Vision and drivers—a South Wales survey

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ABSTRACT

Background A reasonable level of visual acuity is a prerequisite not only for the safety of drivers and their passengers but also other road users. We surveyed a sample of automobile and motorbike drivers in South Wales to identify the prevalence of drivers failing to meet the visual requirements for driving as laid down by the Driver and Vehicle Licensing Agency (DVLA).

Methods A random sample of 301 automobile and motorbike drivers was stopped under police supervision in a lay-by on a single carriageway in Gwent. A simple questionnaire was administered to 298 of them followed by an eyesight test wherein they were asked to read vehicle registration plates at set distances in daylight. This replicated the mandatory test administered during a person’s driving test in the UK.

Results There were five drivers among those tested whose eyesight failed to meet the DVLA standard for driving. This translates to 26,776 drivers in Wales and over half a million drivers in the UK. The failure rate was greater among drivers older than 40 years of age with one in 45 drivers failing the number plate test in that age group.

Conclusion There is an urgent need to raise public awareness and instigate personal responsibility among drivers to maintain the required vision for driving. The magnitude of the problem raises the debate about licence renewal based on periodic mandatory vision testing and the adequacy of the current visual standards used for drivers.

Keywords road safety, eyesight, motor vehicle, licensure

Introduction

Deaths and injuries from road traffic crashes have been recognized as a growing major public health epidemic by the WHO. Around 3500 people are killed on British roads each year and in Wales alone, there were 180 casualties and 1147 people seriously injured in 2005.1,2 Given these statistics, it is hard to ignore the role of vision that is responsible for 95% of driving-related information inputs.3

In the UK, the Driver and Vehicle Licensing Agency (DVLA) has laid down the mandatory minimum level for driving, and driving with uncorrected defective eyesight is an offence.4 Currently, an eye test taken at the time of passing the driving test, which may be taken as young as 17 for a car licence, need not be repeated until one reaches the age of 70. The number of elderly motorists in Britain is set to climb from 7 million in 1993 to around 16 million by 2030.5 While it is compulsory for vehicles to undergo annual Ministry of Transport (MOT) testing after the first three years of registration, drivers themselves are not required to have a similar test at least every few years. The Royal National Institute of the Blind (RNIB) has recommended that everyone has an eye test every two years and urges people to think of it as a full MOT for their eyes.6 However, the goal of this exercise of improving safety and reducing accidents in elderly drivers should not necessarily be to stop older drivers who are still eligible legally to drive from continuing, as it may impact their health and well-being adversely. More needs to be done to educate the general public in order to raise awareness about vision and road safety.

We set out to identify the magnitude of the problem by testing the vision of drivers on the road. To our knowledge, this was the first roadside survey of its kind conducted in the UK.
Methods

Participants
Automobile and motorbike drivers were stopped on the A4042 to Abergavenny in South Wales on the 23rd August 2006. The survey was conducted during the daytime between 9.30 AM and 3.30 PM. The drivers were chosen in a random fashion as described below. Drivers of heavy goods and public service vehicles were excluded as their visual requirements as set by the DVLA are different from those for car and motorbikes.

Study design
The drivers were stopped and asked to drive into a lay-by by the Gwent police who were assisting the authors. Participation was on an entirely voluntary basis. Drivers were assured that no record would be kept of their vehicle registration number or any other details of them or their vehicle. The police did not carry out any other vehicle check at the same time, despite some vehicles clearly displaying out of date tax discs. A simple questionnaire was administered that recorded drivers’ gender and enquired about their age, the approximate number of years that they had held their licence (it was assumed they held one) and if they were known to suffer from any eye disease. They were also asked if they wore spectacles or contact lenses for driving and the approximate timing of their last eyesight test. Sets of four front number plates (i.e. white) had been erected on poles at distances of 25, 20, 15 and 10 m from the position of the drivers. These distances were chosen to allow us to ask a more open question (‘Which is the furthest number plate which you can read clearly?’) and to obscure the legal limit in the first instance. Lines were spray painted on the lay-by surface and the police ensured that drivers were in as close to the same position each time. Variation in distances would have been within 0.5 m across the sample. The drivers were asked to read the furthest number plate that they could read without getting out of their car. The design of these number plates was as specified in the latest DVLA requirements. Participants were also asked to comment on RNIB’s recommendation about mandatory eye testing every two years. The researchers who administered the test (all volunteer nurses from the Department of Ophthalmology at the Gwent Healthcare Trust) were trained to follow a simple standardized procedure during the survey. Randomization was achieved as a by-product of our desire not to keep drivers waiting too long or to cause safety problems on the main road. All drivers were given a leaflet at the end of the test informing them as to whether they had the required visual acuity for driving. It should be noted that the day was drizzly and visibility for drivers was not good due to spray. Ethical approval for the study was obtained from the South East Wales Ethics Committee who deemed the research to be an audit as it involved testing of a legal requirement in the UK.

