Validity and Reliability of the Persian Version of the Dula Dangerous Driving Index

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ABSTRACT

Introduction: Road traffic accidents (RTAs) have always been a major concern and human factor has been recognized as their leading cause. Since taxi drivers play a significant role in accidents, the main purpose of this study was to provide a valid and reliable version of the Dula Dangerous Driving Index (3DI) for taxi drivers working in the city of Zanjan, Iran.

Material and Methods: Based on the convenience sampling method, 316 taxi (including taxi, internet taxi, etc.) drivers were recruited in this descriptive study. The 3DI contained 28 items within three factors related to dangerous driving behavior. After linguistic validation, qualitative and quantitative face validity was determined for the given questionnaire. Consequently, content validity index (CVI) and content validity ratio (CVR) were assessed by a panel of 10 experts. Internal reliability was further calculated based on Cronbach’s alpha coefficient and test-retest method.

Results: The results revealed that face validity (1.60-3.82.), CVR (0.8-1), and CVI (0.891-1) were acceptable. Cronbach’s alpha coefficient was also 0.896 for the total reliability of the instrument and 0.95, 0.89, and 0.94 for each factor, respectively. In addition, Spearman’s rank correlation coefficient was 0.871 (P-value<0.001).

Conclusion: The results ultimately demonstrated that the Persian version of the 3DI had adequate reliability, as well as, face and content validity. However, construct validity remains.

Keywords: Dula Dangerous Driving Index, 3DI, Taxi Driver, Traffic Safety, Validity, Persian Version

1. INTRODUCTION

According to the World Health Organization (WHO) reports, road traffic accidents (RTAs) are predicted to become the third leading cause of death in the world by 2020 (1). In Iran, during a one-year period from March 21, 2017, to March 21, 2018, about 16,000 people had lost their lives and 335,000 had been injured (72% male) due to such accidents (2). Since the human factor contributes by 70-90% to RTAs, it is worth to have a tool for the assessment of dangerous driving behaviors. Since the behavior of taxi drivers also plays a significant role in urban traffic accidents, the main purpose of this study was to provide a valid and reliable version of the Dula Dangerous Driving Index (3DI) for taxi drivers working in the public transport system in the city of Zanjan, Iran.

2. MATERIALS AND METHODS

In this descriptive study, the convenience sampling method was used to select the taxi (including taxi, internet taxi, etc.) drivers. Linguistic validation (namely, forward and backward translation method), quantitative face validity, and content
validity were accordingly employed to ensure the validity of the Persian version of the questionnaire. Reliability was further assessed based on internal and external consistency. Content validity index (CVI) and content validity ratio (CVI) were also assessed by a panel of 10 experts (all from academic settings). The 3DI as a self-report tool for drivers was employed to measure dangerous driving behavior (3). Originally, it included 28 items divided into three factors associated with aggressive driving, including aggressive driving (AD, 7 items), risky driving (RD, 12 items), and negative cognitive/emotional driving (CNE, 9 items). Using a five-point Likert-type scale, from never (1) to always (5), the total scores for each sub-scale were calculated. The descriptive/analytic analysis of the demographic data of the participants (i.e., mean, percentage, standard deviation, maximum and minimum) was also performed to determine the validity of the questionnaire via the Cronbach’s alpha coefficient using the SPSS Statistics software (ver. 22.0).

A total number of 316 licensed taxi drivers from the city of Zanjan, Iran, completed the 3DI voluntarily and anonymously. Among the returned questionnaires, 12 cases were incomplete and four were female. In addition, 76.7% of the participants were in the 31-40 age group, 14% of them were in the 41-60 age group, and 9.3% cases were in the 18-30 age group. The participants’ demographic characteristics are shown in Table 1.

3. RESULTS AND DISCUSSION
The CVI and CVR were calculated to determine content validity. If the mean of the CVI was higher than 79%, content validity could be confirmed (4). In accordance with Lawshe, the CVR higher than 62% was acceptable because the number of experts was 10 (5). To detect content validity, the CVR and CVI were determined according to the expert opinions. The CVR for the test materials was found to be 0.80-1.0. In this study, the resulting CVI for all items was bigger than 0.89, indicating that the Persian version of the 3DI had content validity.

Table 2 depicts the number of items, Cronbach’s alpha coefficients, means, standard deviations, and range for the three factors for the composite 3DI with 28 items, which showed high internal consistency with a Cronbach’s alpha value of 0.896. Among the three factors of the tool, the AD exhibited the highest internal consistency (0.939), followed by the RD (0.934). The other factor, NE, also showed adequate internal consistency with at least 0.89 Cronbach’s alpha values. In this case, it should be noted that each of the items was measuring a similar structure, with no conceptual scattering. Spearman’s rank correlation coefficient was further used to analyze the test-retest reliability. The correlation coefficients for total 3DI (n=50) score ranged about 0.871 (P-value<0.001), suggesting acceptable stability of the measure over time.

In line with these results, the Cronbach’s alpha coefficient of the Chinese version (6) of the questionnaire administered on 246 drivers had been 0.90 and the coefficients had been equal to 0.78, 0.78, and 0.80 for the three factors, respectively. In the French version (7), recruiting a sample of 395 drivers, the Cronbach’s alpha coefficient had been reported by 0.92 and the three factor coefficients had been 0.86, 0.83, and 0.79, respectively. In the psychometric study of the Romanian version (8) of the given tool with 953 drivers, the Cronbach’s alpha value had been obtained by 0.91 and the coefficients were equal to 0.81, 0.81, and 0.78 for the three factors, respectively. The Cronbach’s alpha coefficients in the Belgian version (9) of the questionnaire employing 255 offending drivers had been also 0.90 for the overall index and 0.80, 0.79, and 0.75 for the three factors, respectively. In addition, in the American version (9) of this questionnaire with 190 drivers as participants, the Cronbach’s alpha coefficient for the overall index had been 0.93 and these values had been obtained.
by 0.79, 0.85, and 0.88 for the three factors, respectively. Evidently, the 3DI had been well established in all validated versions. Accordingly, it was assumed that dangerous driving behavior could occur in different continental states with closely related patterns. Therefore, analyzing hazardous driving behaviors, determining the share of each factor (namely, RD, AD, NE) in different populations, and developing predictive models can be achieved through key priorities for traffic safety planning based on drivers' behavior. The mean scores of the 3DI in the latest publications had been 62.8 in US (9), 56.1 in Belgium (9), 55.5 in France (7), 47.5 in Romania (8), and 65.6 in China (6). The mean value in the present study was also 77.5. Thus, the mean score of this questionnaire in Iran was higher compared with those in other countries. In view of that, it is necessary to take effective actions in the planning of behavior-based safety training programs and setting deterrent laws and regulations related to driving behaviors. The comparison should not be overlooked, however, regarding target population (namely, taxi drivers) in the present study. Therefore, further studies are needed to compare the scores of the 3DI in the Iranian society and in other countries.

4. CONCLUSION

According to the results of this study, the Persian version of the 3DI had adequate validity and reliability for self-reporting dangerous driving behaviors by taxi drivers. However, construct validity remains.

REFERENCES