Prevalence and Characteristics of Front Seatbelt Use in Mongolia among Hospital Workers

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Abstract

Background & Aim: Road accident injuries and fatalities are an ongoing world-wide problem. Thus, this study examined the prevalence of front seatbelt use among Mongolian hospital workers and explored the factors associated with this behavior.

Methods: Self-administered questionnaires were distributed to 750 people who worked in a tertiary hospital; 681 agreed to participate and, among them, 521 (76.5%) provided complete responses. Participants were asked about their personal seatbelt use in the front passenger seat and their demographic characteristics. SPSS version 26 was used for all statistical analyses. Chi-squared and Fisher’s exact tests were used to analyze categorical values, with Mann-Whitney U tests being used to analyze ordinal and numeric values.

Results: Approximately five-sevenths (drivers: 73.3%, non-drivers: 71.9%) of participating passengers “always” used seatbelts while in a front passenger seat, according to the self-questionnaires. A multivariate analysis revealed that the timing of seatbelt use while one is in the driver’s seat before starting the engine and experiences of traffic accidents while riding in a car were associated with drivers using the front passenger seatbelt.

Conclusions: We suggest that educational programs on seatbelt use should be developed and delivered for interventions concerning, and promoting seatbelt use before starting the engine.

1. Introduction

Road traffic injuries are the eighth leading cause of death for people of all ages.¹ The number of road traffic deaths is continually increasing, reaching 1.4 million in 2016, although the rate of these deaths, relative to the size of the world’s population, has stabilized in recent years.¹ The United Nations’ sustainable development goals (SDGs), under point 3.6, aim to halve the number of global deaths and injuries from road traffic accidents by the year 2020.² Wearing a seatbelt reduces the risk of death from accidents among drivers and front seat occupants by 45–50%, and reduces the risk of death and serious injuries among rear seat occupants by 25%.³ The World Health Organization (WHO) recommends that seatbelt laws should cover both the driver and all passengers, and that enforcement should thus be equally applied to all car occupants.⁴ Mandatory seatbelt legislation is highly effective in promoting their utilization, and is a cost-effective means of reducing both road traffic deaths and injuries, especially in rapidly motorizing low- and
middle-income countries.\textsuperscript{5}

In Mongolia, drivers and passengers are requested to use their seatbelts when they ride in a vehicle with this device available, according to the Mongolia Traffic Rules.\textsuperscript{6} In recent years, the number of automobiles in Mongolia has increased rapidly, with 65% of 841,537 car registrations being for four-wheeled vehicles, and the number of registered automobiles increasing more than five times from 2007 to 2016.\textsuperscript{6,7} According to figures published from the Public Health Institute, accident fatalities (e.g., road crashes, falls, and equipment-related accidents) were the third leading cause of deaths in Mongolia between 2000 and 2015;\textsuperscript{8} traffic accidents are the second highest cause of injuries in this country.\textsuperscript{8} In 2016, the Public Health Institute recorded 17,198 traffic accident-related injuries and 485 fatalities.\textsuperscript{8} Although research around the wearing of seatbelts was conducted and reported in 2019, studies have still not investigated the factors associated with seatbelt use using a self-administered questionnaire in Mongolia.\textsuperscript{9} Therefore, this study investigated the prevalence of front passenger seatbelt use and the associated factors of this behavior in Mongolia.

2. Materials and Methods

2.1 Design

This study used a cross-sectional survey, designed to determine the characteristics of Mongolian hospital workers who use front passenger seatbelts and to elucidate the factors associated with this behavior among these hospital workers.

2.2 Participants

Study participants were recruited from the research site’s tertiary hospital. In total, 750 hospital workers who worked at this tertiary hospital were recruited during the survey period in June 2019. All workers were given a questionnaire and were invited to participate in the study. The questionnaire was written in Mongolian, with workers who were unable to read Mongolian then being excluded. This resulted in the participation of 681 of the 750 invited hospital workers. Among the 681 questionnaires that were returned, 160 had incomplete data. These responses were thus excluded, resulting in a completion rate of 76.5%; consequently, the final sample size was 521 (Fig. 1).

