

Mobility, Safety and Experiences of Blind and Low Vision Pedestrians in Victoria, Australia

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ABSTRACT

In Australia, approximately 300,000 individuals are blind or experience low vision, with this figure predicted to double by 2020. One of the major challenges for this population group is the ability to maintain independence, commonly measured in the context of mobility. For these individuals, travelling from one destination to another can be difficult. This has led road safety organisations to consider development of road environments that provide for the needs of pedestrians with vision impairment. First however, a better understanding of their mobility patterns is necessary. The present paper presents findings from a two-part study aimed at investigating the issues surrounding the safety and mobility experiences of pedestrians who have vision impairment. The first component entailed a telephone survey of 607 adults who were either blind or experience low vision. The second component entailed two focus group sessions completed with a total of 22 orientation and mobility (O&M) instructors. Findings were discussed in the context of travel patterns, interactions with road and pedestrian infrastructure systems, strategies utilised, as well as collision involvement. O&M training was a particular focus of this paper given the limited research, yet expected benefits associated with mobility and overall safety for pedestrians with vision impairment. Findings from the study suggest that positive experiences along with skill development related to independent travel are perceived outcomes for participants who take part in O&M programs. However, such programs will likely benefit from advancing research in the field. In summary, pedestrians who are blind or experience low vision have a complex pattern of interaction with the road environment that will likely benefit from a combination of enhanced road infrastructure and technologies, complemented by O&M training.

Keywords: Vision (visual) impairment; low vision; blind; pedestrians; vision (visual) impaired pedestrians; safety; mobility; orientation and mobility

1.0 INTRODUCTION

Independent travel is an important goal that humans undertake regularly in their everyday lives. For individuals who experience functional impairments, achieving this task becomes more challenging, along with a range of associated risks. One of these risks involves being a pedestrian, who form one of the most vulnerable road user groups. Pedestrians are at an increased risk on roads due to their lack of protection and limited biomechanical tolerance to violent forces when impacted by a vehicle or other road user (see Dept. Infrastructure, Transport & Regional Development, 2010 and Harrison & Berry, 2008 for recent pedestrian crash statistics). For pedestrians who experience functional impairments, this risk further increases greatly as their needs while using the road network system are likely to vary. Pedestrians who experience vision impairment are an example of an increased vulnerable pedestrian road user group.

The World Health Organisation (2012) reported around 285 million people worldwide have at least some degree of vision impairment, of which 39 million are blind. For developed countries like Australia, many eye conditions are directly associated with ageing, and approximately 82 percent of all people who are vision impaired are aged 50 years and older. Most recent available statistics in Australia suggest approximately 292,700 individuals are either blind or experience some form of vision impairment, and it is estimated that this figure is set to continue increasing with the ageing population (ABS: Ausstats, 2004).

Limited research has been conducted on the experiences of pedestrians with vision impairment, despite the identified need. Of existing literature investigating the experiences, patterns of behaviour, and challenges associated with safe mobility for this pedestrian subgroup, findings remain inconclusive. However, there is evidence to suggest that they are exposed to increased collision risk. Given this finding, further investigation of factors associated with increased crash risk is necessary to assist with developing effective countermeasures to enhance safety for pedestrians with vision impairment. The ability to identify effective strategies that pedestrians with vision impairment can adopt in their independent travel is essential to their overall safety, health and wellbeing. For many of these individuals, their vision loss means they no longer retain the capacity to drive, and subsequently, walking forms a fundamental component to their everyday travel enabling their independence.

1.1 Aims and Objectives

The overall aim of the study was to identify and address issues surrounding the safety and experiences of pedestrians who are blind, or have low vision in Victoria. More specifically, the individual objectives of the overall study include:

- Provision of a better understanding of the experiences of Victorian pedestrians who are blind or have low vision;
- Develop an understanding of the contributing factors to pedestrian collisions amongst Victorians who are blind or have low vision;
- Build data on the prevalence and nature of pedestrian collisions in Victoria where vision loss may be a factor;
- Explore the experiences and impact of O&M training for pedestrians who experience vision impairment;
- Explore aspects related to the O&M profession, and the experiences of O&M instructors who work with individuals that have vision impairment; and
- Provision of recommendations for future research within this field, through identifying avenues of change necessary in the context of services, training, as well as urban planning and road infrastructure.

