THE PERCEIVED INFLUENCE OF THE ENVIRONMENT ON SOCIAL PARTICIPATION AMONG INDIVIDUALS WITH SPINAL CORD INJURY

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Keywords
disabilities, environment, handicap situations, social participation, spinal cord injury

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ABSTRACT
Since the acknowledgement of the impact of the environment in a recent issue in rehabilitation following spinal cord injury (SCI), the purpose of the study was to identify the main environmental facilitators and obstacles to social participation and whether or not the perceived influence of the environment on participation differs according to personal characteristics of individuals with SCI. Results suggest most primary environmental facilitators are related to the social environment while the main obstacles mainly come from the physical environment. Moreover, the perceived influence of environment varies among individuals according to differences in their intrinsic characteristics. This subjective approach based on the person’s perception is a good indicator of how one’s participation is influenced by his/her own specific environment.
INTRODUCTION

At any moment of life, a person interacts with a specific environment that influences his or her behavior; this is true regardless of whether or not the person acquire disabilities. The recognition of this close interrelationship between living organisms and their environment is not recent: Haeckel in the 1860’s already acknowledged it when he proposed the term “ecology” to specify this interaction\(^1\). Over the last decades, several conceptual models were developed to describe the interaction between individuals and their environments.

For examples, Wicker (cited by Kaplan)\(^2\) proposed the “behavior-environment congruence” model and hypothesized that behaviors differ according to the setting. Kaplan\(^2\) stated that such a model places an emphasis on the adaptation of the person to his/her environment, while the adaptation of the environment to the person should also be considered. Bronfenbrenner\(^3\) proposed the model of “ecology of human development” and defined various levels of environment based on the proximity of the environment to the individual, from immediate setting to large societal context. Certain specific disciplines also proposed particular conceptual approaches to the environment. The “Man-Machine System”\(^4\) and the “Person-Process-Environment”\(^5\) models are well known in the field of ergonomics. The works of Kielhofner\(^6\) (the “Human Occupation” model) and Law\(^7,8\) (the “Person-Environment-Occupation” model) have considerably influenced recent approaches in occupational therapy.

Although Badley\(^9\) wrote an early article on the environment in 1987, it is surprisingly only since the first half of the 1990’s that a general consensus seems to have emerged in the literature to emphasize the importance of the environmental dimension in the lives of persons with disabilities, and the necessity of identifying how environmental variables determine the social
consequences of a person’s impairments and disabilities\textsuperscript{10-14}. In the revision of the ICIDH,\textsuperscript{15, 16} environment was recognized as a contextual factor in the conceptual model of disablement. Therefore, full participation or any restriction in participation is viewed as the result of the interaction between the person’s characteristics and his/her environment. Such a paradigm has also been strongly prompted by the Quebec Committee on ICIDH over the last decade.\textsuperscript{17, 18}

Despite a better theoretical understanding of the environment, in practice, this concept has been poorly documented among people with spinal cord injury (SCI) whom life may be strongly affected by various aspects of environment. Dejong, Branch and Corcoran\textsuperscript{19} suggested that this lack of investigation might be explained by a paradigmatic vision of rehabilitation based on a one-to-one disciplinary intervention, a difficulty of operationalisation of environment and an historic perspective wherein short life expectancy after SCI did not stimulate professionals to be concerned by the person’s environment. More recently, a few studies have documented the influence of environment in the life of people with SCI or other impairments. One of the main factor is the quality of social network and relationships usually characterized by the presence of a spouse, family or friend support.\textsuperscript{19-23} The impact of other factors such as physical environment, availability of resources, transportation, insurance benefits coverage, computer technology was also reported as influencing social participation.\textsuperscript{19, 24-26} Richards et al.\textsuperscript{27} suggested an association between life satisfaction and the person’s access to environment based on home accessibility and independence in transportation. These two elements are certainly essential conditions to enhance social participation, but a focus should be placed on a measure of the environment that quantifies the influence of the physical, social and political environments on social participation in people with disabilities. Letts et al.\textsuperscript{28} have made a large inventory of environmental assessment procedures (n = 41) but most of them address only one specific
environmental domain. More recently, investigators had developed a well validated tool (CHIEF)\(^{29}\) to briefly determine the frequency (“How often”) and the impact (Big or little) environmental factors act as barriers to social participation. This approach seems to be adequate for the purpose of large survey but does not take into account the environmental determinants acting as facilitators to social participation.

