

General Practitioners' Perceptions of the New Cognitive Screening Tool for Older Drivers in South Australia

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Abstract *Background:* It is well acknowledged that older drivers with dementia have higher crash rates compared to controls. Doctors in South Australia are required to provide certification of medical fitness to drive for licence renewal of individuals aged 70+ years. Currently, there is no available instrument with adequate predictive validity similar to on-road driving test for older drivers. A new cognitive screening test known as 'the Snellgrove Maze Task' (SMT) was developed to assess driving capability in older drivers in South Australia. The aim of the current study was to assess General Practitioners' perceptions of the use of Snellgrove Maze Test in practice. *Methods:* Ninety General practitioners (GPs) from South Australia were invited to participate in a trial SMT on older drivers for driving licence renewal. Fifty-two (57.7%) GPs responded and trialled 119 patients. Ethics approval for the study was granted by the Department of Health Human Research Ethics Committee. Informed consent was obtained from each individual patient. *Results:* Almost all (96%) respondents strongly and believed that they would use SMT. Both rural and metropolitan GPs were more likely to strongly agree that the tool was useful, and that it was acceptable by older driver patients. This agreement was statistically significant among GPs from rural areas ($p=0.0000$). Also GPs from across metropolitan and rural areas were more likely to strongly agree that they would use the tool. This assertion was statistically significant among GPs from both rural ($p=0.004$) and metropolitan ($p=0.046$) areas of South Australia. The need for GPs' training and the promotion of SMT were identified as issues that needed to be addressed for effective use of SMT. *Conclusion:* The findings of the study indicated a high acceptability rate of SMT by GPs. Its introduction would offer doctors a means to objectively and consistently assess cognitive functions affecting the driving competency of older drivers. However, because SMT discriminates for cognitive domains specific for safe driving only, it would best be introduced as an adjunctive screening measure in the licence renewal process of older drivers.

Keywords: *general practitioners, older drivers' cognitive assessment, the Snellgrove Maze Task, South Australia*

1. Introduction

Although the rate of decline of mental and physical health varies greatly in individuals, changes that occur as a result of the ageing process eventually affect the safe driving ability in each individual. Evidence exists indicating significant problems with attention and visuoconstructional deficits in older people early in dementing process which may impair necessary cognitive functions needed for safe driving [1,2,3].

As a result of improvements in public health and lifestyle, the number and proportion of population aged 65+ years in Australia have significantly increased during the past few decades [4,5,6]. The Australian population aged 85+ years has also increased significantly [4]. The rising prevalence of dementia in association with ageing of population has resulted in increasing number of drivers with dementia on Australian roads [6,7]. For example, in

2006 it was estimated that approximately 190,000 people had dementia in Australia, of whom 81% were aged 75+ years [8]. Of added concern is the fact that because the disease is significantly related to age, this number is predicted to increase to approximately 465,000 by 2031 [8]. Older drivers with moderate or severe dementing disorders pose a hazard to themselves and the public and recommendations have been made to prohibit driving in this population group [1,9].

In recognition that many older individuals are subject to age-related decline in the abilities to allow them to drive, South Australian (SA) doctors are mandated to provide certification of medical fitness to drive for licence renewal of individuals aged 70+ years and to notify the transport authority of any individuals who they believe are unfit to drive as a result of mental or physical impairment [10]. Because of the variation in ability to drive in each person, [1,10] individually tailored assessment of relevant functional skills for driving safely is necessary [11]. The identification of those individuals who pose a risk to

themselves and others can help to institute public health interventions.