2.3 Ethical Considerations

Ethical approval for the study design was obtained from the research ethics committee of the authors’ institution prior to the study (Approval number 488). Prior to data collection, informed consent was obtained from hospital workers willing to participate, after they were informed of the study’s purpose and procedures. Participants were informed about their right to privacy and confidentiality. All procedures related to the study were conducted in accordance with the ethical standards of the institutional and/or national research committee, and with the 1964 Helsinki declaration and its later amend-

\begin{figure}[h]
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\includegraphics[width=\textwidth]{Fig_1.png}
\caption{Recruitment process and profile of the analyzed Mongolian hospital worker participants}
\end{figure}

ments or comparable ethical standards for human participants.

2.4 Protection of Participants’ Confidentiality

Before data collection, informed consent was obtained from hospital workers who were willing to participate in the study after being informed about its purpose, procedures, and expected results. Prior to data collection, all participants signed a consent form affirming their rights to both privacy and confidentiality.

2.5 Data Collection

Data collection was conducted during June 2019. The items in the questionnaire asked for information about participants’ demographic characteristics, such as their age, gender, occupation, current residence, and possession of a driver’s license (Tables 1 and 2). Data on whether front seatbelt utilization is perceived as compulsory, and whether people believe that they benefit from wearing a seatbelt while in the front passenger seat when traveling, were also collected. Participants were asked about their personal seatbelt use while riding in the front passenger seat. The response options for seatbelt use were “always,” “often,” “sometimes,” and “never.” Finally, drivers were asked when they used their seatbelt while riding in the driver’s seat.

2.6 Data Analysis

Descriptive statistics (interquartile ranges and percentages) were used to analyze the participants’ demographic characteristics and their front passenger seatbelt use. Their ages were analyzed using a Mann-Whitney U test. Chi-squared and Fisher’s exact tests were used to compare participants’ seatbelt use, in terms of always using it (“always”) versus not always using it (“often,” “sometimes,” or “never”), with respect to the categorical variables. As shown in Tables 3 and 4, we based our list of likely factors on the findings of previous studies and investigated participants’ age, gender, occupation, their
### Table 1  Characteristics of the study participants in the front seat

| Characteristics                                      | Drivers Frequency | N=243 Percent |
|------------------------------------------------------|-------------------|---------------|
| Age, no. (%)                                         |                   |               |
| Mean ± SD                                            | 36.98 ± 9.884     |               |
| Median (IQR)                                         | 36 (29–45)        |               |
| 20–29 years                                          | 66 (27.2)         |               |
| 30–39 years                                          | 85 (35.0)         |               |
| 40–49 years                                          | 57 (23.5)         |               |
| 50 years or over                                     | 35 (14.4)         |               |
| Gender, no. (%)                                      |                   |               |
| Male                                                 | 65 (26.7)         |               |
| Female                                               | 178 (73.3)        |               |
| Occupation, no. (%)                                  |                   |               |
| Nurse                                                | 63 (25.9)         |               |
| Doctor                                               | 107 (44.0)        |               |
| Other                                                | 73 (30.0)         |               |
| Driver’s license, no. (%)                            |                   |               |
| Yes                                                  | 243 (100.0)       |               |
| Where are you staying now?, no. (%)                  |                   |               |
| Ger                                                   | 79 (32.5)         |               |
| Apartment                                            | 164 (67.5)        |               |
| When do you fasten your seatbelt while sitting in the driver’s seat?, no. (%) | | |
| Before the engine is started                         | 156 (64.2)        |               |
| After the engine is started                          | 87 (35.8)         |               |
| Front passenger seatbelt utilization, no. (%)        |                   |               |
| Always                                               | 178 (73.3)        |               |
| Often                                                | 38 (15.6)         |               |
| Sometimes                                            | 21 (8.6)          |               |
| Never                                                | 6 (2.5)           |               |
| Wearing a seatbelt while in the front passenger seat is beneficial, no. (%) | | |
| Yes, I agree                                          | 234 (96.3)        |               |
| No, I do not agree or I do not know whether I agree or not. | 9 (3.7)          |               |
| What do you believe is correct regarding the use of the front passenger seatbelt?, no. (%) | | |
| Required by law                                      | 238 (97.9)        |               |
| Not required by law or I do not know                 | 5 (2.1)           |               |
| Have you ever experienced any traffic accidents while driving or riding in a car?, no. (%) | | |
| Yes, I have experienced them                         | 83 (34.2)         |               |
| No, I have not experienced them                      | 160 (65.8)        |               |
| Have you ever seen the resulting situation following motor vehicle accidents?, no. (%) | | |
| Yes, I have seen this                                | 197 (81.1)        |               |
| No, I have not seen this                             | 46 (18.9)         |               |
### Table 2  Characteristics of the non-driver participants in the front seat