Results
A total of 298 drivers were surveyed on the day, with 202 males and 96 females (male:female = 2.1:1). There was one person of the 301 who refused to take part in the survey citing his human rights, and two asked to be allowed to decline because they were in a particular hurry. The age distribution of the participants together with comparable data from the same age groups of drivers in Wales is given in Table 1. The table is derived from the official census data published on the web by the Welsh Assembly Government. Nearly 90% of drivers tested had no known eye diseases; 71.1% of participants had held their licence for 21 years or more; 45.2% wore glasses or contact lenses for driving. Responses about the timing of the participants’ last eyesight test have been outlined in Table 2. There were five participants who failed the test giving a failure rate of 1.68% (95% CI 0.72–3.87%); 94% of participants read the number plate at 25-m distance with ease and 4.3% of drivers read the 20-m (the distance stipulated by the DVLA) number plate comfortably, giving an overall pass rate of 98.3%.

The details of the failures are as outlined below:

- Female aged 40–49 years, did not bring her glasses and made one mistake reading at 15 m.
- Male aged 40–49 years, had glasses in the car, read number plate at 10 m unaided and at 25 m after wearing his glasses.

Table 1 Age distribution of participants in the survey and licence holders in Wales

<table>
<thead>
<tr>
<th>Age groups (years)</th>
<th>Number of participants</th>
<th>Percentage (%)</th>
<th>Percentage of licence holders in Wales (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17–29</td>
<td>36</td>
<td>12</td>
<td>16.7</td>
</tr>
<tr>
<td>30–39</td>
<td>38</td>
<td>12.8</td>
<td>20.7</td>
</tr>
<tr>
<td>40–49</td>
<td>67</td>
<td>22.5</td>
<td>19.8</td>
</tr>
<tr>
<td>50–59</td>
<td>66</td>
<td>22.1</td>
<td>19.4</td>
</tr>
<tr>
<td>60 or over</td>
<td>91</td>
<td>30.5</td>
<td>23</td>
</tr>
</tbody>
</table>
Male aged over 70 years, had glasses in the car, read number plate at 15 m unaided and at 25 m after wearing his glasses.

Male aged over 70 years, with history of recent cataract surgery, could read at 15 m but struggled to read the number plate at 20 m.

Male aged over 70 years read the number plate at 10 m unaided, had visited his optician 2–5 years prior when he did not need glasses.

Of the five failed candidates, three admitted to wearing corrective spectacles. While two of them had their glasses in the car and passed the test once they were worn, one had forgotten to bring the spectacles along. Two of the other drivers were not aware that their eyesight failed to meet the legal requirement. All those who failed lived locally and were allowed to drive home, with strong advice where appropriate that they should not drive again until they had visited an optician. No legal action was taken against them. It is known that at least one of the two drivers without prescribed spectacles visited a local optician within the next couple of days.

Discussion

Main findings of this study
Worldwide, 1.2 million people are killed and an estimated 50 million are injured each year. These figures are projected to increase by 65% unless there is a new commitment to prevention. Our survey showed a ratio of one in 60 drivers who failed to meet the standard visual requirements. When this data is extrapolated and applied to the population of Wales, there are a possible 26 776 drivers in Wales who fail to comply with the stipulated guidelines for vision. In UK as a whole, our findings indicate that as many as 538 333 drivers could be driving with eyesight lower than mandated at any particular time.

However, the ratio for the over 40 age group rises to one in 45 drivers with below standard vision, as the five failures in our survey were in this age group, giving a failure rate of 2.23% in those aged 40 years and above. Three of the five failures were above 70 giving a failure rate of 9.09% in that age group.

There was considerable media interest provoked by this research, some positive and some not. There was much comment about the ‘nanny state’, for example, and in press interviews afterwards the researchers were asked frequently about the desirability for more legislation. The need of the hour seems to be efforts to increase public awareness and driver responsibility. The fact that over 90% of participants welcomed the RNIB recommendation that everyone has an eye test every two years is certainly a first step in this process (Table 3).

What is already known on this topic
A report published by the RNIB in the UK reported that one-third of all drivers, 13 million out of 40 million drivers do not have their eyes tested regularly. Our results were comparable with their data in that only 63% of people surveyed had had their eyesight tested in the last two years. Our findings did not match a reported Specsavers survey that a quarter of all drivers could be driving unsafely due to poor eyesight. A clinic-based survey conducted by Warwick University in 2002–03 showed that of the 35% of people who failed one of the standard eye tests, the Snellen test used by opticians, 65% were drivers.