Although there has been a debate as to which medical speciality should do the assessment, GPs are often responsible for the assessment of driving capability and the notification to Driver Licencing Authority of the driving ability of older drivers [1,10]. Notification may occur administratively via the Licencing Renewal Form of Transport SA. However, early dementia conditions are not readily recognised by GPs routinely due to several reasons including the lack of cognitive screening instrument with adequate predictive validity of on-road driving ability in older people with dementia [1,12-19]. For example, the Mini Mental State Examination test (MMSE) which is a neuropsychometric test familiar to many GPs, screens for general cognitive functions but does not measure attention or executive dysfunction caused by dementia and does not demonstrate adequate predictive ability in relation to on-road driving ability [1]. In addition to being an untimed test, the accuracy of MMSE results have been found to vary significantly in people of different social classes, ages, educational levels and ethnicities - leaving questions regarding the utility for identifying individual driving competency by MMSE. In addition, the majority of GPs do not have the necessary formal training in assessing cognitive and physical skills that are needed to be a safe driver [1]. Expensive and legislatively restrictive neuropsychometric screening tests make it difficult for GPs to purchase and use many of the available cognitive screening tools. Because of gradual cognitive decline in older drivers and the lack of readily available objective screening tests, doctors could inadvertently allow people with dementia to continue to drive which may potentially result in serious consequences [1,20].

In responding to deficiencies identified above and as an important public health intervention, Snellgrove (2005) developed a new timed pencil-and-paper screening test known as the Snellgrove Maze Task (SMT) [1,11]. The objective was to offer doctors a means to objectively and consistently assess cognitive functions affecting the driving competency of individual older drivers. The SMT has very attractive characteristics for use including: (i) being simple to administer, (ii) being brief, consuming only up to two minutes in total to administer and score, (iii) being safe and acceptable to older drivers, (iv) being generally inexpensive with material required being a pen/pencil, a paper (the "puzzle" presented in large print) and a stopwatch, (v) providing an assessment of discrete cognitive domains required for safe driving including attention, visuoconstructional skills, and executive functions of planning and foresight, and (vi) being relatively free of possible confounding effects of socio-demographic variables of age, gender, educational attainment, and country of birth, which is an advantage over commonly used cognitive measures [1,11]. This ensures that screening measures are free of bias as culture-fair classifications are important aspect in public health research and practice in Australia, where the proportion of overseas born older people from culturally and linguistically diverse backgrounds is increasing and ageing [21,22,23]. Also, SMT scores correlate with a combination of measures of cognitive domains considered critical to the ability to drive a car and to negotiate traffic and road situations, including attention, visuoconstructional

skills and executive functions of planning and foresight [1,2,3,24]. Furthermore, SMT has been tested and found to discriminate with high accuracy those participants who passed the on-road test (the gold standard) from those who failed the same test [1,11]. Because of its high ability to predict driving competency in older drivers, the tool provides an effective and objective method of assessment to determine an individual's functional driving capability [1]. In addition, unlike other neuropsychometric tests, SMT is free from legislative requirements associated with the Psychological Practices Act and may be used to determine cognitive driving competence in older drivers by any eligible health professionals and not restricted to psychologists alone. As such, other practitioners particularly General practitioners (GPs) who are more readily accessed by large proportions of older people requiring assessment for licence renewal may use it when required [1]. Additionally, because SMT is not language based, it ensures that more cultural fair classification will result [11].

As an important step towards field testing of SMT in clinical settings, a field trial was conducted among General Practitioners (GPs) in SA. The aim of this study was to assess GPs perceptions of the use of SMT in practice.

2. Methods

2.1. Recruitment Process and Participants

The General Practice of South Australia (GPSA) was the peak body for 14 South Australian Divisions of General Practice with important role in advocating for divisions regarding health policy and planning, program development, implementation and evaluation and a link and focal point for information between Divisions and State Government and other non-governmental organisations. Through a collaborative partnership with GPSA, an invitation letter describing the Snellgrove Maze Task and the purpose of the field trial was sent to all GPs in SA via the 14 Chief Executive Officers of Divisions of GP in December 2009. Based on the number of registered GPs with GPSA (N= 1840) and alpha set at 5% (95% CI: 85% expected and 60% worst acceptable proportions of GPs supporting the Maze Task), a sample size of 30 GPs was required. GPs were asked to contact the study coordinator (LM) by phone or email to register their interest to participate. All General Practitioners (GP) in South Australia (SA) have to be registered by the Australian Health Practitioner Regulation Agency (AHPRA). Additionally, at the time of this study, all GPs in the GPSA register were licenced to provide older drivers certification for medical fitness to drive. As such, all GPs registered by GPSA were eligible to participate in the study. GPs involvement in the study was voluntary. Ninety GPs indicated interest and volunteered to participate. Recognising that GP surveys return rate vary widely, [25,26,27,28,29] and to protect for the losses, all 90 GPs who volunteered were invited to the study and were asked to trial this new cognitive screening instrument (SMT) on a typical group of patients (70+ years) who presented to seek certification for medical fitness to drive for their licence renewal between January and February