Description of environmental facilitators as well as barriers is necessary to confirm the assertion stating that “the quality of social participation is the result of an interaction between the person and his/her environment”.\(^{18}\) Practically, such a description allows to determine if the perceived influence of the environment on social participation differs according to various individual characteristics in people with disabilities. For example, in persons with SCI: “Does the influence of home care services on social participation similarly perceive by persons according to the severity of their injury (tetraplegia vs paraplegia)” or “does the perceived influence of health/disability insurance programs on social participation vary with current age?”. Variations in the perceived influence would indicate a potential interaction between the person’s characteristics and the environment which might lead to variations in the level of social participation.

Since no study fully documented the perceived influence of environment, the first objective of the present study was to identify the main environmental facilitators and obstacles to social participation as reported by a group of individuals with SCI. The second objective was to verify whether or not the perceived influence of the environment on participation differs according to personal characteristics.
Research Questions

What environmental factors are perceived as facilitators to social participation by a majority of persons with SCI?

What environmental factors are perceived as obstacles to social participation by a majority of persons with SCI?

Might an environmental factor be perceived as a facilitator to social participation by some individuals and as an obstacle by other individuals?

Does the perceived influence of environmental factors vary according to gender, current age, duration of injury, severity of injury or health status?

METHOD

Recruitment

A total of 2200 medical files were reviewed at the Rehabilitation Institute of Quebec City and the Montreal Rehabilitation Institute in order to identify the target population of the present study. Medical and socio-demographic information was collected for all individuals who had sustained a traumatic SCI between January 1, 1970 and December 31 1993 (N=1771). All those with non-traumatic injuries were excluded. From this population, a random sampling procedure was used to recruit an initial sample of about 1000 subjects, from whom a response rate of 50% was expected. Authorization was granted by the Quebec Access to Information Commission to obtain the subjects' current addresses and phone numbers from the Quebec Health Insurance Plan, a
governmental agency administering the public health care system. A first contact by mail was carried out with 976 potential subjects. The letter described the nature of the study and invited each individual to participate. Thereafter, a questionnaire was mailed out to the potential participants of the study. To augment the number of responses, a reminder was mailed two weeks after sending the questionnaire. Three weeks later, a second reminder was sent, followed by a phone call to all non-respondents who could be reached.

Data Collection

The participants were asked to complete a mailed informed consent form and then an exhaustive questionnaire with the following sub-sections: 1) personal factors (demographics, primary and secondary impairments, education); 2) social participation (as measured by the Assessment of Life Habits, LIFE-H); and 3) environmental factors (as measures by the Measure of the Quality of the Environment, MQE). All sections had been previously reviewed and validated by individuals with SCI and clinicians to ensure that proper wording was used. For the purposes of the present study, only the information that came from the MQE will be discussed.

Subjects

Four hundred eighty-two (482) individuals who returned the questionnaire with complete data constituted the current sample (Table 1). No significant difference was observed between the sample and the base population (n = 1771) for gender, duration of injury, or severity of injury. A significant difference of about 2 years was observed for age and age at injury (p < .05). The statistical significance of such a difference seems to be attributable to the large number of subjects (population and sample) and there is probably no clinical significance related to this
difference. However, the lower representation in the sample of individuals over 60 years of age might limit the generalizability of the results in this age group.