In June 2006, Lord Robertson, former Secretary-General of NATO, launched the Commission for Global Road Safety in London. It is directed at the G8 leaders and the international community in general inviting them to contribute to the development of a global action plan for road safety. The European Commission has deemed road safety to be the major societal issue for this decade and has committed to halving the number of road deaths by 2010. Different countries around the world have set their own guidelines and laws as to their visual standards for drivers. In Queensland, the driver licence shows an ‘S’ licence code for those who must wear corrective lenses when driving. Police can therefore see immediately that a driver is not wearing glasses or can enquire about contact lenses. It is...
believed that in Spain, Switzerland and certain states of America, having a second pair of spectacles in the vehicle while driving is a legal requirement. In the UK, a proposed similar law was rejected in the House of Lords in June 2003 on the grounds that ‘it would impose an additional expense and burden on an individual to keep a pair of glasses in the car, and presumably to have a spare pair in other places at other times’.  

Age and visual impairment have been shown to decrease driving performance when tested in closed road circuits. It has been argued in the past that there is weak positive correlation between age-induced visual deterioration and unsafe driving or accident rates. This is reflected in some parts of the world such as Egypt, South Africa and the majority of States in the USA where bioptic telescopes are permitted for use while driving. However, Davison analysed data on 1000 British drivers’ accident histories and visual performance and found a strong association, particularly among older drivers. Though vision plays a significant role in self-restriction decision making by elderly drivers, such as choosing not to drive to unfamiliar places, during busy periods or at night, action needs to be taken in view of the increasing numbers. Charman has concluded that no change in the visual requirements for driving be made in the UK as there is no single test or combination of tests that have been shown to be able to effectively screen out those at risk of accidents without also leading to the disqualification of a substantial number of potentially safe drivers. More recent research examining the strength of the relationship between useful field of view performance and driving ability in older adults has shown that it is an effective predictor of incident crashes and can be used to screen at-risk older drivers. On the other hand, loss of driving ability is associated with concomitant losses of freedom, esteem, identity and control. It is therefore desirable that elderly drivers are able to maintain their ability to drive as long as is possible. Kaplan has identified the isolation resulting from loss of driving privileges as a primary factor for mortality from all causes in this age group. Many health professionals thereby feel uncertain of the legal and ethical steps to take when confronted with patients whose eyesight compromises their ability to drive.

What this study adds
This study has shown that one in 60 of British drivers are driving with poor eyesight, with a greater prevalence among older drivers. Lack of personal responsibility is an important factor in that more than half of those who failed had prescription spectacles but were not wearing them. An overwhelming majority of the British drivers sampled welcomed the idea of regular mandatory eye testing for drivers. All public health interventions ought to start with education, and only if this fails should additional legal measures be enacted. Hence we propose a variety of measures short of legislation, as indicated in Box I. The fact that three out of the five who failed the test in our survey had corrective glasses that were not worn at the time of driving highlights the need for educating the public and raising awareness towards maintaining the standard vision required for driving at all times. When asked why they were not wearing their glasses, the three drivers concerned told us ‘I didn’t know I had to make this journey and left them in the office’ (from a healthcare professional) ‘My reactions are very good for a man of my age’ and ‘It makes me look old’ (from a nonagenarian). Interestingly, after the research was carried out there were media broadcasts suggesting that young motorists in UK also are too vain to wear their glasses when driving. Mandatory testing at regular intervals to prove fitness to drive, say every five years from the age of 40 and every two years from the age of 60, may also be considered. The police involved in this exercise noted that although they automatically breathalyse drivers involved in accidents they do not routinely check drivers’ eyesight or whether glasses or contact lenses were being worn at the time.

Box I Publicity campaigns to raise awareness about regular eye checks
- Self-administered number plate tests at public places such as motorway service stations, hospitals or supermarkets.
- Opticians to issue a reminder windscreen sticker for eye checks such as some garages give for car MOT.
- Spare pair of spectacles to be kept in the vehicle when it is in use.
- Motor Insurance policies to clearly state that driving without glasses or without an up to date eye test would invalidate the insurance.
- Vision data to be included in STATS19 data collected at the site of accidents.

Limitations of the study
There is a degree of uncertainty as to whether our sample was representative of the population from which it was drawn. The survey had its limitations with respect to the month of the year and the time of the day in which it was carried out. The fact that it was conducted in August which
is a school holiday period in Britain and during the non-peak hours of the day could have meant that the working population were on holiday or already at work. There were a greater proportion of elderly drivers in the sample surveyed than in the population of all licence holders in Wales with a smaller representation from the younger age groups. However we found a better match than we expected when our data was stratified by age group and compared with the population of Wales (Table 1).

Hence there should be an urgent review of the adequacy of the current eyesight test, recognizing the gap in knowledge about how often people drive, how many driver miles these drivers cover, how far they self-limit their driving to particular times and conditions, and whether eyesight and accident rates are actually linked. Awareness about the importance of vision while driving can be raised through simple publicity campaigns emphasizing the need for regular eye checks for drivers or through mandatory testing at regular intervals to prove fitness to drive. The frequency of eye checks needed and the minimum standard of vision required for driving would be a useful debate to have in the light of recent evidence. There is also a need for more definite and user-friendly guidelines for healthcare professionals on advising the public about their visual fitness for driving.

Competing interest

We declare that we have no competing interest. No funding was required.

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References