2010. The study required GPs to respond (Yes or No) to the purpose built questionnaire after their patients had completed the trial. The questionnaire comprised five questions including:

- 1). This screener is simple, brief and easy to use in assessing the likely driving competence of older people who may have MCI or early dementia
- 2). This tool will help GPs screen for the signs of mild cognitive impairment (MCI) or early dementia in older drivers.
- 3). I would use this screener if introduced in SA to assess the likely driving competence of older people with known or suspected MCI or early dementia
- 4). Is the Snellgrove Maze Task economically viable in General Practice?
- 5). This screener is acceptable by my older driving patients?

GPs were also provided an option to provide open ended comments for each question to describe their perceptions of the SMT.

Patients were asked to complete SMT and the performance was scored according to time (in seconds) on completion of the test. Informed consent was obtained from all participants and anonymity confirmed. Participants were also advised that their performance results on the SMT would be considered in combination with other criteria in the GP's decision to provide the certificate for driving. No performance data on individual patients was collected.

2.2. Data Analysis

Data was analysis using Stata statistical package and a range of descriptive and rational analysis performed. Where appropriate, the Chi-square test was used to determine whether there were statistically significant differences of outcome variables. Qualitative responses were analysed manually by identifying key issues and themes and these were related back to objectives of the study.

2.3. Ethical Considerations

Ethics approval for this study was granted by the South Australian Department of Health Human Research Ethics Committee (Project number HREC 328/11/2012). Patients were asked for the consent to participate voluntarily, and advised that they would not have direct benefits from the trial.

3. Results

3.1. Demographic Characteristics of Study Respondents

The survey response rate was 57.7% (n= 52 (52/90)) including 34 (65.4%) males and 18 (34.6%) females (Table 1). Respondents were from different divisions of GP across South Australia and their ages ranged from 30 to 66 years (mean age = 51.4 ± 7.4 years). The highest frequency (mode) age-group of respondent was between 50 and 54 years (Figure 1). Respondent GPs' ages and sex differences for both metropolitan and rural locations were not statistically significant (p= 0.172).

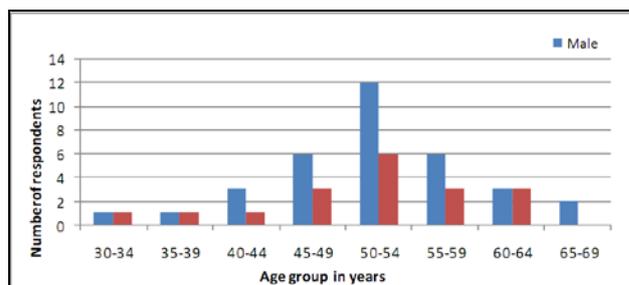


Figure 1. Number of respondents' age-groups by sex

3.2. Respondent GPs Location and Clinical Work Experience

Respondents worked in different divisions of general practice across metropolitan (65.4%) and rural (34.6%) areas of South Australia (Table 1). Respondents work and clinical experience ranged from 3 to 41 years (mean = 23.4 ± 8.4 years), with highest frequency (mode) being between 30 to 34 years of work experience. The majority (76.3%) of respondents were males, who were more likely to work full time compared to females (p= 0.0000). Both male GPs and female GPs were more likely to work full time, but in comparison to female GPs, the likelihood of male GPs (both from rural and metropolitan areas) working full time was statistically significant (p= 0.0000). Females made the majority (92%, p=0.0000) of GPs who worked part time. There were no male respondent GPs who worked part time in rural areas (Table 1). Respondents' work status (full time vs part time) was not statistically different between rural and metropolitan GPs (p=0.393).

