but divorced or widowed	24 (88.9)	3 (11.1)	
Educational level			0.056
≤ High school graduate	52 (92.9)	4 (7.1)	
Junior college graduate	29 (78.4)	8 (21.6)	
College graduate	50 (78.1)	14 (21.9)	
Graduate school or more	2 (66.7)	1 (33.3)	
Household income			0.270
≤ 1.5 million won	27 (75.0)	9 (25.0)	
≤ 2.5 million won	39 (83.0)	8 (17.0)	
> 2.5 million won	68 (87.2)	10 (12.8)	
Length of time worked at the job (yr)			0.896
< 1	26 (81.3)	6 (18.8)	
< 3	34 (81.0)	8 (19.1)	
< 6	33 (86.8)	5 (13.2)	
≥ 6	37 (82.2)	8 (17.8)	
Daily working hours (hr)			0.576
≤ 8	78 (85.7)	13 (14.3)	
≤ 10	38 (79.2)	10 (20.8)	
> 10	16 (80.0)	4 (20.0)	
Working days per month (day)			0.543
≤ 22	35 (81.4)	8 (18.6)	
≤ 26	66 (81.5)	15 (18.5)	
> 26	33 (89.2)	4 (10.8)	
Verbal violence, over the past year			0.034
≤ 4 times a year	84 (88.4)	11 (11.6)	
> 4 times a year	50 (75.8)	16 (24.2)	
Physical violence, over the past year			0.017
Never experienced	83 (89.3)	10 (10.8)	
Experienced	51 (75.0)	17 (25.0)	

*Center for Epidemiological Studies Depression Scale (CES-D) ≥ 21.

ers, 67.1%) were married or living with a partner. The educational levels of the daeri drivers were diverse, ranging from below high school to college. In the case of household income, 48.4% of the drivers made more than 2.5 million won per month (approximately USD 2,500/month), but 22.4% of the drivers made less than 1.5 million won per month (approximately USD 1,500/month). There was no difference in the prevalence of depression according to the demographic characteristics of the daeri drivers.

The duration for which the participants had worked as daeri drivers varied from less than a year to more than 6 yr, but a majority of the drivers (n = 112, 71.3%) had worked for less than 6 yr. Ninety-one drivers (57.2%) worked for 8 hr or less per day, but the remainder of them worked for more than 8 hr per day. In the case of number of working days per month, 43 of the daeri drivers (26.7%) worked for less than 5 days per week. The analysis revealed that there was no difference in the prevalence of depression on the basis of occupational characteristics. With regard to workplace violence experienced over the past year, all of the daeri drivers had experienced verbal violence while driving and 66 of them (34.1%) had experienced verbal violence more than once in the past quarter. In addition to verbal violence, 68 of the daeri drivers (42.2%) had experienced certain types of physical violence while at work. Depression was more prevalent in daeri drivers who had experienced verbal violence more than once in the past quarter (24.2%, $P = 0.034$), and in those who had experienced even 1 instance of physical violence over the past year (25.0%, $P = 0.017$) (Table 1).

Odds ratio of depression according to experience of workplace violence

Table 2 shows the effects of verbal and physical violence experienced over the past year on the depression of the daeri drivers. The results of crude analysis revealed higher ORs for the drivers who had experienced verbal violence more than once in the past quarter (2.44, 95% CI: 1.05-5.68) and in those who had experienced even 1 instance of physical violence in the past year (2.77, 95% CI: 1.18-6.51). In Model I, higher ORs were also ob-

Table 2. Effect of verbal and physical violence against substitute (daeri) on their depression

Violence	Crude	Model I*	Model II†
Verbal violence, over the past year			
≤ 4 times a year	1.00	1.00	1.00
> 4 times a year	2.44	2.67	2.84
	(1.05-5.68)	(1.08-6.61)	(1.11-7.30)
Physical violence, over the past year			
Never experienced	1.00	1.00	1.00
Experienced	2.77	3.04	3.26
	(1.18-6.51)	(1.22-7.60)	(1.27-8.36)

*Model I: Adjusted for age, marriage, educational level, and household income; †Model II: Adjusted for age, marriage, education level, household income, work tenure, daily working hours, and monthly working days.

served in both daeri driver groups who had experienced workplace violence (2.67 for verbal violence with a 95% CI of 1.08-6.61, and 3.04 for physical violence with a 95% CI of 1.22-7.60) and in Model II, even higher ORs were observed (2.84 for verbal violence with a 95% CI of 1.11-7.30, and 3.26 for physical violence with a 95% CI of 1.27-8.36).