*The Measure of the Quality of the Environment (MQE)*

The MQE assesses the perceived influence of specific environmental factors on the social participation of individuals or populations in relation to their abilities and limits. Its conceptual development was based on the environmental factors nomenclature of the Handicap Creation Process (See Fougeyrollas et al. in this Issue). It is a generic tool that can be used regardless of the type of impairment or the level of disability. The first step in constructing the instrument was the development of a list of situations or environmental factors (n = 84) that covered most of the HCP environmental categories. These items were grouped into six themes: 1) Support and attitudes of your family and friends; 2) Income, job and income security; 3) Governmental and public services; 4) Physical environment and accessibility; 5) Technology; and 6) Equal opportunity and political directions from works of Whiteneck & Fougeyrollas. 30, 31

Second, a general question was developed to be answered for each applicable item: “*Indicate to what extent the following factors or situations influence your daily activities and social roles by taking into account your abilities and personal limits*”. Third, a scale was devised to assess the presence of environmental barriers or facilitators and to quantify the extent or impact of their influence (Major, Moderate, or Minor). A barrier was operationally defined as an environmental factor that impedes the accomplishment of daily activities or social roles (social participation) while a facilitator supports such an accomplishment. The scale has a negative score (-3 to -1) when the respondent perceives the factor as a barrier (major, moderate, minor), a positive score (1 to 3) when the respondent perceives the factor as a facilitator (minor, moderate, major), and a
neutral score (0) when the respondent feels that the environmental factor does not influence his or her social participation.

Since the responses to the MQE are based on the person’s own reality (life circumstances and living arrangement), some situations may not be present in his/her environment and, therefore, they are to be marked as “non-applicable”. Moreover, in certain situations, it is possible that the participants may not be able to determine the influence of some environmental circumstances, in which case they are to mark “I do not know” for these items. When either response (“not applicable” or “do not know”) appears for a specific item, the item is not included in the analysis for that person, which explains the variation in the number of respondents across items.

Validation Process
Following a content validity process performed with a group of clinicians and researchers, a study was designed to assess the test-retest reliability of the French and English versions of the MQE among cognitively intact young adults with cerebral palsy. Despite small sample sizes (Toronto, n= 30 and Quebec City, n= 28), a procedure of concordance analysis with data from each sample revealed that 56% and 85%, respectively, of factors showed concordance scores of 60% or higher, indicating a moderate to high level of reliability. 32, 33

Results
Main Facilitators
Among the 84 factors of the MQE, 12 of them were identified by a majority of subjects (> 50%) as facilitators of social participation (Table 2). Attitudes and support from family, friends or colleagues seem to be the major domain of environmental facilitators since they were
acknowledged by about two-thirds of the sample as facilitating social participation. A substantial number of participants also recognized the positive influence of elements related to the physical environment such as the physical accessibility of the residence, the use of assistive devices and various electronic technologies (Computers, Fax, etc.). As well, the availability and access to various services in their living community (Health services, disability insurance programs, businesses) are seen as important contributors to social participation.

Main Obstacles

Only a few environmental factors among the MQE items were mentioned by more than 50% of subjects as obstacles to social participation (Table 3). They are mostly related to the physical environment. First, living in a northern country, it was predictable that almost all subjects would identify winter climatic conditions as a serious obstacle to participation. Likewise, particular summer climatic conditions such as hot temperature and humidity were also recognized as having a deleterious effect on participation. Many participants also reported difficulties with the unevenness or nature of terrain which impact the accomplishment of numerous activities. At the opposite of the own residence, the accessibility of friends’ residence seems to be a serious obstacle as mentioned by about two-third of the participants.

Affected by various factors (personal as well as environmental), the time required to carry out various tasks is further considered as an obstacle to social participation. Finally, two-thirds of the subjects who were concerned by the labor market mentioned that the availability of jobs in their living area is an important obstacle for being employed.
Variations of the perceived influence of environment.

Since high percentages of individuals perceive specific factors as facilitators or obstacles, one might hypothesize that a total agreement (100% of the sample) could be reached about the perceived influence (obstacle or facilitator) of certain environmental factors. Among the 84 items of the MQE, none reached such an agreement from the sample. Rather, for the most significant facilitators or obstacles, there were always a certain proportion of subjects who perceived in an opposed way the influence of these factors on their social participation (Table 4). For example, among the factors related to social support which were mainly identified as facilitators (top of Table 4), from 7% to 13% of individuals reported that these factors are obstacles to their participation. Regarding home accessibility, 13% of subjects stated that this constitutes an obstacle while this factor is mainly perceived as a facilitator.

