A Pilot Study of the Cost of Traffic Accidents Using WTP
Focus on the Traffic Accident Offenders' PTSD

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Introduction
This study is to suggest the cost of traffic accident considering psychological economic value about traffic accident offenders. The main method of estimating the cost of a traffic accident used by the Gross Loss of Output Approach or the Human Capital Approach, which follows the loss of future income, vehicle damage, medical expenses, and traffic accident handling. These approaches did not consider that the risks of mental health quantification. Some countries (Britain, Japan, etc.) estimate the cost of a traffic accident including PGS (Pain, Grief, and Suffering) resulting from the traffic accident. However, these studies did not focus on PGS economic value from offender’s mental health problem like PTSD. (Post-traumatic Stress Disorder). Thus this study suggests estimating the quantity of detailed and accurate the cost of traffic accidents.

Method
Cost-benefit analysis (CBA) is the most common method in stated preference in the way which measures economic costs in the mental health problem. At this moment, the method usually used is Contingent Valuation Method (CVM). CVM is a method of surveying participant’s willingness to pay (WTP) for services after suggesting hypothetical scenarios. This study was designed by open-ended questions and conduct survey there has been no study of the traffic accident offender's psychological cost.

PTSD Checklist (PCL-5) is self-report measure tool of PTSD severity. The cutoff score of 33 is recommended. If the PCL-5 score is over 33, a subject of study may be considered to be a probably PTSD. PCL-5's Cronbach a in this study sample was .94.

Design of CVM
Condition: Offender’s mental health problem is PTSD.
Hypothesis: You can get counseling and psychiatric service to obtund the severity of PTSD (10 session)
Open ended questions:
1) “If you can obtund the severity of PTSD and recover mental health condition before accident through the counseling service, how much you are willing to pay for?”
2) “If you can obtund the severity of PTSD and recover mental health condition before accident through the psychiatric service in a hospital, how much you are willing to pay for?”

Results
For this pilot study, participants were 66 traffic accident offenders in Korea. The survey was composed of sociodemographic factors and PCL-5. We classified the probably PTSD subjects and the No PTSD subjects. 16.7% \((n =11)\) of this study sample was probable PTSD. The probable PTSD subjects showed the WTP of counseling more than the No PTSD subjects, \(t = -2.192, p < .05(M=31,490.91 \text{ won} vs. M=51,818.18 \text{ won})\). Also the probable PTSD subjects showed the WTP of psychiatric service more than the No PTSD subjects, \(t = -1.987, ns\) \((M=36,690.91 \text{ won} vs. M=56,363.64 \text{ won})\). Multiple regression analysis indicated the predictor of the WTP of counseling was monthly income, and that of psychiatric service was monthly income and the PTSD severity.

Based on these results, the cost of the mental health for offenders in Korea by on the availability of PTSD diagnosis are as follows. If the probably PTSD subjects receives counseling (10sessions), the WTP for counseling is 19 billion won (1.95 billion yen) and 58 billion won (5.92 billion yen) for psychiatric service (10times). The total cost of the mental health was estimated at 77 billion won (7.88 billion yen) for counseling and 88.3 billion won (9 billion yen) for psychiatric service.

Discussion
Based on a calculation of total WTP, the cost of traffic accident proposed was approximately 23.748 trillion won, and the human damage was 12.126 trillion won by ROTA from 2016. Adding the cost of the psychological problem from this study results in 23 trillion 8,253 billion won (+0.3%) for counseling and 23 trillion billion won (+0.37%) for psychiatric service. Only if considering the human damage, it is estimated to be 12 trillion 896 billion won (+0.64%) for counseling, 12 trillion 1,009 billion won (+0.74%) for psychiatric service.

The limitations are as follows: small participants, not to consider various variations, to confine the offender's psychological problem to PTSD. Therefore, based on the WTP was suggested this study, prospective studies have to demonstrate the accurate cost of a traffic accident is estimated through a various scenario using another CMV methods like dichotomous choice format.

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