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Using personal cars for emergency transport of patients with life-threatening medical conditions: A pilot study

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ABSTRACT

Personal motor vehicle usage is not typically associated with health benefits in any cost-benefit analysis of different modes of transport. In this study, we explored the usage of personal cars for emergency transport to a hospital or emergency department because of a life-threatening situation. The data for the study were gathered as a part of a larger traffic safety survey. The sample was representative of Finnish-speaking residents older than 15 years ($N = 1025$). Every seventh (14.2%) respondent reported that someone from their household had used a personal car to transport a person requiring urgent medical attention to a hospital or emergency department. The types of life-threatening situations and reasons for using a personal car in these instances were also reported. We discuss the implications for cost-benefit analyses of this transportation mode.

1. Introduction

Driving motor vehicles incurs enormous societal costs because of air and noise pollution, deaths and injuries from crashes, and indirectly with variety of health problems related to sedentary behavior (Bista et al.2020; Dedoussi et al., 2020; James et al., 2020). It has been estimated that in the European Union each kilometer driven by a car produces a societal cost of 0.11€, while the same distance travelled by cycling and walking creates benefits of 0.18€ and 0.37€, respectively (Gössling et al., 2019). Typically, the most decisive factor in this kind of cost-benefit analysis is the large health benefit associated with cycling and walking (Gössling, Nicolosi and Litman, 2021; Gössling et al., 2019).

While the negative impact of motor vehicles on the environment and human health is well researched and documented, no health benefits are ever attached to driving personal cars in these cost-benefit analyses. However, abundant anecdotal evidence exists that some lives might be saved through critically ill patients' last-minute arrival at emergency departments by personal car. Unfortunately, the literature lacks comprehensive data on this possibility. However, one of the rare studies reported that as much as 68% of patients with chest pain arrived at the emergency department of two large hospitals in Belgium by personal car (Van Severen, 2017). They either drove themselves (16%) or were driven by a partner, family member or a neighbor (52%). The proportion of arrivals by personal

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car was 57% for patients diagnosed with acute coronary syndrome, 66% for patients who received another cardiovascular diagnosis, and 76% for those with another type of diagnosis.

In the case of a heart attack, as with other acute medical conditions, it is of utmost importance to receive adequate medical treatment as soon as possible. However, in order to be transported by ambulance to an emergency department, several steps must be completed. First, the patient or people around them must recognize the seriousness of the situation; moreover, this must also be recognized by the paramedic who answers the emergency phone call. Second, an ambulance must be available. Finally, the paramedics arriving at the scene must also confirm the need for urgent treatment before the patient is transported by ambulance.

For a number of reasons, problems can arise at each of these steps. For example, patients and the people around them might wait until the last moment before calling the emergency phone number. Furthermore, an ambulance is not always available. In both situations, the availability of a personal car might be beneficial. Rather than waiting until the last moment and deciding to call an ambulance, visiting the emergency department by personal car as a precaution may be an easier option to choose.

Given the above considerations, the aim of this study was to examine how often personal cars were used for emergency transport in life-threatening situations.

2. Methods

The data for the study were gathered in Finland in May 2021 as a part of the annual traffic safety survey of the Finnish Road Safety Council (Liikenneturva). The market research company Kantar was responsible for data collection. The participants were recruited from the company's online panel of people over the age of 15 who respond to surveys on a regular basis. The sample (N = 1025) was representative of Finnish residents aged between 15 and 79 years. There were 18 questions/scales in the survey, the estimated time for answering was 13 min, and 37.6% of the invited panelists answered the survey. The data were then weighted by age, gender, and region of residence ensuring the representativeness. This weight variable was used in all results presented below.

Most of the questions included in the survey were created by Liikenneturva to serve their traffic safety work; however, we were allowed to include two sets of questions. The first set concerned whether Finns preferred a transport policy aimed at extending or saving lives. The second concerned the usage of personal cars for emergency driving to emergency departments. Here, we report the results of the second set of questions; the first is reported elsewhere.

3. Results

Every seventh (145/1025; 14.2%) respondent reported that someone in their household had used a personal car to transport a person to a hospital or emergency department because of a life-threatening situation (Table 1). In 24% of these cases, the patient drove him/herself. This drive had occurred during the last 12 months in 8.6% of cases, 1–2 years ago in 11.5% of cases, 3–5 years ago in 19.1% of cases, 6–10 years ago in 19.9% of cases, and over 10 years ago in 38.1% of cases, while 2.9% were unsure about the time of the occurrence (see Table 2).

4. Discussion

The self-reported data gathered in this study indicate that in 14.2% of Finnish households someone had been transported by personal car to an emergency department or hospital because of a life-threatening medical condition. As 8.6% of these cases had occurred during the last 12 months, such emergency drives can be considered to occur in 1.2% of Finnish households every year. In absolute terms, that would mean around 33,000 cases, as, according to the latest data, there were 2,766,679 households in Finland in 2020 (Statistics Finland, 2021a). Nevertheless, this is an approximation because our sample was representative of Finns over the age of 15 and not of households in general.