Among the main obstacles to participation (bottom of Table 4), some subjects differ as to the perceived influence of these factors. For example, 6% of the sample seems not to be influenced by the winter climatic conditions and even a few of them seem to appreciate these conditions since they qualified them as facilitators of participation. Likewise, as the physical accessibility of friends’ residence was mainly perceived as an obstacle, 20% of subjects reported that this factor facilitates their participation suggesting none or little architectural barriers in their friends’ home.

Variations of the perceived influence of environment according to personal characteristics.

The influence of the environment can be perceived differently from a person to another according to their own personal characteristics. Five personal factors were considered given their potential interaction with the environment and, on this basis, the variations of the subjects’ perceived influence of 4 environmental factors are illustrate to depict this phenomenon (Figures 1-5).
Gender. The perceived influence of 22 environmental factors on participation significantly differed between the male and female subjects (p < .05). For example, a greater proportion of female than male subjects considered that the household appliances and the electronic technology are facilitators to their daily activities (Figures 1, Graph a-b). More drastically, the positive influence (facilitator) of day care is almost exclusively acknowledged by female subjects (Graph c) while the majority of male subjects considered it as having no-influence on social participation. Finally, a slightly higher proportion of female subjects perceived the time allowed to execute tasks as an obstacle that may hinder participation (Figure 1d).

Duration of injury. As the duration increases, the perceived influence of most environmental factors remains globally unchanged. Only 2 factors significantly varied over time even though a few (n = 5) tended to differ with the duration of injury. In the first years after injury, the counseling and employment services are perceived as facilitators to participation by more than 50% of the participants but, after the first 5 years post-injury, less than 25% of the sample recognized their positive influence (Figure 2, Graph a). This particular association with the duration of injury was similar for the perceived influence of the Private Disability or Health Insurance Programs (Graph b) and in a lesser manner for the public disability related insurance programs (Graphs c). Availability of jobs is much perceived as obstacles whatever the duration of injury but, only 20% of individuals in the first 2-4 years after injury believe that it is a facilitator (Graph d). Over the following period (5-9 years post-injury), the perception of this factor as an obstacle reached 75% and a very few individuals believe that it may facilitate participation.
Current age. Only 11 environmental factors showed a variation of the perceived influence with current age. Two different trends of variation might be observed in the sample (Figure 3). On the one hand, a positive influence of the support from colleagues which reached 80% among the youngest participants (≤ 29 years of age) tends to constantly decrease over time and is considered as a facilitator by less than 25% of the oldest individuals (Graph a). A similar pattern of perceived influence was observed over time for the Cultural and Entertainment Services offered in the setting (Graph b). On the other hand, about 30% of the sample acknowledged the facilitating influence of two factors (public health and social programs, availability of housing responding to the individual’s needs) up to 60 years of age (Graphs c-d).

Severity of injury. This personal characteristic is by far that interacting the most with the perceived influence of environment. The subjects’ perceived influence on participation of 39 environmental factors significantly vary according to the type and completeness of injury. For example of this interaction, the facilitating support from colleagues (Figure 4, Graph a) is perceived by more than 75% of individuals with complete tetraplegia while this perception fall to 45% in those with incomplete paraplegia who normally show less disabilities. Home care services (Graph b) is described as a facilitator by a greater proportion of individuals with tetraplegia than those with paraplegia. Accessibility of friends’ residence definitely appears as a limiting factor to participation for individuals with a complete lesion (Graph c). More than 75% of them considered it as an obstacle while less than 40% of individuals with an incomplete lesion perceived it as an obstacle. Likewise time allowed to execute a task seems to hinder social participation of a greater proportion of individuals with a complete lesion (Graph d).
Health Status. Differences in the perceived health status seems to affect the perception of the impact of several environmental factors (n = 20). For example, the attitudes of the family (Figure 5, Graph a) are perceived as an obstacle to participation by a very small percentage of individuals having a fair to excellent health but, 25% of individuals with a bad health status mentioned that the family’s attitudes hinder their social participation.