Table 1. Gender of respondents and work experience by location and sex

Location	Work status	Sex		Total No.	Percentage (%)
		Female	Male		
Rural (N=18, 34.6%)	Full time	1	14	15	29
	Part time	*3	0	3	6
Metro (N=34, 65.4%)	Full time	6	19	25	48
	Part time	*8	1	9	17
	Total (%)	18 (34.6)	34 (65.4)	52	100

*Compared to male GPs, female GPs were more likely to work part time (p=0.0000).

3.3. Field Trial Screening and Older Drivers' Responses

Each GP assessed between one to seven patients (mean 2.4 ± 1.2 patients/GP). In total, 119 older drivers aged 70+ years from different areas across metropolitan and rural SA participated in the field trial (Table 2). All trialled older drivers completed the trial successfully, but one GP reported to have referred a patient to conduct an on road driving test because he was not sure of his performance results. None of the tested drivers chose to surrender their licences due to results of this field trial.

Table 2. Number of doctors by sex and total number of patients screened

No. of patients/GP	Sex of doctor		Total No. of GPs	Total number of patients screened
	Female	Male		
1	5	6	11	11
2	3	8	11	22
3	10	18	28	84
4	0	1	1	4
7	0	1	1	7
Total	18	34	52	119

3.4. Respondents' Quantitative Responses of Study Questions

Forty nine (94%) respondents strongly agreed that SMT would help them with this assertion being statistically significant for both rural ($p= 0.004$) and metropolitan ($p= 0.046$) GPs (Figure 2).

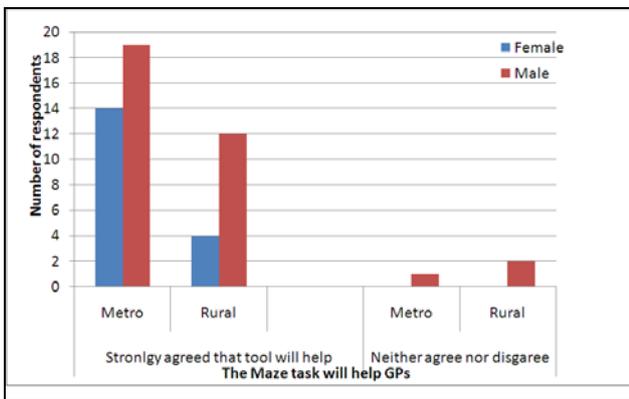


Figure 2. Respondents responses on whether the Maze task will help GPs

The majority (96.2%) of respondents strongly agreed that they would use SMT in their practice if introduced in South Australia (Figure 3).

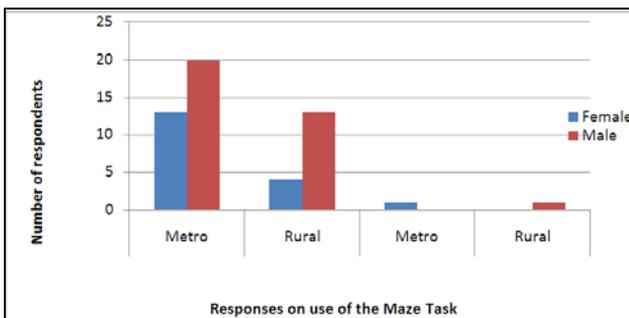


Figure 3. Respondents will use the Maze Task by location and sex

Forty eight (92.3%) respondents strongly agreed that SMT was simple, brief and easy to use and the majority (84.6%) strongly agreed that it was economically viable in their practice (Figure 4). Forty three (82.7%) respondents strongly agreed that the SMT would be acceptable by older drivers and (17.3%) were uncertain whether the instrument would be acceptable by their clients.

