Analysis on Related Factors of Accident Tendency of Bus Drivers in Haikou City

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Abstract: **Objective** To understand the current situation of accident tendency of bus drivers in Haikou City, and to provide data reference for preventing bus traffic accidents in Haikou City. **Methods:** A total of 512 bus drivers with driving age ≥ 5 years were investigated by self-made questionnaire by random cluster sampling. The collected data were statistically analyzed by SPSS 26.0. **Results:** There were significant differences in accident proneness among bus drivers with different family pressure, relationship between different family members, different driving age, different driving time per day and different sleep time per day ($P < 0.05$). **Conclusion:** Drivers with high family pressure are easy to cause accidents many times, and drivers with general or disharmonious family members, lower driving age, less sleep time per day and longer driving time per day are easy to cause traffic accidents. Therefore, the relevant departments should take relevant measures according to these factors to reduce the incidence of bus drivers traffic accidents in Haikou City.

Keywords: Accident Proneness; Bus Driver; Traffic Accident

Introduction

According to statistics, more than 2,000 traffic accidents occurred in Hainan Province from 2017 to 2020. Among them, the number of traffic accidents and deaths in Haikou City are the largest in the province. Compared with the annual production safety accidents in the city, traffic accidents accounted for a large proportion.Many scholars in China have shown that the generation of road traffic accidents is inextricably related to the factors such as people, vehicles, roads and environment, which are caused by the loss of balance of these factors, of which among these four factors, human factors are very unstable, especially drivers [1-3]. According to epidemiological surveys, more than 95% of accidents are caused by drivers. Because drivers need to send various instructions to vehicles according to environmental changes and vehicle changes and operate vehicles safely, and drivers' some special physiological characteristics, psychological quality and personality factors may affect drivers to make correct judgment and operation in traffic situations, thus causing traffic accidents. Many scholars at home and abroad refer to this potential, long-term and stable psychological or physical feature as "accident proneness" [4–5]. This paper intends to explore the related factors of accident tendency of bus drivers and provide data reference for the prevention of road traffic accidents.

1. Materials and Methods

1.1 Study Subjects

The subjects were bus drivers who had been driving for ≥ 5 years in Haikou City.

1.2 Sampling Method

Random cluster sampling was used to select bus drivers from Haikou Bus Company whose driving age was ≥ 5 years to conduct a questionnaire survey. A total of 512 questionnaires were distributed and 466 valid questionnaires were retrieved, with a response rate of 91%.

1.3 Pre-investigation and on-site investigation

Pre-survey: Pre-surve formal survey and questionnaire were modified according to pre-survey results.

Formal investigation: All the questionnaires were filled out by the respondents themselves and returned on the spot after

explaining the purpose of the survey and the requirements for questionnaire filling by uniformly trained investigators.

1.4 Definition of accident liability

Drivers who had three or more equally responsible traffic accidents in the five years from January 2015 to December 2019 were defined as drivers with accident proneness.

1.5 Data Analysis

Data were cleaned and analyzed by using SPSS 26.0 statistical software. Differences between enumeration data groups were compared using the chi-square test. $P < 0.05$ was considered statistically significant.

2. Results

2.1 Basic information

Among the 466 respondents, 59.9% were males and 40.1% were females. Sixty-two percent were aged 41 to 50 years, 20.4% were aged 31 to 40 years, and 17.6% were aged 51 to 60 years. 73.2% were married, 14.6% were unmarried, 10.1% were divorced, and 2.1% were widowed.

2.2 Analysis of Related Factors of Accident Tendency of Bus Drivers in Haikou City

Chi-square test analysis revealed that there were significant differences in the frequency distribution of traffic accidents in the past 5 years among drivers with different family pressures, different family members' relationships, different driving ages, different driving time per day, and different sleep time per day ($P < 0.05$), indicating that the above factors were significantly correlated with the accident tendency of bus drivers. Among them, the incidence of traffic accidents was highest in those with family stress, family members' disharmony, driving age of 5 years, driving time of 7-8 hours per day, and sleep time of ≤ 6 hours per day.See Table 1 for details.