2.0 METHOD

The study comprised of two complementary components; the pedestrians survey and the O&M focus group and questionnaire. The aim of the survey component was to explore mobility experiences of adult pedestrians who are blind or experience low vision. The aim of the focus group sessions and questionnaire was to explore and develop a better understanding of a range of issues related to O&M training, both for the instructor and the experiences of their clients undergoing O&M training.

2.1 Pedestrian Survey

2.1.1 Recruitment Design and Participants

Potential participants were recruited through a sustained awareness activity by Blind Citizens Australia, Guide Dogs Victoria and Vision Australia and supplemented through the Vision Australia client database. A semi-random recruitment design was employed in order to target a representative sample of adults in Victoria who are either blind or experience low vision. Potential participants were selected and stratified according to gender, age group and level of blindness (low vision: moderate and severe; blindness: profound and totally blind), following the categorisation utilised by WHO (2012). In total 1,451 potential participants were contacted, with a target sample size of 600. The recruited sample comprised 607 participants (301 males and 306 females), aged 18 years and over, who experience vision impairment. Figure 1 presents the age and gender distribution, followed by Figure 2, which illustrates the degree of vision loss across the sample.

Figure 1: Age and gender distribution of participant sample

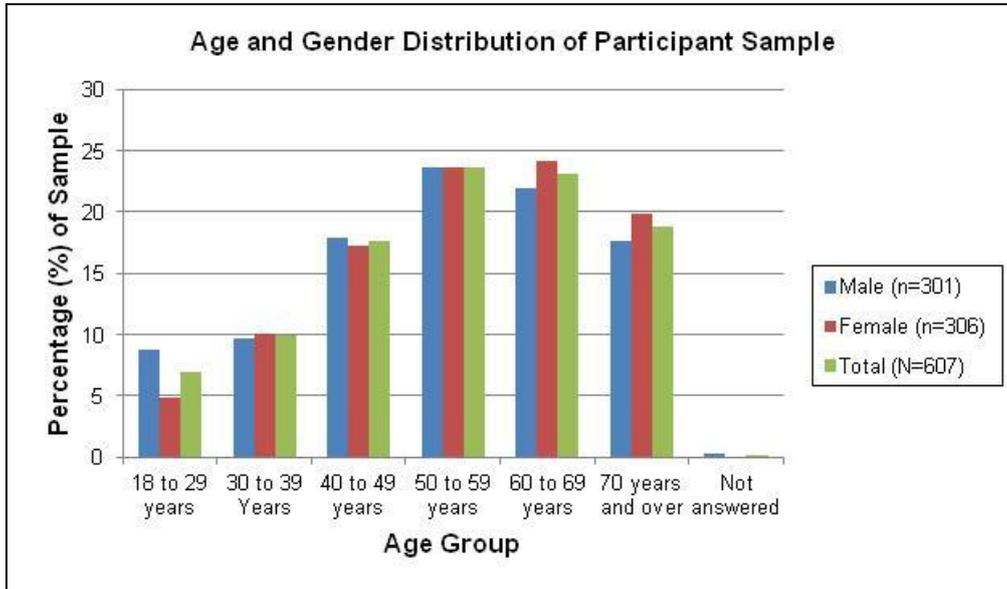
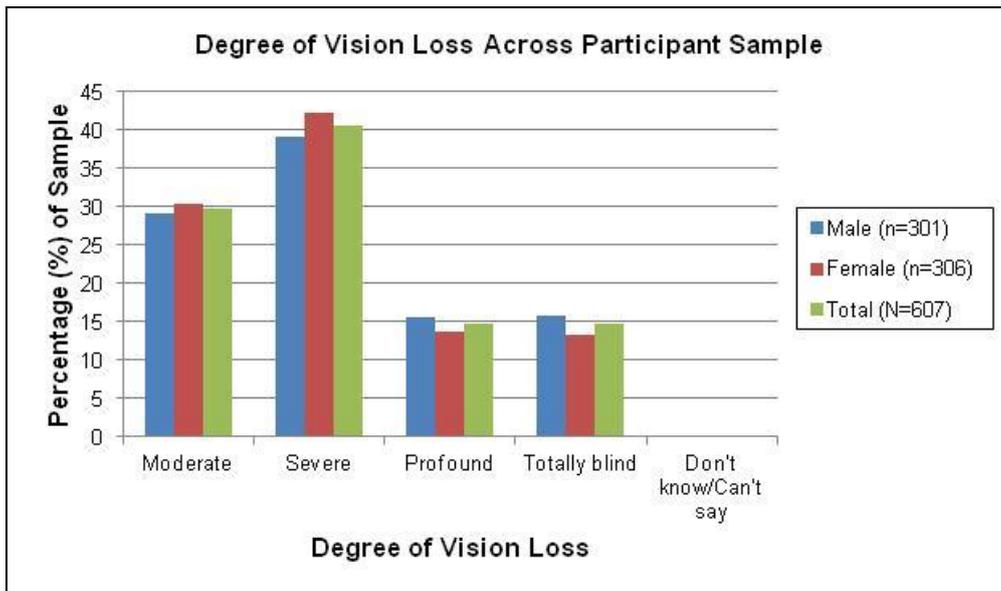