As the health status is deteriorating, some dimensions of architectural barriers (‘Street accessibility’) is further perceived as an obstacle (Graph b). Finally, the positive perception of the impact of insurance programs as well as the responsibilities of the various governmental levels is also related to health status, these factors appearing as obstacles in a greater proportion of individuals with a bad health status (Graphs c-d).

Discussion

The purpose of this article was to identify, among a series of environmental factors, those perceived as facilitators or obstacles to social participation by a majority of individuals with SCI. The main findings of this study are that: 1) among the primary environmental facilitators, many are related to the social environment while the main obstacles mainly come from the physical environment, and 2) this perceived influence of environment varies among individuals according to differences in their intrinsic characteristics. This subjective approach based on the person’s perception is a good indicator of how one’s participation is influenced by his/her own specific environment. Other authors have also suggested that “People live in an objectively defined environment but they perceive a subjectively defined environment and they respond to this subjective life space”. 34
Compared with the physical dimensions, the human environment is probably that interacting the most with the person on a dynamic basis. Clearly, by their attitudes and support, one’s family and relatives may have a tremendous influence on his/her social participation since these are usually among the first and most salient resources available post-injury. The current results suggest that the “significant others” act in a suitable manner since more than two-thirds of the sample recognized their facilitating influence on participation. Support from the spouse or close relatives has been previously reported as a main feature that facilitates independence. 20, 22, 35 Although only a few respondents perceived their human environment as an obstacle, this indicates that the way the surrounding individuals behave, can in some circumstances create limitations for people with SCI. It is possible that, in some cases, the actions or support providers may exceed what is needed or wished by the person or, conversely, their support does not meet his/her expectations to effectively enhance social participation.

The results suggest that accessible housing is probably the main element of the physical environment that supports people with SCI in their community participation. As most individuals have motor disabilities, accessibility of the residence enhances their independence in daily activities inside the home and ensures the possibility of getting outside, which is a prerequisite for the accomplishment of many activities and roles that take place in the community (social contact, education, leisure activities, etc). In the same sense, the use of assistive devices and various electronic technologies (computers, fax machines, etc.) seems to facilitate certain aspects of participation, from basic ADLs to more complex activities such as those related to work. Physical disabilities may considerably limit the possibility to work in traditional domains requiring the use of upper limbs and complete mobility. However, in the area of services where the output is usually produced by the person’s intellectual capabilities, the use of technology is a
way to go beyond or compensate for limitations due to physical disabilities and thus to enhance participation.

Another major factor facilitating participation in society is the access to health care and disability insurance programs such as those provided following work or motor vehicle accidents. Some characteristics of the social programs in Quebec such as the universal access to health care and the public automobile insurance program might explain this phenomenon. After the acute care and rehabilitation, some services and income compensations are available which financially support the recipient to the point of return to normal living and pre-morbid activities, when possible. Despite positive aspects of benefits coverage, one may see that certain facilitating measures might sometimes have adverse effects, particularly when reducing the likelihood of return to gainful employment.

While the most significant facilitators were related to the social environment domain (support, services, programs), the most frequent obstacles identified by the study’s participants were related to the physical environment and accessibility. Individuals with SCI are particularly bothered by any climatic or natural conditions that make wheelchair locomotion energy-consuming or ultimately unusable. This is the case for displacements in snowy streets and pathways that ultimately confine the person at home and therefore hinder important domains of social participation. Regarding interpersonal relationships and social integration, the possibility to meet friends and relatives outside home is a major issue after SCI. For many individuals, this activity can be compromised, given that 62% of respondents identified the accessibility of friends’ residences as an obstacle. Such a finding indicates that, while obvious efforts are
deployed on an individual basis to make one’s residence accessible, at a societal level architectural barriers are still present in residential construction.

Return to productive activities is always an important issue after SCI. Despite vocational endeavors to allow individuals with SCI to become gainfully employed, this action might be inefficient if the number of jobs is limited. Results seem to support this possibility since two-thirds of the study subjects for whom labor market questions were relevant mentioned that the availability of jobs in their living area is an important obstacle to being employed. It is, however, unclear if the people’s appraisal concerned the availability of jobs in general or if it focused mainly on the jobs that fit their capabilities. The respondents also raised the issue regarding time to carry out tasks. If motor disabilities are important, time required to perform simple activities such as basic ADLs, transportation or manual handling is increasing and may be so long that the person cannot expect to meet requirements related to usual schedule and performance (presence during business hours, time to get a specific job done, productivity standards, etc.).