Most (88.5%) respondents reported that their clinical judgements matched patients' performance results on SMT and 11.5% noted that their clinical judgement did not correspond to the SMT performance results (Figure 5). However, only one GP reported to have referred a patient to conduct an on-road driving test to confirm the participant's performance results of SMT

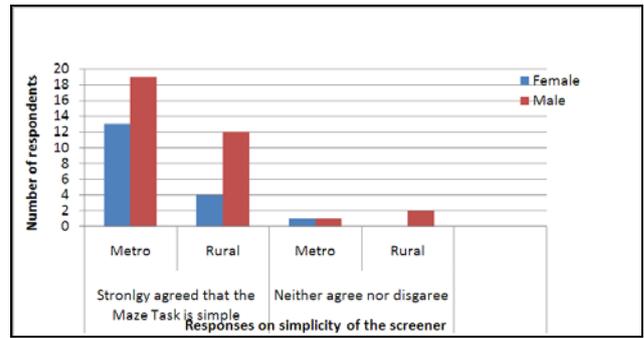


Figure 4. Respondents and simplicity of the Maze Task by location and sex

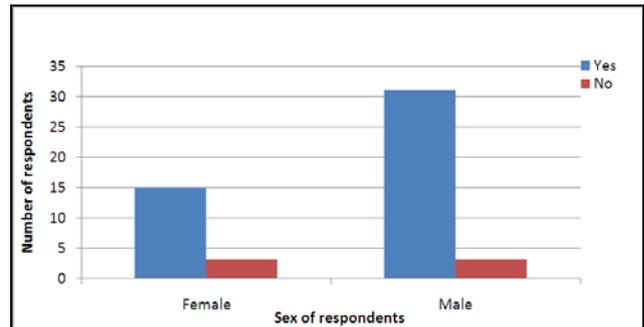


Figure 5. GPs judgement corresponding with the Maze Task results by sex

3.5. Qualitative Responses to the Core Questions

Because of the current situations where it is unclear what tool to be used and who specifically should conduct screening to determine the driving competence in older drivers, GPs expressed different views about the use of SMT in their practice. As expressed by the following quotes, some GPs affirmed that they were willing to use SMT if introduced in clinical practice.

"I am very happy to have an objective tool to use". Male GP.

"This tool is good as it corresponds only with aspect of driving and ease to use too". Male GP.

"This tool is quick and I always gave them a bit of mental task to do anyway". Male GP.

"This tool was easy, did not need literacy or numeracy skills". Female GP.

"I will use the Snellgrove Maze Task as I know it has been validated for this purpose". Female GP.

GPs indicated that the tool would help in their clinics. They were also happy that, following the trial completion, results matched their clinical judgement.

"I hope this tool will help, it is interesting to watch people complete it. Almost as soon as they start you can tell how cognitively sound they will be". Male GP.

"All three patients trialled needed renewal of the licence and all completed and passed as I predicted". Male GP.

Some GPs have been assessing older patients for driving competence and they have never had to ask whether the patients were happy to use the tool. Interestingly, expressions were made indicating that if introduced, older drivers needing medical certification for driving would be happy to use the new tool. Examples of such expressions were such as:

"All patients happy to do it. One was amused.". Male GP.

“No one refused (I asked only three people though). I suspect some will be wary (but then that may mean they are worried about the ability to perform)”. Male GP.

Even though some GPs use other tools to assess driving capability for their elderly patients, it was interesting to note that compared to other screeners, the Snellgrove Maze Task appeared to be an attractive option.

“I currently use the Trail Making test B. Many of my colleagues do not do screening for driving. The Snellgrove Maze Task is easy to use and may be attractive to many GPs.” Male GP.

“I did both the Trail making test and the Snellgrove Maze Task. The Snellgrove Maze Task screener was two minutes all up and the Trail making test five minutes”. Female GP.

A few GPs expressed that there was no need for a new tool because they were happy with the tools they were using. Expression indicative of such assertions were:

“I normally use the Cox test which takes similar time but does not need two worksheets handy”. Male GP.