DISCUSSION

In this study, all the daeri drivers had experienced verbal violence and about 42% of them had experienced physical violence over the past year. Furthermore, the odds of developing depression were almost twice as high for workers who had experienced even 1 instance of physical violence in the past year and for workers who had experienced verbal violence more than 4 times a year. These significant relationships were not attenuated after adjustment for SES. To our best knowledge, this is the first study that investigates workplace violence experienced by daeri drivers and its relationship to the drivers' depression.

There are many types of workplace violence experienced by daeri drivers and the drivers' firsthand experiences obtained through interviews were also recorded in the current study. The following are excerpts from our interviews with the daeri drivers. One driver stated, *"Once, I drove a car owned by an interior designer. The drunken designer fell asleep, and a little later, he suddenly got up and threw a hammer at me for no reason at all. Maybe he lost control, or didn't know what he was doing because he was drunk"*. Another driver stated, *"After I had an argument with a customer, he suddenly took out a scissor and threatened me and then even tried to cut his abdomen to threaten me. I had to stop him from running away from the scene and called the police"*. Yet another stated, *"Some customers request us to speed and even ignore traffic rules, telling us to break signals and centerline rules"*. A fourth driver stated, *"After having experienced workplace violence, I can no longer concentrate on driving as I am constantly worried"*. Thus, our qualitative interviews revealed that daeri drivers are prone to various dangerous situations due to workplace violence. Daeri driving involves being confined in the closed space of the car with the customer, involves the possibility of accidents, and also involves dealing with drunken customers. All these possibilities are serious stress factors for daeri drivers.

The daeri drivers in this study experienced workplace violence with higher frequency compared to workers in other professions. Although the frequency of workplace violence varies according to occupation, preceding studies concerning workplace violence in Korea suggest that the overall prevalence of workplace violence is less than 5% (5). Workplace violence is known to be associated with sick leave, burnout, a poor job retention rate, and depression (17,18). The prevalence of depression in the general elderly Korean population ranges from 4.6%

to 7.5% (19), and other studies investigating the prevalence of depression according to occupation also reveal that the current prevalence of depression in the case of people in most occupations is 10% or less (20). The high frequency and intensity of workplace violence experienced by daeri drivers might have resulted in the high prevalence of depression, namely, 16.8%. As we pointed out earlier, based on the qualitative interviews with the daeri drivers, such a high prevalence of depression among them might be due to the stressful workplace environment due to factors like the high susceptibility to violence. This is to say, according to the results of our interview, daeri drivers chose their career because they got fired from original job or they failed in business. Hence, majority of daeri drivers suffer from lack of social support or economic difficulties. Such conditions might have also affected on high prevalence of depression in daeri drivers. In addition, presence of huge difference in perceived socioeconomic status between daeri drivers and drunken customers might have aggravated depression in daeri drivers (21).

If customers wish to hire a daeri driver, they make a call to a service center for daeri driving. The service center uploads details (i.e., where the customer wants to go and where the customer is parked) regarding the customer's request, to a web program. The web program sends the customer's request to all the daeri drivers who are under contract with the company. All the contracted daeri drivers receive the information via a smartphone application that sounds an alert every time there is a potential customer. The first driver who contacts the customer gets him/her and, consequently, the money. Hence, even though there are numerous daeri drivers at the same place at the same time, they are not really co-workers, but rather, competitors. Such a harsh and competitive working environment can make daeri drivers feel lonely, and loneliness itself is an important predecessor of depression.

Since avoiding DUI is the main reason that people hire daeri drivers, they (i.e., the drivers) usually work from evening until the early hours of the morning. Night jobs are known to be related to various neuropsychic problems including anxiety and depression (22). Thus, the fact that daeri drivers have to work at night may be one of the important causes of the high prevalence of depression among daeri drivers.

Traditionally, marriage is known to have a favorable effect on depression due to its functions of fulfilling unmet psychological needs or helping an individual cope with stressful events (23, 24). On the contrary, lower SES is known to be related to a higher prevalence of depression (25). The monthly household income of over 50% of the daeri drivers in this study was 2.5 million won or less (\leq USD 2,500/month). Further, the results of the study showed a higher prevalence of depression among the married drivers. According to our qualitative interview, many of the study subjects chose to become daeri drivers because they had lost their original jobs. We believe that economic

hardships due to low household income and the psychological burden of supporting a family might have led to the higher frequency of depression among the married daeri drivers.