Having hypothesized that social participation is the result of the interaction between the person and his/her environment, we expected we might observe variations in the subjects’ perceived influence of environmental factors on participation as differences occurred in individual characteristics (impairments, disabilities, identity, etc.). Results have shown that the perceived influence of several environmental factors varied according to gender and age, which indicates that not only impairments and disabilities interact with the environment to modify social participation but also some other non-modifiable characteristics. The best example of this phenomenon is the large discrepancy existing between the male and female participants as to the
influence of daycare on participation. Its facilitating influence is acknowledged almost exclusively by the female participants. In a less drastic manner, such a difference is also noticeable for the influence of various residential or electronic devices. These differences might be a reflection of long-standing traditional roles in society wherein women tend to have more responsibilities than men regarding care of children and various household activities.

Variations in the perceived influence of the environment with age seem to appear mostly over 60 years of age. For example, specific pension plans compensate for a decrease in income after retirement and are necessary to maintain some aspects of social participation. As well, housing for aged people usually is adapted to compensate for the decrease in capabilities observed in some residents, and thus acts as a facilitator to maintain their social participation. However, participation in some life habits among aged people might be limited due to environmental obstacles. Results suggest that some services related to participation in leisure activities may not be sufficiently accessible to allow aged people to be engaged in such endeavors. This situation is worrying given that leisure participation, when taking place outside of the residence, favors interpersonal relationships of aged individuals.

Variations in the perceived influence of 39 specific environmental determinants according to the severity of lesion soundly illustrate the link between the person and his/her environment and how it can act on social participation. Persons with a greater level of motor disabilities (complete lesion and particularly tetraplegia) perceive in a more definite manner the facilitating or impeding influence of the environment than those with less severe disabilities. Actually, the impact of the human and social environment is largely perceived as facilitating by those with tetraplegia. At the
opposite end, those with a complete lesion forcefully pointed out the negative impact of physical factors related to architectural barriers.

When health status is deteriorating, the influence of the environment seems also to also vary. Perceptions of environmental barriers to participation consistently increase as health status decreases. The decline in health status generally associated with a physical weakness, progressively increases the perception of the architectural obstacles in the community. Moreover, people in bad health assess more negatively the responsibilities taken by various governmental levels. We may speculate that declines in an individual’s health condition may require a larger use of governmental services (health care, disability programs, etc.), resulting in an appraisal that some services do not completely meet the person’s expectations or needs regarding some of the domains of social participation.

**Conclusion**

There has been a growing recognition of the importance of environmental attributes in the lives of persons with disabilities. The present paper illustrates this theoretical vision and how the environment interacts with the individual’s characteristics to modify social participation. The study supports this interactive process (person-environment) influencing the outcome (social participation), and we may hypothesize that it can also be extended to other situational outcomes such as quality of life and even the concept of comprehensive health. A qualitative investigation suggests that ultimately quality of life in people with disabilities depends on the person’s ability to establish and maintain harmonious relationships with his/her environment (both physical and social). Likewise, a recent conceptualization of health suggests that it may be defined as the “physical and social capabilities for a person to act in his/her life milieu and to fulfill roles in an
acceptable manner...". Such a definition refers to the similar process of a dynamic balance between the person’s capabilities and the characteristics of the living environment. Moreover, it supports the proposition of conceptual frameworks of disablement that integrate the environmental factors as a whole, and it stresses the necessity to document the influence of the person’s environment regarding his/her social participation, as in the present study.
References


  Bibliothèque nationale du Québec.
Table 1: Comparison of demographic characteristics and severity of injury between the population and the sample