| Characteristics                              | Non-drivers Frequency | N=278 (%) |
|---------------------------------------------|-----------------------|-----------|
| Age, no. (%)                                |                       |           |
| Mean ± SD                                   | 37.13 ± 10.532        |           |
| Median (IQR)                                | 36 (27–46)            |           |
| 20–29 years                                 | 92 (33.1)             |           |
| 30–39 years                                 | 63 (22.7)             |           |
| 40–49 years                                 | 76 (27.3)             |           |
| 50 years or over                            | 47 (16.9)             |           |
| Gender, no. (%)                             |                       |           |
| Male                                        | 18 (6.5)              |           |
| Female                                      | 260 (93.5)            |           |
| Occupation, no. (%)                         |                       |           |
| Nurse                                       | 124 (44.6)            |           |
| Doctor                                      | 60 (21.6)             |           |
| Other                                       | 94 (33.8)             |           |
| Driver’s license, no. (%)                   |                       |           |
| Yes                                         | 98 (35.3)             |           |
| Where are you staying now?, no. (%)         |                       |           |
| Ger                                         | 120 (43.2)            |           |
| Apartment                                   | 158 (56.8)            |           |
| Front passenger seatbelt utilization, no. (%)|                       |           |
| Always                                      | 200 (71.9)            |           |
| Often                                       | 45 (16.2)             |           |
| Sometimes                                   | 29 (10.4)             |           |
| Never                                       | 4 (1.4)               |           |
| Wearing a seatbelt while in the front passenger seat is beneficial, no. (%) | | |
| Yes, I agree                                | 259 (93.2)            |           |
| No, I do not agree or I do not know whether I agree or not. | 19 (6.8) | |
| What do you believe is correct regarding the use of the front passenger seatbelt?, no. (%) | | |
| Required by law                             | 242 (87.1)            |           |
| Not required by law or I do not know        | 36 (12.9)             |           |
| Have you ever experienced any traffic accidents while driving or riding in a car?, no. (%) | | |
| Yes, I have experienced them                | 21 (7.6)              |           |
| No, I have not experienced them             | 257 (92.4)            |           |
| Have you ever seen the resulting situation following motor vehicle accidents?, no. (%) | | |
| Yes, I have seen this                       | 195 (70.1)            |           |
| No, I have not seen this                    | 83 (29.9)             |           |
perception that seatbelt use is compulsory, their perception of the benefits of wearing a seatbelt, their experiences of traffic accidents while driving or riding in a car, and their experiences of seeing the resulting situation following motor vehicle accidents as a potential determinant of seatbelt use. Moreover, we added a driver’s item on seatbelt use prior to starting the engine when driving, based on the idea of important habitual behaviors found in our previous study. We estimated the contribution of each factor in terms of any increase they caused in seatbelt use, and compared the “always uses a seatbelt” (“always”) group with the “does not always use a seatbelt” (“often,” “sometimes,” or “never”) group using a logistic regression. The variables were considered for the multivariate analysis if their univariate p-value was <0.2. Age and gender were used as confounding variables in the multivariate logistic regression analysis. Furthermore, the analysis estimated the odds ratios and 95% confidence intervals of front passenger seatbelt use. SPSS Version 26 was used for the statistical computations, with the cutoff for statistical significance being set at p<0.05.