“My patients have been screening for more than five years and expect to screen (Mini Mental State Examination, 2000-2005, Trail Making B, 2005-2010; the Snellgrove Maze Task, 2010), who knows?” Male GP

Although after trialling most participating GPs were satisfied and expressed the willingness to use SMT, some respondents demonstrated a degree of uncertainty of this tool and the screening process. Concerns were also raised regarding the accuracy of the assessment and doubts were expressed whether the tool would be used on people who were known to have cognitive impairment.

“This tool is very easy to use. This study does not assess its accuracy in assessment of driving competence”. Male GP.

“I would like to try it on people who I know have cognitive impairment”. Female GP.

“I would prefer universal requirements rather than to have to select who we ask”. Male GP.

Some expressions indicated that the use of the new tool would impose some anxiety on some patients. In addition, GPs expressed concerns that needed to be addressed if this new tool was to be introduced as a compulsory screener for driving capability SA. Expressed views were related to time added for the consult, the ease of accessibility of the new tool and the need for GP training. Expressions that were related to these issues included:

“Some apprehension at being asked to do it”. Female GP.

“They will feel threatened if it [Maze Task] becomes compulsory”. Female GP.

“Patients not keen”. Male GP.

“One patient did not like it [Maze Task]”. Male GPs

“This tool is good, only adds a little time to the consult.” Male GP.

“Access is needed via my computer to regularly use it, for example, to print it off my screen.” Male GP.

“We may need some training to be sure how to use it”. Male GP.

4. Discussion

There was notably high rate of GPs from both metro and rural areas responding that they would use SMT. This

suggests a willingness on their part to conduct the screening for driving competence in older drivers if the tool was made available to them. The findings of the current study also support other studies that GPs are appropriate for the role of screening to predict the driving competence of older drivers with dementia because they are local, accessible, trusted, and play a pivotal role in the ongoing medical management of older drivers [1,13,14,15,30,31,32]. Factors including the lack of a brief, objective and consistent tool to help GPs with busy clinics to rapidly conduct screening for driving competence for older drivers play and contribute to undiagnosed dementia in the elderly [1,33]. It is also likely that some cases of dementia remain undetected [34,35] because some individuals with dementia may present as friendly and cooperative [1] and the majority present to their doctors for reasons other than cognitive problems [36].

To protect the general public from older drivers who are unable to drive safely because they are cognitively impaired by the dementing process, an objective, consistent and accurate tool in recognizing individual older drivers ‘at risk’ is necessary, and the SMT could provide some avenue to address this. The current study supported available evidence and indicated that GPs are appropriately positioned for this role. The introduction of SMT would therefore offer GPs a means to objectively and consistently perform this task and to identify the risky drivers without an on-road test, resulting in a substantial reduction in the need to perform an on-road driving test [1].

Although the majority of respondents found SMT to be easy, brief and simple, and they said they would use it, there were some questions arising from the fact that it was a new instrument and not well understood by GPs. In order for GPs to use this new tool and to conduct the screening effectively and efficiently, Snellgrove noted that GPs would require some training [1]. Consistent with the findings of the current study; education, training, the provision of appropriate guidelines and ongoing support for health professionals were among complex factors identified for successful management of health and driving in the elderly by a study commissioned by the National Transport Commission in 2006 [37].

Although a large proportion of respondents strongly agreed that SMT would help them screen for signs of early dementia, issues were raised including whether this new tool would be easily accessed. In addition to further training, some GPs indicated the need to promote SMT in order to alleviate worries that doctors and patients may have regarding the quality and appropriateness of the use SMT. These questions are necessary and it is reasonable to promote the instrument and provide training including appropriate information on validity of this new instrument to GPs in order to ensure that GPs understand the tool well and are able to use it effectively.