Table 1

Life-threatening situations leading to emergency transport by a personal car (predefined single-choice question).

| Reasons for the emergency drive | N (%) |
|--|-------------------------------|
| Accident | 36 (24.9%) |
| Serious allergic reaction | 31 (21.1%) |
| Attack of illness (stroke, heart attack, etc.) | 28 (19.4%) |
| Becoming seriously ill | 20 (13.9%) |
| Injury caused by violence | 9 (5.9%) |
| Mental-health-related problem, attempted suicide, etc. | 8 (5.8%) |
| Pregnancy complication or delivery | 5 (3.4%) |
| Poisoning | 3 (1.7%) |
| Alcohol or drug overdose | 1 (1.0%) |
| Other reasons | 2 (1.1%) |
| Unknown reason | 3 (1.8%) |
| Total | 145^a (100%) |

^a Because the data were weighted, the numbers were rounded, and the sum of frequencies in the table is 146.

Table 2

The reasons for choosing a personal car for emergency transport (predefined multiple-choice question).

| Reasons of using a personal car | N (%) |
|---|-------------------|
| It was faster with our own car; we got moving right away | 85 (58.6%) |
| In a sparsely populated area, access to aid is known to take a long time | 44 (30.3%) |
| An ambulance was not immediately available | 25 (17.2%) |
| Forced by panic to leave in our own car (felt compelled to do something) | 24 (16.8%) |
| The situation did not seem very serious at first | 23 (15.6%) |
| The critically ill person wished to be transported by personal car | 12 (8.2%) |
| The paramedic on the phone failed to acknowledge the seriousness of the situation | 11 (7.5%) |
| The route to the place where help was required was extremely complicated | 7 (4.6%) |
| The critically ill person refused to go for treatment by ambulance | 3 (1.8%) |
| I cannot say | 3 (1.8%) |
| Total | 145 (100%) |

Moreover, this approximation is not the only limitation of this study. The fact that the data were based on self-reports and not confirmed by medical professionals represents a much larger limitation. For instance, an exaggeration of the seriousness of the medical emergency by our respondents would lead to an overestimation of the real figures. On the other hand, failure to recollect such emergencies would lead to an underestimation of the real figures; however, this is less probable for cases that had occurred during the previous 12 months.

Even if we assume that only a fraction of these emergency drives saved lives, their number is far from insignificant for any cost-benefit analysis of personal cars as a mode of transport. In Finland, the average number of annual emergency visits is 145 per 1000 residents. Due to a decrease in the number of emergency policlinics in general practice, the number of emergency visits to hospitals has increased by about 20% in the last decade (Rissanen, 2019). One example of a Finnish emergency department is that of Jorvi Hospital, one of the main hospitals in the Helsinki University Hospital Region in Finland, with about 300,000 residents living in its primary catchment area. This hospital witnessed a total of 54,174 emergency visits in 2015, of which 650 (1%) were categorized as life threatening and 11,354 (21%) as an urgent situation. Twenty-seven of these patients died during the visit, of whom 15 were primarily considered to have a life-threatening, eight an urgent, and four a non-urgent condition (Pihlajamaa, 2017). Thus, only 2% of patients with a life-threatening condition, and overall 0.05% of patients died during the primary emergency visit.

It should also be noted that the data were collected in May 2021 during the COVID-19 pandemic, which, as pointed out by one reviewer, might have introduced bias in the self-reporting in an unpredictable way. On the other hand, on April 15, 2020 the three-week-long travel restrictions between the most populated southern region and the rest of Finland were lifted, so this perhaps served as a good time reference for those respondents who reported that the emergency drive took during the last 12 months.

During 2015–2020, the annual number of road fatalities in Finland was between 211 and 270 (Statistics Finland, 2021b). Given that road fatalities represent a high proportion of the costs associated with motor vehicle traffic, the number of lives saved through emergency transport in life-threatening medical situations by this mode of transport should be included in any comprehensive cost-benefit analysis. Even if only 1% of the estimated 33,000 emergencies resulted in a saved life, the figure would nevertheless exceed the annual number of road fatalities.

In this study, which is to the best of our knowledge the first of its kind, we found that personal cars might play a role in saving lives due to their widespread availability and consequent near-immediate availability of transport for those who require urgent medical attention. Future studies should employ a more rigorous methodology (e.g., cooperation with emergency departments) in order to provide a better estimation of the possible impact.

Conflict of interest declaration

The first author's current projects (Road traffic suicides and Road user identities) are supported by several driver organizations and car-industry-funded foundations. None of them had an influence on the topic selection, data collection and analysis, or writing of this article except for JK who was involved in article writing.

CRedit authorship contribution statement

Igor Radun: Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing. **Jenni Radun:** Conceptualization, Methodology, Writing – review & editing. **Jyrki Kaistinen:** Writing – review & editing. **Juho Wedenoja:** Writing – original draft, Writing – review & editing. **Timo Lajunen:** Conceptualization, Methodology, Writing – review & editing.

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