Very old drivers: findings from a population cohort of people aged 84 and over

Carol Brayne, a Carole Dufouil, b Anne Ahmed, a Tom R Dening, c Lin-Yang Chi, a Magnus McGee d and Felicia A Huppert e

Background

Increases in longevity will involve a significant increase among the number of drivers in the very old, who are at greater risk of being involved in road accidents. Data are thus needed from studies of older populations to characterize those still driving, the reasons for giving up and to help formulate appropriate policies for dealing with the problems faced and created by an increase in older drivers.

Methods

A driving questionnaire was administered to surviving members of a cohort comprising a representative sample of individuals aged ≥84, the Cambridge City over 75 Cohort. Out of 546 survivors 404 completed the driving questionnaire at the 9-year follow-up. In addition, subjects were assessed, at baseline and at each follow-up, for cognitive performance using the Mini-Mental State Examination (MMSE) and for physical impairment using the Instrumental of Activities in Daily Living (IADL) scale.

Results

Of the sample, 37% had driven in the past, and 8.4% were still driving, the majority regularly. The drivers tended to be younger (mean age 86.6 years), men (71%) and to be married (67.7%). Although physical disability and cognitive impairment are common in this age group, current drivers had few physical limitations on their daily activities and were not impaired on MMSE. None of the current drivers had visual impairment and 22.6% had hearing loss. Of those who had given up driving, 48.5% had given up at the age of ≥80. The commonest reasons for giving up driving were health problems (28.6%), and loss of confidence (17.9%). One-third reported giving up driving on advice.

Conclusion

A process of self-selection takes place among older drivers. People over the age of 84 who are still driving have generally high levels of physical fitness and mental functioning, although some have some sensory loss. Given the likely increase in the number of older drivers over the next decades, safety will be improved most by strategies aimed at the entire driving population with older drivers in mind, rather than relying on costly screening programmes to identify the relatively small numbers of impaired older people who continue to drive.

Keywords

Driving, elderly, cognitive function, physical impairment

Accepted 11 January 2000
Subjects and Methods

In the 9-year follow-up of a cohort study in Cambridge city, people aged ≥84 were asked about their driving history. The original study of people aged ≥75 had selected all people of this age from six group general practices, with one in three from a seventh practice.11 The respondents were interviewed at baseline and on several occasions subsequently to ascertain changes in socio-demographic status, health status and cognition. At this follow-up as many survivors were contacted as possible from the original 2077 individuals and trained lay interviewers conducted an interview to elicit the information above. Included in the interview for the first time were questions on whether the individual had ever driven a car, how often they drove, whether they still drove a car, and whether they owned a car. If they had stopped driving, the reason for stopping was asked.

Medical conditions reported to the respondents by their doctors were recorded, in particular, angina and ischaemic heart disease, stroke and transient ischaemic attacks. These are conditions about which there are driving policies from the UK Driving Licensing Authority, and these conditions have been incorporated in the driving policies from the UK Driving Licensing Authority, and these conditions have been found to predict driving status.13 Level of physical impairment when able to read only font size ø12, mild impairment when able to read only font size ø14, severe impairment when able to read only font size ø18. Distant vision was not tested.

The Whisper Test was used to assess hearing impairment. A subject was classified as impaired when failing on one of the hearing subtests (not being able to hear one of a sequence of three letters or numbers spoken when standing behind the respondent, with hearing aid if appropriate).

Results

Out of 546 survivors (74%) 404 individuals took part in this 9-year follow-up, of the original cohort (42 further subjects had an interview with a proxy). Of those able to respond to the questions (33 were not able to answer any but the cognitive section) 62.5% (n = 232) reported never having driven a car and 37.5% (n = 139) had driven in the past. Some 31 individuals (8.4% of the total sample and 22.3% of those who had ever driven) reported that they were still driving, 8 occasionally and 23 regularly. About two-thirds were men (n = 22), and one-third women (n = 9). All 31 drivers owned cars. Those who drove were slightly younger than the non-drivers with a mean age of 87.6 as compared with 88.4 years. The prevalence of drivers dropped away sharply with age, and in the ≥90 age group there were only 3 drivers, out of 77 individuals. The characteristics of individuals by driving status are shown in Table 1. The never drivers were more likely to be women, less educated, have lower cognitive performances at each wave and be more physically impaired. Those still driving had higher cognitive performances at entry and their cognitive performances remain remarkably stable over time compared to others. No significant difference by driving status was observed for depressive symptoms, nor for psychotropic drug use and among those still driving, only two subjects were taking psychotropic drugs.

When asked at what age they had stopped, of the 101 who replied, 10.9% had given up before they were 50, a further 17.8% before 70, 8.9% between 70 and 74, 13.9% between 74 and 79, 28.7% between 80 and 84 and 19.8% between 85 and 89.