3. Results

3.1 Participants’ Characteristics

The participants’ demographic characteristics, of both drivers and non-drivers, are shown in Tables 1 and 2, respectively. The chi-squared test showed that always using the front passenger seatbelt versus not always using it were significantly correlated with experiences of traffic accidents during either driving or riding in a car, seeing the resulting situation after a motor vehicle accident, and the timing of wearing a seatbelt while in the driver’s seat. However, age and gender were not found to be significant with regards to passenger seatbelt use, which is shown in Table 3.

3.2 Use of Seatbelts

Table 1 depicts the results of self-reported front passenger seatbelt use by the participating drivers, with Table 2 showing the results of the self-reported front passenger seatbelt use by non-drivers. Approximately five-sevenths (drivers: 73.3%, non-drivers: 71.9%) of participants always wore their front passenger seatbelts when they were riding in a vehicle.

3.3 The Associated Factors of Seatbelt Use

Tables 5 and 6 show the relative effects of factors associated with front passenger seatbelt use by both drivers and non-drivers, respectively. Multivariate analyses revealed that the timing of wearing a seatbelt when people were in the driver’s seat significantly increased the utilization of the front passenger seatbelt by drivers, while experiences of traffic accidents while driving or riding in a car significantly decreased front passenger seatbelt use by drivers.

4. Discussion

This study examined seatbelt use among hospital workers from a tertiary hospital in the capital city of Mongolia and found that approximately five-sevenths of participants reportedly used the front seatbelt, according to the self-administered questionnaire responses. A multivariate analysis revealed that experiencing traffic accidents while riding in a car by drivers, and the timing of seatbelt use while sitting in the driver’s seat before starting the engine, were associated with the use of a front passenger seatbelt. The multivariate analysis also found that the factors significantly associated with seatbelt use were having experienced a traffic accident, which reduced the use of seatbelts. Similar to previous studies, we found that having experienced an accident increased the likelihood that participants would not wear their seatbelt. Our findings suggest that the prevalence of front passenger seatbelt use among those who usually drive a car would increase if both regions and countries put measures in place aimed at reducing the risk of traffic accidents.

The multivariate analysis also found that another factor significantly associated with front passenger seatbelt use, is the timing of wearing one’s seatbelt when in the driver’s seat prior to starting the engine. One previous study found that fastening one’s seatbelt before starting the engine when driving, prior to becoming pregnant, was a significant factor influencing rear seatbelt use during pregnancy. These results suggest that it is possible to promote increased utilization of front seatbelts by instructing people to fasten their seatbelts before starting the engine whenever they are riding in the driver’s seat. Some cars have specific reminder systems that sound an alarm whenever a passenger is not wearing their seatbelt after the car engine has started. One previous study discovered that these reminder systems are effective in increasing seatbelt use. However, in the automobile society, wherein used cars are the mainstream, it remains unclear whether vehicles always have these alarm systems installed; hence, it would be more effective to instruct people to wear their seatbelts prior to starting the engine to instill it as an unconscious habit.

4.1 Limitations

This study has several limitations. For example, all the participants were hospital workers—other groups of people, who are not hospital workers, may demonstrate different characteristics from this study’s sample. An observation survey based in Ulaanbaatar found that 56.8% of drivers wore seatbelts, with 34.5% of front passengers wearing their seatbelts. Therefore, our results may not be representative of the seatbelt use of the wider, general populace throughout Mongolia.