Figure 2: Degree of vision loss across participant sample



2.1.2 Survey Development

The project research team (Vision Australia and Monash University Accident Research Centre) developed the “Road Safety for Adult Pedestrians who are Blind or Vision Impaired” telephone survey. The questions generated were based on national and international literature, in addition to existing questionnaires on general pedestrian safety and travel patterns. The survey comprised six main sections, designed to elicit important information relating to 1) vision loss, 2) travel information, 3) interaction with the road system and pedestrian infrastructure, 4) strategies used as a pedestrian with vision impairment, 5) collision involvement, and 6) demographic characteristics.

2.1.3 Procedure

Telephone interviews were conducted between October and November 2011, during business hours. Contacted individuals were invited by interviewers to take part in the survey on a voluntary basis. On average, the telephone interviews were completed in approximately 15 to 20 minutes. Reasons for

non-participation were not recorded. Once a potential respondent declined to participate, the telephone conversation was terminated. Responses to the telephone survey were recorded on a standalone online database, generated for ease of data recording. Participant responses were simultaneously entered into the database during the interview sessions. Data collected from the Road Safety for Adult Pedestrians who are Blind or Vision Impaired telephone survey was analysed using the Statistical Package for Social Sciences (SPSS) program.

2.2 Focus Groups

2.2.1 Participants

A total of 22 O&M instructors from Vision Australia and Guide Dogs Victoria participated in one of two focus group sessions conducted. Of the 22 participants, 12 completed questionnaires were returned, producing a response rate of 55%. Of the 12 respondents, there were four males (33.3%) and eight females (66.7%) aged 18-29 years (n=1), 30-39 years (n=2), 40-49 years (n=5) and 50-59 years (n=4). All 12 respondents indicated that they experienced no vision impairment.

2.2.2 Orientation and Mobility Focus Group Themes and Questionnaire

The focus group themes developed for discussion are summarised in Table 1, which also describes a breakdown of the issues underlying each theme. A questionnaire was provided to all participants following their focus group session, addressing demographics, O&M instruction history and clientele. In addition, issues related to O&M training were also addressed in order to consolidate findings from the focus group discussions.

Table 1: Themes and range of issues discussed in O&M focus group sessions

| Themes | Issues |
|---------------------------------------|--|
| Access to O&M services | How to access O&M services Current funding arrangements for clients seeking O&M education Overview of range of clients seeking O&M education Barriers to accessing the service and areas in the process that require development |
| Training and strategies | Overview of training process (e.g. length of time, breakdown of content covered) Ranges of strategies used to assess, advise, and train clients Most effective strategies (what works and why) Feedback from clients Areas for improvement |
| Barriers and limitations | Obstacles associated with implementing training Challenges associated with working with clients Availability of resources Suggestions for addressing barriers and limitations to O&M education |
| Training programs for O&M instructors | O&M training courses available in Australia Adequacy of training programs offered Areas that require further development in O&M training programs |
| Other considerations | Accessibility of environments and technological aids to assist with clients following training Training booster sessions (how to bridge the gap between changes in road infrastructure and O&M skills) |

2.2.3 Procedure

Each focus group began with a short presentation detailing background research on pedestrian safety and the main findings from the telephone survey. The aim of the short presentation was to provide some context for participants surrounding the aims of the present research. This was followed by an approximate two-hour focus group session, which discussed the themes outlined in Table 1. At the conclusion of the focus group, participants were provided with a questionnaire to complete and return to the researchers. Data collected from the questionnaire was analysed using the Statistical Package for Social Sciences (SPSS).