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Population</th>
<th>Current Sample</th>
<th>Statistical Tests</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 1771</td>
<td>n = 482</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age (years x ± sd)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current age</td>
<td>44.3 ± 14.2</td>
<td>42.4 ± 12.1</td>
<td>$Z^¥ = -3.1$</td>
<td>0.002</td>
</tr>
<tr>
<td>Age at injury</td>
<td>30.8 ± 13.9</td>
<td>28.5 ± 11.7</td>
<td>$Z = -2.8$</td>
<td>0.005</td>
</tr>
<tr>
<td><strong>Gender (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>81.4</td>
<td>81.3</td>
<td>$X^{2†} = 0.003$</td>
<td>0.957</td>
</tr>
<tr>
<td>Female</td>
<td>18.6</td>
<td>18.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Severity of injury (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete Tetraplegia</td>
<td>24.6</td>
<td>24.3</td>
<td>$X^{2} = 3.61$</td>
<td>0.307</td>
</tr>
<tr>
<td>Incomplete Tetraplegia</td>
<td>21.4</td>
<td>19.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete Paraplegia</td>
<td>34.1</td>
<td>38.0</td>
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<tr>
<td>Incomplete Paraplegia</td>
<td>19.9</td>
<td>18.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cause of injury (%) †</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor vehicle accident</td>
<td>-</td>
<td>58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Falls</td>
<td>-</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diving</td>
<td>-</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sports accident</td>
<td>-</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>-</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Violence</td>
<td>-</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

†: Chi-square comparing proportions between the population and the sample
¥: Z-test comparing mean values between the population and the sample
∆: Information not available for the study population
Table 2  Proportion of subjects perceiving definite environmental factors as applicable to their own life context and as facilitators to social participation ( Total N = 482).

<table>
<thead>
<tr>
<th>Category*</th>
<th>Environmental items</th>
<th>Number (%) of subjects who considered the item applicable and present in their environment</th>
<th>% subjects who perceived the item as a facilitator</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Support from the family</td>
<td>426 (88)</td>
<td>73</td>
</tr>
<tr>
<td>1</td>
<td>Support from friends</td>
<td>433 (90)</td>
<td>73</td>
</tr>
<tr>
<td>1</td>
<td>Attitudes of friends</td>
<td>435 (90)</td>
<td>69</td>
</tr>
<tr>
<td>4</td>
<td>Physical accessibility of the residence</td>
<td>450 (93)</td>
<td>69</td>
</tr>
<tr>
<td>4</td>
<td>Attitudes of the family</td>
<td>438 (91)</td>
<td>66</td>
</tr>
<tr>
<td>3</td>
<td>Availability of businesses in the setting (grocery, drug, hardware stores, etc.)</td>
<td>422 (88)</td>
<td>63</td>
</tr>
<tr>
<td>5</td>
<td>Use of assistive devices</td>
<td>372 (77)</td>
<td>60</td>
</tr>
<tr>
<td>1</td>
<td>Support from colleagues</td>
<td>224 (46)</td>
<td>60</td>
</tr>
<tr>
<td>5</td>
<td>Electronic technology (computer, fax, ...)</td>
<td>411 (85)</td>
<td>59</td>
</tr>
<tr>
<td>3</td>
<td>Health services in the community</td>
<td>397 (82)</td>
<td>59</td>
</tr>
<tr>
<td>3</td>
<td>Public disability insurance program</td>
<td>257 (53)</td>
<td>58</td>
</tr>
<tr>
<td>3</td>
<td>Services offer by businesses in the setting</td>
<td>415 (86)</td>
<td>58</td>
</tr>
</tbody>
</table>

* Environmental categories
  1: Support and attitudes (family and friends)
  2: Incomes, job and income security
  3: Governmental and public services
  4: Physical environment and accessibility
  5: Aids, devices and technology
  6: Equal opportunity & political orientations
Table 3 Proportion of subjects perceiving definite environmental factors as applicable to their own life context and as obstacles to social participation (Total N = 482).