Although the Driver Licencing Authority in South Australia requires GPs to notify them of all potential drivers who may pose a danger to themselves and others as a result of not being medically fit, current study responses seem to provide a number of shortcomings in the field. For example, it is clear that: not all GPs conduct cognitive assessments for driving capability; and/or not all patients aged 70⁺ years know that they need to have screening conducted to find out whether they are

cognitively capable of driving. These inconsistencies in practice may partly be caused by the lack of a clear directive from the Driver Licensing Authority in SA as to what should be assessed, as well as the lack of a simple tool that can be used consistently and rapidly in busy GP settings. Previous findings [1] which were echoed in the current study, indicate that some GPs conduct medical assessments for fitness to drive but do not necessarily test for cognitive impairment affecting driving competence in older drivers. This is not surprising, because, coupled with the lack of an easily accessible objective screening tool with high predictive value, driving is a highly visual task and it has traditionally been expected that the higher incidence of visual problems and eye disease in the elderly is a primary cause of their driving deficiency [38]. Failure to assess for cognitive impairment may inadvertently allow people with dementia to continue to drive, with potentially disastrous consequences.

In response to an ageing population which will increase the numbers of individuals with early dementia on SA roads, it is necessary to have a directive that requires doctors to assess for cognitive impairment affecting driving ability and an objective cognitive screening test would provide the necessary support to achieve this. Findings from a previous study that examined whether the introduction of compulsory cognitive testing for driving ability would potentially threaten doctor-patient relationship, provided in principle support of the introduction of SMT in SA, with 90% of GPs affirming that the tool would help them make more objective and defensible judgement [39]. Consistent with the previous findings, responses from the current study indicated that the introduction of cognitive testing for compulsory assessment for the licence renewal process would more likely add a small amount of time to the GP consultation. It has however been argued that this cost would be minimal at a societal level relative to the potential for reducing the financial, material and human costs associated with medical services, vehicle repairs for crash victims, property damage and the quality of life lost by victims and their families in on-road crashes caused by an undetected dementing person [1,40]

4.5. Limitations of the Study

It is important to acknowledge some limitations of the field trial. Firstly, the sample size was derived from only one state of Australia. It would have been better if a multicentre study had been conducted to involve more than one state in Australia, thus providing a bigger sample size. Additionally, the sample was derived from GPs who volunteered to participate. Although the selection of the GPs was not purposive, it is possible that GPs who volunteered were those most concerned with the screening of the older people for driving competence, and/or those who had an interest in issues pertaining to injury prevention in general. The time provided for the field trial was only two months. This is a relatively short timeframe and may have precluded GPs who were not able to take part within the time parameters of the study. It is also possible that the short timeframe was the cause of some interested GPs not responding because they did not have patients seeking certification for medical fitness to drive during the two month period of the field trial. In addition,

the trial was conducted in the New Year (i.e. January and February 2010). It is also possible that some GPs were on leave during this time of the year and that would have precluded them from accessing the recruitment strategy. However, these shortcomings would have been compensated by the additional recruitment strategy as described in the methods section of the report. Also, because the study recruitment information was sent to all GPs, it plausible to argue that both rural and metropolitan GPs had equal chances of responding, if an interest existed.

5. Conclusions

The findings of the current trial support a high acceptability rate of the Snellgrove Maze Task by GPs. This new tool has recently been found to be a valid method of screening for driving capability in older people with early dementia [11]. If the use of SMT were made compulsory for the licence renewal process, GPs would be required to administer it by law and this would also serve to clarify their primary role in this regard. Patients would understand the mandatory nature of this screening by GPs and this would reduce any perceived threat to the doctor-patient relationship.

Additionally, a high proportion of GPs confirmed a high level of acceptability of SMT by older drivers. If introduced therefore, the possibility of resistance from older drivers would be low. Because SMT is very simple, easy and brief to administer and score, a relatively small increase in the fee for assessment of fitness to drive, which could be recovered by marginally increasing the Medicare fee or patient gap charge, may provide GPs with adequate reimbursement. Because SMT is limited to screening for cognitive domains associated with safe driving only, it could only serve as an adjunctive screening measure in the licence renewal process of older drivers. In addition, training of GPs in the use of the tool and the promotion of it among GPs as a quality tool for assessment would be required.

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