3.0 RESULTS AND DISCUSSION

For the purpose of this paper, only the results for the second component (Focus Group) findings will be presented.

3.1 Pedestrian Survey

Refer to Oxley, et al. (2012) for a comprehensive discussion of the pedestrian survey findings.

3.2 Focus Groups

3.2.1 Access to O&M Services

Orientation and mobility services are offered at both Vision Australia and Guide Dogs Victoria however, the results from the focus group suggest that public awareness of such services is limited. A range of limitations were presented regarding barriers to public awareness including inadequate marketing campaigns, inadequate community engagement, in addition to inaccurate media reporting, which has lead to public misunderstanding of concepts such as “vision loss” and “vision impairment”. At present, there is a high prevalence of vision loss experienced in the community however, the focus group discussions suggests that awareness of the range of services provided by organisations like Vision Australia and Guide Dogs Victoria are limited, even to those who would benefit greatly from the services available.

Both Vision Australia and Guide Dogs Victoria offer a range of services to assist individuals of all ages, who are blind or have low vision. These services are provided for free. Vision Australia offers 15 core services outlined in Table 2 (Vision Australia, 2010). Guide Dogs Victoria also provides a range of different services across their different teams, which include Guide Dog Mobility, Children’s Mobility, Orientation and Mobility, Acquired Brain Injury Mobility and Occupational Therapy. Vision Australia is a national service, whereas Guide Dogs Victoria services the state of Victoria. Both organisations discussed the challenges associated with servicing more remote regional areas.

Table 2: Core services provided by Vision Australia

| Aim of Service | Service |
|---------------------------------|---|
| Enhancing access to information | Braille Alternate format production i-access(r) Radio for the print handicapped |
| Making the most of technology | Assistive technologies Training Leveraging expertise |
| Being part of the community | Peer, emotional and social support Children’s services Facilitating and maintaining employment Low vision clinics Independence in the home and community <i>Seeing Eye Dogs, orientation and mobility</i> Recreation Creating social inclusion |

Note: For a more detailed description of services, refer to Vision Australia (2010, p.6-8).

Clients are able to gain access to services via a range of referral options. These include, but are not exclusive to: self/individual referral, family or friend referral, other health service providers (e.g. eye care professionals, hospitals and rehab departments), education centres and the Low Vision Clinic. Both organisations (Vision Australia and Guide Dogs Victoria) undergo a standard initial assessment to screen for the clients’ needs. The needs assessment is comprehensive, and screens a range of areas related to physical, mental and emotional health. Within the screening, there are flagged items to indicate the potential need for orientation and mobility training. Of those individuals where screening indicates the need for orientation and mobility training, clients are referred to O&M teams.

3.2.2 Training and Strategies

When clients are referred for orientation and mobility training, most clients undergo an initial functional assessment session aimed at individual goal setting. For clients who are children, or not independent, parents or carers, as well as family or friends may also attend the session in support of the client.

Often these sessions are completed in the client's home environment so that they can be observed within the context of their everyday setting.

The task of goal setting depends on a number of factors, but is always client-focused. O&M instructors work with clients to identify and develop goals they want to meet, and a program is then generated for the clients to complete. This program is required to be flexible and may change as clients achieve individual goals. Two main barriers to goal setting may include clients' readiness to undertake O&M training (acceptance of vision impairment) and insight. Given training is an ongoing process; the reshaping of goals according to the client's progress is highlighted.

When training individual clients, there is a wide array of strategies that O&M instructors utilise depending on the characteristics and knowledge demonstrated from the client, in addition to the goals that the client has set. The overall aim of training is to offer clients alternative strategies to achieving orientation and mobility. Some of the main strategies that were discussed include:

- Use of other senses (e.g. hearing, remaining vision);
- Visualisation of a route (i.e. practicing in one's mind prior to undertaking the travel trip);
- Depth perception and reducing glare/adapting to lighting;
- Use of cognitive functions (e.g. problem solving, insight);
- Breaking down the task into smaller, more manageable parts (one trip can consist of a series of mini steps);
- Use of trial and error to determine which strategies suit the individual best;
- Concept development (visiting different environments so client can build a good understanding of how their environments are constructed);
- Preparing for "worst case scenario"