Driving and physical impairments

Out of the 31 current drivers, none had near visual impairment and 7 had hearing impairment. Of the 31 drivers, 5 reported angina, 3 heart attack, 2 transient ischaemic attack and none stroke.

Driving and cognition

All of the current drivers completed the MMSE at the 9-year follow-up, and none scored below conventional cutoff points for severe cognitive impairment (17/18) whereas 17.8% of the non-driving population did. The mean MMSE of the current drivers was 27.2 (95% CI : 26.3–28.1). This was significantly different from the non-drivers whose mean score was 22.3 (95% CI : 21.9–23.2). Cognitive decline between baseline and 9-year follow-up was significantly less in current drivers (mean MMSE difference = –1.0, SD = 2.5) than in never drivers (mean MMSE difference = –3.6, SD = 5.0) or former drivers (mean MMSE difference = –3.2, SD = 5.5) (P < 0.001).

Reasons for giving up

Of the 108 individuals who reported ceasing to drive, 28.6% reported giving up because of health and 17.9% due to loss of
confident or other psychological reasons. Only one reported ceasing because of being told to by a doctor, four by relatives, five by other drivers and ten stated they found public transport to be more convenient. Forty-seven gave other reasons, largely financial, for stopping driving. Many reported a combination of these factors which were not seen as mutually exclusive.

Table 2 presents factors associated with driving cessation. It shows that driving cessation is mainly related to severe physical impairment and cognitive impairment.

Discussion

This study of the very old reveals that those people who continue to drive tend to be younger, are more likely to be men, and are cognitively intact according to MMSE. Thus older people appear to be making the decision to stop driving when they are aware of failing faculties. The study further shows that doctors are very rarely involved in the decision to stop driving, but that health status is cited, along with confidence, as the reason for stopping driving. Despite the drivers functioning very well some do report visual and hearing difficulties which could potentially interfere with driving competence, although distant vision was not tested.

This study is hampered by the small number of drivers. However, the sample derives from a population base, rather than being selected on the basis of admission to hospital or having an accident. The non-drivers in the sample were more characteristic of the drop-outs than the drivers and, although it is possible that there were drivers in the drop-outs, it would have to be assumed that there was a difference between non-responding drivers and responding drivers. There was a high response amongst the survivors (404/546) and some of the non-response was definitely due to frailty. As far as we are aware from death certificates, no death has been due to road traffic accidents in this group.

Although MMSE can be viewed as a relatively crude instrument for measuring cognitive functions, higher levels of performance, as demonstrated by the drivers, are rarely associated with late onset of dementia. Moreover, MMSE has been found to correlate well ($r = 0.71, P < 0.01$) with in-traffic tests scores allocated by active observations of driving in licensed drivers.3

The study is UK based and of a particular age cohort, predominantly women. There are likely to be considerable cultural, including differential gender, effect and cohort effects which will necessitate monitoring the ways in which older populations’ attitudes to driving evolve.

Table 1 Sample characteristics at 9-year follow-up by driving status

<table>
<thead>
<tr>
<th></th>
<th>I Never driver (N = 232)</th>
<th>II Former driver (N = 108)</th>
<th>III Current driver (N = 31)</th>
<th>P-value (I/II)</th>
<th>P-value (I/III)</th>
<th>P-value (II/III)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% female</td>
<td>87.1</td>
<td>50.9</td>
<td>29.0</td>
<td>0.001</td>
<td>0.001</td>
<td>0.003</td>
</tr>
<tr>
<td>% married</td>
<td>31.0</td>
<td>45.8</td>
<td>67.7</td>
<td>0.007</td>
<td>0.001</td>
<td>0.03</td>
</tr>
<tr>
<td>Mean age (SD) (years)</td>
<td>88.4 (3.3)</td>
<td>87.9 (2.6)</td>
<td>86.6 (2.2)</td>
<td>0.10</td>
<td>0.003</td>
<td>0.06</td>
</tr>
<tr>
<td>% more educated (left school aged ≥15)</td>
<td>27.2</td>
<td>47.5</td>
<td>54.9</td>
<td>0.001</td>
<td>0.002</td>
<td>0.46</td>
</tr>
<tr>
<td>Mean no. of depressive symptoms (SD)</td>
<td>2.8 (2.0)</td>
<td>2.4 (1.8)</td>
<td>2.4 (1.7)</td>
<td>0.11</td>
<td>0.31</td>
<td>0.93</td>
</tr>
<tr>
<td>% taking psychotropic drugs</td>
<td>16.0</td>
<td>11.9</td>
<td>6.5</td>
<td>0.31</td>
<td>0.16</td>
<td>0.39</td>
</tr>
<tr>
<td>Mean MMSEa score at baseline (SD)</td>
<td>25.9 (3.0)</td>
<td>26.8 (2.9)</td>
<td>28.2 (1.1)</td>
<td>0.01</td>
<td>0.001</td>
<td>0.01</td>
</tr>
<tr>
<td>Mean MMSE score at 9-year follow-up (SD)</td>
<td>22.3 (3.0)</td>
<td>23.5 (6.0)</td>
<td>27.2 (2.4)</td>
<td>0.06</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>Mean no. of IADLb limitations (SD)</td>
<td>2.6 (1.9)</td>
<td>2.3 (1.8)</td>
<td>0.7 (0.9)</td>
<td>0.12</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>% having ≥3 IADL limitations</td>
<td>50.9</td>
<td>43.2</td>
<td>6.5</td>
<td>0.18</td>
<td>0.001</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Table 2 Factors associated with driving cessation