<table>
<thead>
<tr>
<th>Category*</th>
<th>Environmental items</th>
<th>Number (% of subjects who considered the item applicable and present in their environment)</th>
<th>% subjects who perceived the item as an obstacle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter climatic conditions (snow, ice, ...)</td>
<td>443 (92)</td>
<td>88</td>
<td></td>
</tr>
<tr>
<td>Availability of jobs in the setting</td>
<td>181 (38)</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>Physical accessibility of friends and relatives’ residences</td>
<td>437 (91)</td>
<td>62</td>
<td></td>
</tr>
<tr>
<td>Unevenness of terrain (hills, slopes, ...)</td>
<td>426 (88)</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td>Nature of terrain’s surface (grass, sand, ...)</td>
<td>419 (87)</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Time required to execute a task</td>
<td>391 (81)</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Summer climatic conditions (heat, humidity, …)</td>
<td>448 (93)</td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>

* Environmental categories
1: Support and attitudes (family and friends)
2: Incomes, job and income security
3: Governmental and public services
4: Physical environment and accessibility
5: Aids, devices and technology
6: Equal opportunity & political orientations
Table 4. Variations among the subject of their perceived influence of specific environmental factors to social participation. The perceived influence varies from major obstacle to major facilitator (Total N = 482).

<table>
<thead>
<tr>
<th>Environmental items</th>
<th>Main facilitators</th>
<th>Obstacles</th>
<th>No Influence</th>
<th>Facilitators</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Major</td>
<td>Moderate</td>
<td>Minor</td>
<td>Total (%)</td>
</tr>
<tr>
<td>Support from the family</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>(7)</td>
</tr>
<tr>
<td>Support from friends</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>(6)</td>
</tr>
<tr>
<td>Attitudes of friends</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>(13)</td>
</tr>
<tr>
<td>Physical accessibility of the residence</td>
<td>2</td>
<td>3</td>
<td>8</td>
<td>(13)</td>
</tr>
<tr>
<td>Availability of business in the setting (grocery, drug, hardware stores, etc.)</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>(11)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Main obstacles</th>
<th>Obstacles</th>
<th>No Influence</th>
<th>Facilitators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter climatic conditions (snow, ice, ...)</td>
<td>53</td>
<td>21</td>
<td>14</td>
</tr>
<tr>
<td>Availability of jobs in the setting</td>
<td>35</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Uneveness of terrain</td>
<td>23</td>
<td>13</td>
<td>21</td>
</tr>
<tr>
<td>Physical accessibility of friends’ residence</td>
<td>27</td>
<td>16</td>
<td>19</td>
</tr>
<tr>
<td>Time required to execute a task</td>
<td>11</td>
<td>14</td>
<td>25</td>
</tr>
</tbody>
</table>
FIGURE-TEXT

Figure 1. Variation in the subjects’ perceived influence of 4 environmental factors on their social participation according to gender. Each factor may be perceived as facilitator, having no influence, or obstacle to social participation. The difference in the number of cases between the factors is due the exclusion from the analysis of subjects who answered ‘do not know’ or ‘not applicable’ to the general question regarding the influence of each factor.

Figure 2. Variation in the subjects’ perceived influence of 4 environmental factors on their social participation according to duration of injury. Each factor may be perceived as facilitator, having no influence, or obstacle to social participation. The difference in the number of cases between the factors is due the exclusion from the analysis of subjects who answered ‘do not know’ or ‘not applicable’ to the general question regarding the influence of each factor.

Figure 3. Variation in the subjects’ perceived influence of 4 environmental factors on their social participation according to current age. Each factor may be perceived as facilitator, having no influence, or obstacle to social participation. The difference in the number of cases between the factors is due the exclusion from the analysis of subjects who answered ‘do not know’ or ‘not applicable’ to the general question regarding the influence of each factor.

Figure 4. Variation in the subjects’ perceived influence of 4 environmental factors on their social participation according to type and completeness of injury. Each factor may be perceived as facilitator, having no influence, or obstacle to social participation. The difference in the number of cases between the factors is due the exclusion from the analysis of subjects who answered ‘do not know’ or ‘not applicable’ to the general question regarding the influence of each factor.

Figure 5. Variation in the subjects’ perceived influence of 4 environmental factors on their social participation according to perceived health status. Each factor may be perceived as facilitator, having no influence, or obstacle to social participation. The difference in the number of cases between the factors is due the exclusion from the analysis of subjects who answered ‘do not know’ or ‘not applicable’ to the general question regarding the influence of each factor.