Moreover, a reporting bias may have occurred because the participants’ actual seatbelt use behaviors were not observed. One previous study revealed that the gap between observed and self-reported rates of seatbelt use was smaller for urban area roads. In this study, the mismatch in the rates between observed versus self-re-
Table 3  Characteristics of the driver participants in the front seat (comparison of “always” versus “not always” responses)

| Characteristics                                      | Total Frequency | Always Frequency | Percent | Not always Frequency | Percent | p-value       |
|------------------------------------------------------|----------------|------------------|---------|----------------------|---------|---------------|
| Total, no. (%)                                       | 243            | 178              | (73.3)  | 65                   | (26.7)  | —             |
| Age, no. (%)                                         |                |                  |         |                      |         |               |
| 20–29 years                                          | 66             | 47               | (71.2)  | 19                   | (28.8)  | 0.586         |
| 30–39 years                                          | 85             | 61               | (71.8)  | 24                   | (28.2)  |               |
| 40–49 years                                          | 57             | 41               | (71.9)  | 16                   | (28.1)  |               |
| 50 years or over                                     | 35             | 29               | (82.9)  | 6                    | (17.1)  |               |
| Gender, no. (%)                                      |                |                  |         |                      |         | 0.871         |
| Male                                                 | 65             | 47               | (72.3)  | 18                   | (27.7)  |               |
| Female                                               | 178            | 131              | (73.6)  | 47                   | (26.4)  |               |
| Occupation, no. (%)                                  |                |                  |         |                      |         |               |
| Nurse                                                | 63             | 46               | (73.0)  | 17                   | (27.0)  | 0.982         |
| Doctor                                               | 107            | 79               | (73.8)  | 28                   | (26.2)  |               |
| Other                                                | 73             | 53               | (72.6)  | 20                   | (27.4)  |               |
| Driver’s license, no. (%)                            |                |                  |         |                      |         |               |
| Yes                                                  | 243            | 178              | (73.3)  | 65                   | (26.7)  |               |
| Where are you staying now?, no. (%)                  |                |                  |         |                      |         |               |
| Ger                                                  | 79             | 56               | (70.9)  | 23                   | (29.1)  | 0.643         |
| Apartment                                            | 164            | 122              | (74.4)  | 42                   | (25.6)  |               |
| When do you fasten your seatbelt while sitting in the driver’s seat?, no. (%) |                |                  |         |                      |         |               |
| Before the engine is started                         | 156            | 123              | (78.8)  | 33                   | (21.2)  | 0.010*        |
| After the engine is started                          | 87             | 55               | (63.2)  | 32                   | (36.8)  |               |
| Wearing a seatbelt while sitting in the front passenger seat is beneficial, no. (%) |                |                  |         |                      |         |               |
| Yes, I agree                                         | 234            | 172              | (73.5)  | 62                   | (26.5)  | 0.704         |
| No, I do not agree or I do not know whether I agree or not | 9              | 6                | (66.7)  | 3                    | (33.3)  |               |
| What do you believe is correct regarding the use of the front passenger seatbelt?, no. (%) |                |                  |         |                      |         |               |
| Required by law                                      | 238            | 175              | (73.5)  | 63                   | (26.5)  | 0.612         |
| Not required by law or I do not know                 | 5              | 3                | (60.0)  | 2                    | (40.0)  |               |
| Have you ever experienced any traffic accidents while driving or riding in a car?, no. (%) |                |                  |         |                      |         |               |
| Yes, I have experienced them                         | 83             | 52               | (62.7)  | 31                   | (37.3)  | 0.009**       |
| No, I have not experienced them                      | 160            | 126              | (78.75) | 34                   | (21.25) |               |
| Have you ever seen the resulting situation following motor vehicle accidents?, no. (%) |                |                  |         |                      |         |               |
| Yes, I have seen this                                | 197            | 138              | (70.1)  | 59                   | (29.9)  | 0.025*        |
| No, I have not seen this                             | 46             | 40               | (87.0)  | 6                    | (13.0)  |               |