<table>
<thead>
<tr>
<th>Gender</th>
<th>Odds ratioa (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>1</td>
</tr>
<tr>
<td>Female</td>
<td>2.2 (0.8–6.2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Odds ratioa (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤15</td>
<td>1</td>
</tr>
<tr>
<td>≥15</td>
<td>0.7 (0.2–1.9)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Years of schooling</th>
<th>Odds ratioa (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥14</td>
<td>1</td>
</tr>
<tr>
<td>≥15</td>
<td>0.7 (0.2–1.9)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MMSEa score at baseline</th>
<th>Odds ratioa (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase or &lt;3 points decrease</td>
<td>1</td>
</tr>
<tr>
<td>≥3 points decrease</td>
<td>11.5 (2.8–41.1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MMSE change between baseline and 9-year follow-up</th>
<th>Odds ratioa (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase or &lt;3 points decrease</td>
<td>1</td>
</tr>
<tr>
<td>≥3 points decrease</td>
<td>11.5 (2.8–41.1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of physical impairments (IADL)</th>
<th>Odds ratioa (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>1</td>
</tr>
<tr>
<td>≥3</td>
<td>9.0 (2.43)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Visual or hearing impairment</th>
<th>Odds ratioa (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>1</td>
</tr>
<tr>
<td>Yes</td>
<td>2.7 (0.9–7.7)</td>
</tr>
</tbody>
</table>

---

a Odds ratio estimated from multivariate regression model adjusting for all factors.
b Mini-Mental State Examination.
c Instrumental Activities of Daily Living.
The proportion of drivers in this population was less than the 19% reported from a study of acute geriatric wards, but this hospital-based study included younger respondents. A case-control study has suggested that there was no significant difference between cases with Alzheimer’s disease and controls in their accident record, probably due to the reduction in driving in the cases. The case-control approach led to similar findings to ours—in the cases who had ceased driving, neuropsychological test scores were also consistently lower.

This UK-based study found only one individual who had been advised to stop driving by a physician; this is in marked contrast to two US studies in which between 27% and 23% were so advised. In Persson’s study of ex-drivers, the proportions who reported loss of confidence and medical conditions reported these similarly as factors in their decision, but more reported advice from others. The main reason reported for driving cessation in another UK-based study was cost, also cited by many in our study.

In Morgan’s study, 22 out of 43 of the drivers on acute geriatric wards suffered from significant conditions which could interfere with driving. These were angina, transient ischaemic attacks, blackouts, poor vision and hypoglycaemia. These conditions were rare in our population sample. This difference almost certainly results from the nature of the hospital sample. It would have been of interest in the hospital sample to ascertain whether these individuals continued to drive once discharged from that episode, as these health reasons are also those which are associated with driving cessation.

This study shows clearly that older people themselves can make the decision to stop driving, and that there are factors which influence this decision. More worryingly, however, this study suggests that the call to screen for dementia or health status in the older population will not reduce the marked rise in accidents seen with age, because those with cognitive impairment and failing health in the oldest age groups have already chosen to stop driving. Thus the bulk of accidents seen in the older age groups is likely to be the result of accidents involving fit older people, with relatively intact health and cognition. This is a finding of some public health importance and suggests that a wider-reaching strategy should be pursued to identify what is a finding of some public health importance and suggests that fit older people, with relatively intact health and cognition. This is a finding of some public health importance and suggests that fit older people, with relatively intact health and cognition. This is a finding of some public health importance and suggests that fit older people, with relatively intact health and cognition.

This study was funded by the Charles Woolfsson Charitable Trust, the Medical Research Council, and the East Anglian Regional Health Authority Public Health and Operational Research Committee. We are grateful to the general practitioners, their staff, our respondents and their families for their continuing commitment to the study.

References