These strategies can be used in overall tasks such as orienting a child client to school or assisting an adult client to the bank. One of the essential experiences fostered in O&M training is client confidence, or empowering the client to feel comfortable with their individual ability in orientation and mobility. Confidence can be enhanced through increasing positive experiences and preparing for "worst case scenario" situations so the client feels safe. In addition to this, peer support groups, as well as social support received from family or friends, are also significant factors. The former enables the client to share some of their experiences with others who may have had similar experiences also. The latter is crucial to overall health and wellbeing of the client. A solid support network can also assist with encouraging and reinforcing clients to utilise the strategies they develop during their training.

O&M training duration varies depending on the client. Completion of O&M training is a significant stage for clients and determining when to discontinue O&M training has the potential to be challenging and frightening. During training, O&M instructors gradually reduce their level of input as the client progresses both in skills, and confidence. This process gradually raises their independence. Ending O&M training is a process and includes a conversation between the instructor and the client to establish a time that the client is comfortable with. O&M instructors also ensure that clients are well connected with any other relevant services they may require in the future, prior to ending their O&M training. It is also possible for clients to resume O&M training services in the future, should the need arise.

3.2.3 Barriers and Limitations

There are a series of barriers and limitations for orientation and mobility training associated with a range of individuals including the clients themselves, working with other health professionals, in addition to working relationships with local council, government and road authorities. Furthermore, the availability of resources and education can also be limited. Combined, these aspects can impact on the overall effectiveness of orientation and mobility training, as well as general pedestrian safety for individuals with vision impairment.

In terms of working with clients, one of the main obstacles for O&M instructors is the ability to design different programs to suit different clients. Given the very nature of working with different clients entails interacting with a range of personalities, varying levels of cognition and existing skills, in addition to different set goals, the task of facilitating this process can be challenging in any of the specified areas. This suggests that O&M instructors are required to be adaptable and flexible when working with clients.

Regarding working with other allied health staff (e.g. Occupational Therapists, Psychologists, Social Workers/Case Managers etc) one of the main challenges can be their limited understanding in the orientation and mobility training field. Some allied health professionals are not aware of the role O&M instructors play for individuals who have vision impairment, and this can impact on their ability to recognise the need for such services, referral rates, and the ability to work in a collaborative manner for the client.

O&M instructors also play a crucial “advocacy” role for pedestrians with vision impairment. This role includes communicating to local councils, other government stakeholders, in addition to road authorities regarding issues such as urban planning (in terms of accessibility and user friendliness) and road infrastructure (in terms of safety and other transport related issues). This role is essential as O&M instructors can be the voice for this particular population group.

Lastly, there can be challenges associated with adequate resourcing in terms of provisions for educating clients. Given the small size of the O&M profession, resources are also impacted due to funding and support.

3.2.4 Training Programs for O&M Instructors

Over the past few decades, there have been different programs available for orientation and mobility instruction. These range from courses offered at university, to courses developed by organisations such as Vision Australia. There are limited courses available due to the small size of the professional group, and at times the university courses are not always offered.

In terms of course content, there are deviations in structure between different O&M courses. However, all courses appear to involve a theory component, a practical component and a supervised practice component. The content of the theory component has varied over the years, ranging from the physical condition of blindness or vision loss, to strategies that can be implemented in O&M training. In some courses, basic counselling skills are also taught to assist with the psychological, emotional and mental health impact of vision impairment. The practical component (including supervised practice) enables the student to experience O&M training within the context of real life situations. There is consensus that the practical component is crucial to success, when the student enters the professional world. During discussions, participants clearly indicated that the opportunity to work with and have experience with “real life” clients was invaluable to their education and skill development.

There exists general agreement that there are some areas of improvement necessary to enhance current training programs. One suggestion was to advocate for an accreditation process for O&M training courses to ensure consistency and standard of courses offered. It is believed that this may also assist with obtaining recognition of the field. Another suggestion was to implement O&M refresher courses, or professional development options to ensure that skills and knowledge are up to date with current, evidence-based best practice. In terms of content of such courses or professional development areas, novel road infrastructure design, as well as technologies would be two significant areas).

