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Letter to the Editor

Risk Factors Influencing the Severity of Cognitive Decline in Elderly Taxi Drivers Over 65 Years of Age: Applying a Zero-Inflated Negative Binomial Regression Model

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Dear Editor-in-Chief

In line with the rapid aging of the population, the proportion of taxi drivers over 65 yr old increased from 19.5% in 2015 to 35.2% in 2020. The number of traffic accidents involving commercial vehicles with drivers older than 65 yr of age nearly doubled from 9,453 cases in 2015 to 17,094 cases in 2020. The number of accidents caused by taxis was 14,472 as of 2020, higher than that of intra-city buses and trucks, and the number of deaths and injuries was nearly three times higher (1).

Cognition has mainly been dealt with as an influencing factor of driving behavior or accidents, and is reported as an important factor affecting driving ability (2). Cognition is affected by various factors; not only age (3) but also physical, economic, and social ones (4, 5). In addition, the job environment related to transportation differs depending on the transportation industry, and the existing research results do not fully explain the mechanisms of safety performance and cognitive ability (6). Furthermore, linear or logistic regression analysis was mainly used, despite overdispersion data (7).

It is a descriptive research study to find out risk factors for the severity of cognitive decline among male taxi drivers over 65 yr of age who drive taxis in Seoul. After receiving approval from the Institutional Review Board/Ethics Committee of Konkuk University (7001355-202011-E-127), data collection was conducted. A total of 441 taxi driver questionnaires were finally analyzed using the statistical program R (R Foundation for Statistical Computing, Vienna, Austria). Overall 349 subjects (79.5%) answered that there was no cognitive decline at all (Fig. 1). The zero-inflated negative binomial (ZINB) regression model suitable for overdispersion data with a larger variance (5.16) than the mean (3.28) was used (8). Through ZINB regression, the count model predicts the risk factors for worsening cognitive decline, and the logit model predicts the likelihood of future cognitive decline.

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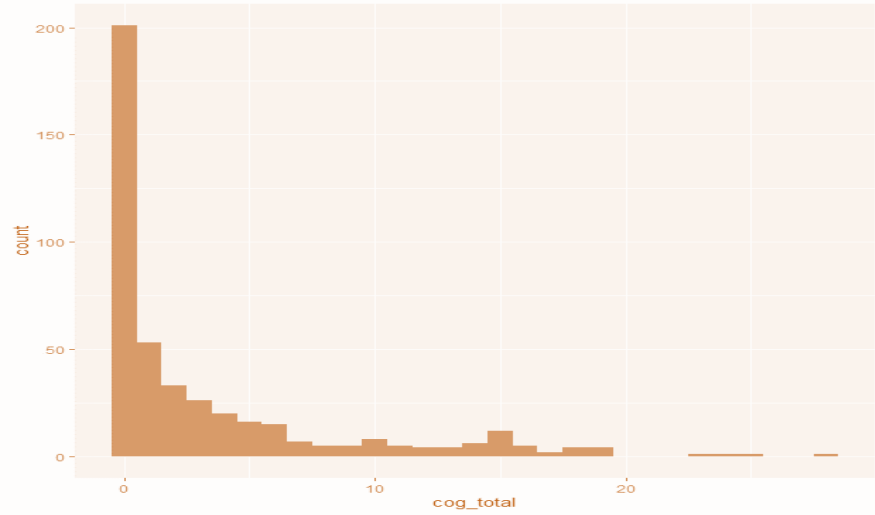

Fig. 1: Frequency of cognitive decline among elderly taxi drivers

Count model include age increase, BMI decrease, continuous driving time increase, increase in the number of accidents, increase in the number of family dependents, decrease in personal monthly income and being unmarried. Logit model include BMI increase, average daily driving distance decrease, increase in the number of night shifts, increase in the number of family dependents, personal monthly income decrease, and being unmarried (Table 1).

Table 1: Risk factors influencing severity of cognitive decline in elderly taxi drivers

Categories		***Count model***				***Logit model***			
		β	SE	z	*P*> |z|	β	SE	z	*P*> |z|
Physical	Age	0.013	0.003	3.944	<0.001	0.008	0.011	0.705	0.481
	BMI (kg/m²)	-0.007	0.003	-2.365	0.018	0.033	0.012	2.783	0.005
Occupational	Driving distance/day	0.001	0.000	2.676	0.007	-0.004	0.001	-5.862	<0.001
	Continuous driving hour/day	0.020	0.005	4.396	<0.001	0.055	0.011	4.815	<0.001
	No. night shift/month	0.001	0.002	0.315	0.753	0.040	0.006	6.857	<0.001
	No. traffic accident	0.060	0.008	7.580	<0.001	-0.078	0.025	-3.115	0.002
	No. near miss	0.022	0.004	5.755	<0.001	-0.040	0.013	-3.044	0.002
Socio-economic	Marital status(ref. married with spouse)								
	Single	0.835	0.074	11.344	<0.001	1.112	0.206	5.390	<0.001
	Divorce & Separation	0.117	0.035	3.336	<0.001	0.512	0.123	4.177	<0.001
	No. family dependents	0.026	0.013	2.101	0.036	0.200	0.037	5.355	<0.001
	Personal income/month (ref. 100 (ten thousand won)								
	100-150	0.106	0.061	1.736	0.083	-0.450	0.142	-3.181	0.001
	150-200	-0.104	0.063	-1.652	0.099	-1.027	0.161	-6.366	<0.001
	200-250	-0.065	0.072	-0.902	0.367	-0.346	0.174	-1.991	0.046
	250-300	-0.545	0.095	-5.763	<0.001	-0.959	0.265	-3.622	<0.001
	≥300	-2.671	0.241	-11.078	<0.001	-17.6	892.8	-0.020	0.984

The result of this study could be used as objective evidence for developing intervention programs to expand self-regulation of taxi drivers and preparing customized policies for elderly taxi drivers. Since this study was targeted at male taxi drivers over 65 yr of age who are driving taxis in Seoul, further studies that expand the subjects and regions of the study will be needed.

Conflict of interest

The authors declare that there is no conflict of interest.

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