*p < 0.05, **p < 0.01, ***p < 0.001
Table 4  Characteristics of the non-driver participants in the front seat (comparison of "always" versus "not always" responses)

| Characteristics                          | Total Frequency | Always Frequency | Percent | Not always Frequency | Percent | p-value     |
|------------------------------------------|-----------------|-----------------|---------|----------------------|---------|-------------|
| Total, no. (%)                           | 278             | 200             | (71.9)  | 78                   | (28.1)  | —           |
| Age, no. (%)                             |                 |                 |         |                      |         |             |
| 20–29 years                              | 92              | 62              | (67.4)  | 30                   | (32.6)  | 0.065       |
| 30–39 years                              | 63              | 40              | (63.5)  | 23                   | (36.5)  |             |
| 40–49 years                              | 76              | 59              | (77.6)  | 17                   | (22.4)  |             |
| 50 years or over                         | 47              | 39              | (83.0)  | 8                    | (17.0)  |             |
| Gender, no. (%)                          |                 |                 |         |                      |         |             |
| Male                                     | 18              | 13              | (72.2)  | 5                    | (27.8)  | 1.000       |
| Female                                   | 260             | 187             | (71.9)  | 73                   | (28.1)  |             |
| Occupation, no. (%)                      |                 |                 |         |                      |         |             |
| Nurse                                    | 124             | 85              | (68.5)  | 39                   | (31.5)  | 0.381       |
| Doctor                                   | 60              | 47              | (78.3)  | 13                   | (21.7)  |             |
| Other                                    | 94              | 68              | (72.3)  | 26                   | (27.7)  |             |
| Driver's license, no. (%)                |                 |                 |         |                      |         |             |
| Yes                                      | 98              | 72              | (73.5)  | 26                   | (26.5)  | 0.780       |
| Where are you staying now?, no. (%)      |                 |                 |         |                      |         |             |
| Ger                                      | 120             | 87              | (72.5)  | 33                   | (27.5)  | 0.893       |
| Apartment                                | 158             | 113             | (71.5)  | 45                   | (28.5)  |             |
| Wearing a seatbelt while in the front passenger seat is beneficial, no. (%) | | | | | | |
| Yes, I agree                              | 259             | 190             | (73.4)  | 69                   | (26.6)  | 0.065       |
| No, I do not agree or I do not know whether I agree or not. | 19 | 10 | (52.6) | 9 | (47.4) | |
| What do you believe is correct regarding the use of the front passenger seatbelt?, no. (%) | | | | | | |
| Required by law                          | 242             | 178             | (73.6)  | 64                   | (26.4)  | 0.163       |
| Not required by law or I do not know     | 36              | 22              | (61.1)  | 14                   | (38.9)  |             |
| Have you ever experienced any traffic accidents while driving or riding in a car?, no. (%) | | | | | | |
| Yes, I have experienced them              | 21              | 14              | (66.7)  | 7                    | (33.3)  | 0.616       |
| No, I have not experienced them           | 257             | 186             | (72.4)  | 71                   | (27.6)  |             |
| Have you ever seen the resulting situation following motor vehicle accidents?, no. (%) | | | | | | |
| Yes, I have seen this                     | 195             | 143             | (73.3)  | 52                   | (26.7)  | 0.467       |
| No, I have not seen this                  | 83              | 57              | (68.7)  | 26                   | (31.3)  |             |
ported seatbelt use would likely be similar to seatbelt use among front seat passengers in urban areas of Mongolia. The differences between drivers and non-drivers would also be within the expected range.

5. Conclusion

This study reveals the factors associated with the use of front seatbelts by Mongolian tertiary hospital workers. The findings of this research highlight the importance of developing strategies for improving front seatbelt use. Briefly, the prevalence of front seatbelt use among hospital workers was substantially high. Using one’s seatbelt prior to starting the engine while one is in the driver’s seat, including knowledge of its protective function, might increase overall use. Further studies are needed to elucidate effective interventions and the role of using one’s seatbelt before starting the engine in terms of increasing seatbelt utilization throughout the general populace.

Funding Declaration

The authors received no financial support for the research, authorship, and publication of this article.

Acknowledgments

We are grateful to all study participants for their contribution and cooperation.

Declaration of Conflicting Interests

The authors declare that there is no conflict of interest.

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