Table 1 Analysis on Accident Tendency Related Factors of Bus Drivers

Variable		Frequency of traffic accidents within 5 years				Total	$\times^2$	P
		1 time	2 times	3 or more	None			
Gender	Nale	19	6	0	254	279	5.080	0.123
	Female	10	10	1	166	187		
Marital status	Married	26	13	1	301	341	8.497	0.588
	Unmarried	3	2	0	63	68		
	Divorced/widowed	0	1	0	56	57		
Family stress	No pressure	16	9	0	306	331	8.376	0.039
	Pressurized	13	7	1	114	135		
Relationship between family members	Harmony	14	8	0	291	313	13.793	0.017
	General	11	6	0	94	111		
	Disharmony	4	2	1	35	42		
Physical health	Very good	13	6	1	255	275	10.623	0.069
	General	12	6	0	132	150		
	Not good	4	4	0	33	41		
Driving age	5 years	15	10	1	42	68	54.670	0.000
	6years	9	5	0	243	257		
	7years 年	5	1	0	91	97		
	≥8years	0	0	0	44	44		
Driving time per day	5-6hours	4	2	0	169	175	13.698	0.002
	7-8hours	25	14	1	251	291		
Sleep duration	≤6hours	20	12	1	129	162	30.181	0.000

per day	7hours	9	4	0	233	246
	8hours	0	0	0	44	44
	≥9hours	0	0	0	14	14

3. Discussion

From the results of this study, it can be seen that the traffic accident tendency of bus drivers is related to factors such as family stress, family member relationship, driving age, driving time per day, and sleep time per day.

Drivers with general or disharmonious family relationships are more prone to traffic accidents than drivers with harmonious family relationships. Because drivers have to work for a long time every day, they spend little time to accompany their families, and do not communicate with their families, long-term accumulation is easy to cause poor family members' relationship, family contradictions are prominent, and these can easily to lead to emotional instability of drivers, thus affecting the efficiency of work, serious will cause traffic accidents.

Drivers with greater family stress are prone to multiple traffic accidents. Drivers work long hours every day and spend extra energy and time dealing with family stress while dealing with their busy daily tasks. Although transient stress does not cause any impact, if drivers are in a stressful environment for a long time, it will inevitably adversely affect the physical and mental health of drivers, such as easy to make them cause chronic diseases, emotional instability, affect the normal sleep, etc., and these may also cause traffic accidents[6].

Drivers with low driving age are more likely to cause traffic accidents than drivers with high driving age, which may be related to their work experience. Bus drivers with low driving age have far less experience in dealing with emergencies than bus drivers with high driving age, and if they face sudden accidents, it is difficult to deal with accidents as calmly as calmly as drivers with high driving age. As a result, drivers with low driving age are also prone to traffic accidents.

Drivers who drive longer and sleep less every day are also prone to traffic accidents. Because bus drivers start working early every day, working hours are long. Causing drivers to rest less time, so that drivers have fatigue, lack of concentration, reaction decreased, it will cause certain potential safety hazards[7-9].

Bus drivers have long working hours, driving more than a dozen hours a day, and their diet and routines are irregular, often busy to fly to work without taking care of rest and eating. In addition, drivers have very little time to rest every day and severely insufficient sleep time. Therefore, long-term irregular routines and diet have a certain impact on the physical and mental health of drivers, easy to cause cervical, spinal or lumbar diseases, chronic diseases and so on. Therefore, bus companies should make appropriate adjustments to the working hours and rest hours of buses, and drivers' rest hours far away can be extended; companies need to perform physical examinations for drivers every half a year to assess the physical condition of drivers, regularly carry out health knowledge lectures, and enhance drivers' awareness of their own health management [10-12].

4. Acknowledgment

Innovation and Entrepreneurship Training Program for college students of Hainan Medical University in 2020（grant no.X202011810001）； The Natural Sciences in Hainan Province in 2019 (grant no. 319QN221).

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