The results also revealed that there was a higher prevalence of depression among drivers who had completed junior college and who had graduated from college than among drivers who were high school graduates. Although a higher educational level is traditionally believed to have a protective effect on depression, the effect of educational level on depression is still inconclusive (26). Daeri drivers choose their job due to stressful events such as layoffs and these occupational events are known to have adverse effects on psychological health and self-esteem (27). It is possible that in the case of highly educated drivers, choosing to work as a daeri driver as a second career after having being laid off results in a greater sense of loss, which may have resulted in a higher prevalence of depression among this group of drivers. Meanwhile, depression was more common in the group of daeri drivers who had been working the job for a short period of time. The authors believe that this finding is also related to the difficulty involved in coping with a new job as a daeri driver. According to the results of our qualitative study, due to the unique characteristics of the job, daeri drivers work alone and there is no peer group to teach them how to perform the job better. Isolation from people due to the necessity of working at night, the absence of a peer group at work, and the hardships involved in coping with these stressful situations may have collectively influenced the results of this study.

Currently, in Korea, violence against people who are driving is a punishable offense following the passage of the Additional Punishment Law on Specific Crimes and the penalty levels exceed those in the case of common assault or threat crimes, since violence against drivers is directly related to citizens' safety (2). Daeri drivers are not different from other drivers and their safety and mental health is directly related to traffic safety and to the safety and security of citizens.

Current study has several limitations. First of all, the cross-sectional study design did not allow us to determine the causal direction between workplace violence and depression. The results were based on interviews with only 166 daeri drivers in a metropolitan city, so they cannot be generalized to daeri drivers who work in small cities. Because we carried out the survey for just 10 days during the summer, the effects of seasonal changes on depressive symptoms should also be considered (28). Further, no information on when exactly over the past year, the violent events occurred. This is considered important information as recent experiences of violence are likely to have a greater effect on depressive symptoms than remote ones. In addition, no information on the medical history of the daeri drivers was collected, and this information, too, is important as past medical history and a family history of depression can affect the symptom level of depression. For the last, since market

entrance regulations for daeri drives do not exist, leaving work also happens easily and quickly, especially in the cases of diseased workers. As a result, relatively healthy workers are included in cross-sectional studies (healthy worker survival effect). At the same time, daeri driving essentially includes dealing with customers face to face. Considering this well-known nature of job, possibilities of entering daeri driving might be higher in workers with higher adaptability to emotional work (healthy worker selection effect). Such healthy worker effects results in underestimation of association between work environment and its impact on health (29). Nevertheless, significant results on relationship between workplace violence and depression in daeri drivers shown in current study prove that degree of violence in daeri drivers is profound though a more comprehensive prospective study design with a representative sample is needed to elucidate the relationship between workplace violence and depression in daeri drivers.

Daeri driving is a new occupation created by the need of society in coping with random inspections by policemen on DUI drivers. Besides Korea, other countries also have certain types of daeri driving but the job's characteristics differ greatly according to cultural differences or social needs and especially in terms of social support. In the case of Japan, daeri drivers are supervised by National Police Agency and Ministry of Land, Infrastructure, Transport and Tourism and at the same time, market entrance is also regulated by law. In addition, fare for daeri driving in Japan is 1.5 to 2 times of taxi fare. In the United States of America, charged membership service named I'm Smart exists, and this service provides daeri drivers in teams of two to registered customers only. As for England, daeri drivers are covered by workers' compensation insurance. On the other hand, in the case of Korea social security for daeri drivers is absent (30).

This study is the first in the world, to examine the relationship between workplace violence and depression in daeri drivers. The results highlighted the fact that daeri drivers experience severe workplace violence and even small number of workplace violence were related to increased risk of depression in daeri drivers. Moreover, because violence against drivers can aggravate the safety of the driver, customer, and all other passengers, the safety and health of daeri drivers should be highlighted and measures should be taken to ensure that it receives adequate attention.

DISCLOSURE

The authors have no potential conflicts of interest to disclose.

AUTHOR CONTRIBUTION

Conception and design: Jung PK, Won JU, Yoon JH. Acquisition of data: Lee JH, Seok H, Lee W. Analysis and interpretation of

data: Jung PK, Yoon JH. Writing or revision of the manuscript: Jung PK, Yoon JH. Administrative supports: Lee JH, Seok H, Lee W. Study supervision: Roh JH.

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