Expectation of users and professionals regarding assistive technologies for driving electric wheelchairs

P Gallien1,2, B Fraudet1, E Leblong1, A Durufle1,2, A Colin2, S Achille-Fauveau2, L Devigne1,3, M Babel3, B Nicolas1,2

1Pole Saint Helier, Rennes, France; 2 Breizh PC Network, Brittany, France; 3 INSA, Rennes, France

INTRODUCTION

A significant number of users have difficulty when driving an electric wheelchair and consequently lose their autonomy. Various driver assistance systems suggest a gain in terms of autonomy and safety for users and can thus allow a larger number of users to drive their wheelchair independently. So it is important to define needs, obstacles and expectations regarding the use of electric wheelchairs by users and professionals.

METHODS

A questionnaire was proposed to professionals and adult users with motor disorders in order to have a cross-referenced look at their expectations and fears regarding the use of driving assistance.

RESULTS

131 users, including 67% with cerebral palsy, 64 men and 67 women with an average age of 43.3 +/- 14 years, and 205 professionals, 36 men and 169 women with a mean age of 38.3 +/- 10 years answered the questionnaire.

A quarter of wheelchair users need help to drive, usually a caregiver. One third does not feel safe when using their wheelchair and more than half of the users have already experienced a collision with external elements.

45% of professionals have already been led to prohibit autonomous driving due to a safety problem, either for the user or for those around him. In the event of a proposal for driver assistance, both users and professionals prefer autonomy over safety, even if safety remains a major concern. The two main obstacles for users and professionals are the financial cost of assistance systems and the lack of confidence in their performance.

The three systems preferred by users are in order of preference:
- a system that adjusts the trajectories but lets the user manage the driving,
- a system that only operates in case of danger,
- a system that helps to position the wheelchair.

While the vast majority (86%) would like to benefit from driving assistance, very few are willing to finance it.

DISCUSSION

There is no fear of the use of new technologies for wheelchair driving, either for users or for professionals. However users want to maintain maximum driving autonomy and prefer autonomous driving assistance systems rather than guidance systems without the possibility of control. Autonomy is favored to safety by patients who wish to maintain control of driving. This is therefore a major element to take into account to ensure the acceptability of robotic assistance and thus promote its development.

CONCLUSION

Intelligent wheelchairs are ready to leave the research laboratories. They will improve the autonomy of users and enhance the safety of daily wheelchair use. Solutions must be financially affordable to enable their dissemination. Users are in favour of introducing robotics solutions to improve the driving of electric wheelchairs, but they want to keep control of the driving. This is important for the development of driving assistance systems.