3.2.5 Other Considerations

When working with individuals who have vision impairment, it is important to be aware of the range of physical, psychological and emotional experiences of the client. This is significant because it is highly likely that these factors will in turn affect client experiences and outcomes of O&M training. It is important to note that each client is an individual with different degrees of vision loss, other co-morbid physical conditions that have the potential to impact on their mobility, a range of mental health symptoms (e.g. depression or anxiety symptoms, adjustment to condition), as well as a range of conflicting emotions.

At present, there is limited research that has been conducted in this field. In future, further research investigating the experiences of clients undertaking O&M instruction, and the development of a more evidence-based understanding in terms of theories and practice within this field, would greatly benefit the O&M profession, as a whole.

3.3 Orientation and Mobility Questionnaire

3.3.1 Orientation and Mobility (O&M) Instruction History and Clientele

Participants completing the questionnaire were asked about how long they had been working as a professional O&M instructor. Responses indicated that there was a wide breadth of experience across participants, ranging from half a year (newly trained and having just started in the field) to more than 30 years experience working in the field. In terms of type of training, all respondents indicated that they had been formally trained. Courses ranged across different participants but included:

- Bachelor Degrees, majoring in Orientation and Mobility (O&M);
- Graduate Diplomas or Post Graduate Diplomas in Orientation and Mobility (O&M); and
- Graduate Certificate in Vision Impairment

It is important to note that the courses were undertaken at different points in time, so may have varied in structure and content. One respondent also indicated that they have since undertaken informal training, in the context of professional development sessions and conferences during their time, working as a professional O&M instructor.

Participants were asked some questions relating to their client workload. With respect to the average number of clients trained per month, responses ranged from six to 40 clients. Closer analysis of qualitative data from this question suggests that this number can vary depending on client circumstances, and the longevity of their planned O&M training program. Similarly, responses to the question relating to number of sessions each client required were varied. Responses suggest that the number of sessions required is highly dependent upon the client’s needs. These results were consistent with the focus group discussions.

O&M instructors train a range of clients with varying levels of vision impairment. Table 3 details the level of vision loss each respondent most often works with. These results indicate that the majority of clients trained by the sample experience “moderate” levels of vision loss. Respondents were also asked to highlight the main concerns expressed by their clients, related to their training in orientation and mobility. Consistent with this range of clients, the main issues highlighted from this question include: readiness to undertaken O&M training; a range of road safety issues (e.g. crossing roads, navigating difficult road infrastructure such as slip lanes and roundabouts, navigating conditions with high traffic volume); use of public transport; and other psychological and emotional aspects including stigma attached to being identified as “blind” or having “low vision”.

Table 3: Level of vision loss most commonly worked with

| Level of Vision Loss | Frequency | Percentage (%) |
|----------------------|-----------|----------------|
| Moderate | 7 | 58.3% |
| Severe | 3 | 25.0% |
| Profound | 1 | 8.3% |
| Totally Blind | 0 | 0% |

Note: There was 1 missing response (N=12)

3.3.2 Orientation and Mobility (O&M) Training

Access to Orientation and Mobility Services: The issue of access to O&M instructors and the services provided was explored in the questionnaire. Table 4 summarises respondents’ perception of orientation and mobility training accessibility. The majority of respondents rated accessibility as either “somewhat easy to access” or “very easy to access”. Closer analysis of qualitative data relating to comments regarding access indicate that one of the main obstacles seen to limit greater client numbers, is awareness of the availability of orientation and mobility services. In addition, another barrier to access described was reaching clients that live in more remote or regional areas.

Table 4: Perceived level of accessibility to orientation and mobility training services for clients

| Accessibility Level | Frequency | Percentage (%) |
|---------------------|-----------|----------------|
|---------------------|-----------|----------------|

| | | |
|------------------------------|---|-------|
| Very easy to access | 4 | 33.3% |
| Somewhat easy to access | 5 | 41.7% |
| Neutral | 2 | 16.7% |
| Somewhat difficult to access | 1 | 8.3% |
| Very difficult to access | 0 | 0% |

Training, Strategies and Barriers: The questionnaire asked respondents to describe some of the training strategies that they used with clients, and to indicate why such strategies are effective. Qualitative analyses of the responses suggest that O&M instructors use a range of different strategies with their clients. Some examples include use of sensory modalities (e.g. remaining vision, listening), cognitive strategies (e.g. problem solving, planning, interpreting information from the environment), navigating complex road environments (e.g. identifying risks, crossing roads, gap selection), use of canes and other mobility aids, in addition to confidence building. With respect to why these strategies are effective, respondents reported that they enable the client to slowly increase their independence through breaking down their tasks, understanding concepts related to safe orientation and mobility, increasing their awareness of the road traffic environment and fostering their confidence to be more independently active.

Overall, the majority of respondents (83.3%) felt that gaps remain in the current orientation and mobility training program they provide to their clients. Qualitative analysis of their responses suggest that the gaps reside in areas such as provision of access to regional clients, the availability of O&M instructors, being up to date and trained in the use of various novel technology aids to assist with mobility, and the ability of programs to adequately address road safety concepts for pedestrians who are blind or experience low vision.

Road safety is an important aspect for pedestrians who are blind or experience low vision. Most respondents (75%) indicated that they believe the O&M training program they provide, adequately addresses pedestrian safety aspects, such as detecting motor vehicles, vehicle speeds and directions; and determining safe gaps for completing a road crossing. However, respondents reported a range of areas in the context of road safety that could be improved upon. These generally reflect new issues for pedestrians with vision impairment, such as locating cyclists and electric cars. It is interesting to note that many pedestrian safety issues outlined by respondents relate to overall road infrastructure design and driver awareness of pedestrians who have vision impairment. This suggests that O&M training programs need to be complemented with safe road infrastructure design, as well as road user education.

Lastly, respondents were asked about their perceptions of the most beneficial outcomes achieved by their clients through O&M training. Respondents indicated that benefits achieved for clients through O&M training include an enhanced understanding of the road environment, which can translate across different environments, an increase in independence, confidence and also self-esteem, which contributes to the greater likelihood of activity and social engagement for individuals with vision impairment. These aspects are all crucial to overall health and wellbeing of an individual.

4.0 CONCLUSIONS AND RECOMMENDATIONS

This study provides some preliminary results to understanding the experiences of pedestrians who are blind, or have low vision. More specifically, the overall study concluded that:

- Maintaining safe mobility is important for pedestrians with vision loss;
- The degree of vision loss impacts on the skills and strategies utilised by this road user group;
- The degree of vision loss impacts on the confidence felt by this road user group; and
- Safety is a concern, with a high proportion of pedestrians experiencing collisions or near collisions.

More specifically, in the context of O&M training, it was found that:

- O&M training uses a client-centred approach providing a range of different skills to individuals with vision loss; and
- O&M instructors have a complex role to play that requires flexibility, adaptability and a range of skill sets to cater for the clients physical, psychological and emotional needs.

Inconclusive results from the pedestrian survey were found regarding O&M training being related to reduced confidence levels and increased levels of collisions, or near collisions. This finding was inconsistent to perspectives presented in the focus group discussions with O&M instructors. The available data collected in the pedestrian survey limits more in-depth analyses of the results in this area. Therefore results surrounding the relationship between O&M training with that of collision risk need to be further investigated in future studies to extrapolate a better understanding of the relationship between the two factors.

Another noteworthy finding from the study highlights potential challenges for pedestrians who are blind, or experience vision loss. The study identified electrical vehicles and cyclists as being two of the most difficult interactions within the road network system for these individuals to navigate safely. This finding was consistent across both the pedestrian survey and the focus group discussions. Given the significant promotion and movement towards sustainable transport within many western societies, this finding highlights the need to consider unique vulnerable road user groups in the process of creating a safe and sustainable road network environment.

Given the outcomes of this study, it is clear that more initiatives are required to manage the safe mobility of pedestrians with vision loss. Therefore, it is recommended that:

- Further research be conducted in specific areas of safe mobility for pedestrians (e.g. effect of confidence, collision risk) to enhance current understanding of these factors;
- More research conducted in the area of O&M instruction to inform a more evidence-based training program for training O&M professionals; and
- Engagement of relevant stakeholders to encourage safer behaviour by road user groups as well as improvements to infrastructure and road design to enhance environments that provide for safe mobility of pedestrians with vision loss.

It is important to note that in the area of road safety for pedestrians who are blind, or experience low vision, there are numerous avenues for further developments. The above recommendations only reflect and highlight some overall, immediate needs. As research within the area begins to develop further, it is likely that a better understanding of more practical requirements for this population group will surface.

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