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Research Report

Attributional Style and Disability Outcome

Disability is both a very personal and social issue. In 1999, The World Health Organization (WHO) published their latest revisions to the ICDH-2. This document includes the latest conceptual developments in understanding the structure and process of disabling conditions. The document highlights that disability outcome occurs within a dynamic system characterized by the impairment itself, environmental and personal factors (World Health Organization, 1999).

While the Beta-2 version of ICDH does not include classification of the personal factors, such factors are included in the model because of their theoretical importance in understanding disability etiology and course. Attributional style (Abramson, Seligman, & Teasdale, 1978) may be one such important personal factor. Outside disability and rehabilitation classification, research already has demonstrated significant relationships between attributional style, health status and depression for the general population (Peterson & Seligman, 1987; Seligman, 1990). However, the majority of research applying attribution theory to individuals with physical disabilities has focused on attributions people make for the disability itself (Bordieri & Drehmer, 1987a, 1987b, and 1988; Bordieri, Drehmer, & Comninel, 1988; Bordieri, Comninel, & Drehmer, 1989; Bordieri & Kilbury, 1991; Bulman & Wortman, 1977). The few studies that have investigated attributional style and the role it plays in the lives of people with disabilities have used depression as an indicator of adaptation to disability and investigated the relationship between attribution style and depression in samples of people who have disabilities (e.g. Chaney, Mullins, Uretsky, Doppler, et al. 1996). The research reported here goes beyond investigating chronic illness and disability outcome in terms of depression. Instead, we investigated the role attributional style may play in a measure of perceived health outcome that uses activity limitation scaling (Seekins, Smith, McCleary, Clay, & Walsh, 1990). Recent research suggests that depressed mood associated with disability may be directly related to the activity limitation experienced by individuals with a variety of different impairment types (see Williamson, 1998).

Study 1

Method

Participants and Procedure

Forty-eight individuals with mobility impairments were randomly selected from stratified case service records of 3 community-based service agencies serving people with disabilities in two US states. Case service records were stratified by level of functional limitation and overall level of health status to help assure that a range of these variables would be represented in the sample selected. These 48 individuals were contacted by letter and then by telephone to solicit participation in this study. The 29 (60.4%) individuals who agreed to participate were sent a packet of questionnaires along with a description of the study and an informed consent sheet.

Additionally, the participants were scheduled for a face-to-face individual interview conducted by two researchers in their home (the analysis of these interviews is not included as a part of the research presented here). They were asked to complete the questionnaires before the interview date so that the interviewers could collect them at the time of the interview. Participants were offered 10 dollars in exchange for their participation.

Of the 29 respondents, 18 had spinal cord injuries and 11 had other physical disabilities (e.g. Multiple Sclerosis, Arthritis, Cerebral Palsy). Of those with spinal injuries, 11 were classified as quadriplegic and 7 were paraplegic. Overall, men represented 62.1 percent of the sample and women 37.9. The mean age of the sample was 40.4 years (SD=11.4). Participants reported a median educational level of 14 years and a median annual income of 10,000 dollars.

Measures

Subjects were mailed surveys that included, among other scales, the Surveillance Instrument of Secondary Conditions (SCSI; Seekins, Smith, McCleary, Clay, & Walsh, 1990), the Attributional Style Questionnaire (ASQ; Peterson,

In addition to the moderating role of depression on disability outcome (Schiaffino & Revenson, 1992), there are at least two mechanisms by which attributional style could amplify the activity limitation an individual experiences. First, attributional style has been associated with health outcome (Peterson & Seligman, 1987; Seligman, 1990). People who have a pessimistic attributional style (i.e. persistent pattern of attributing negative events to global, stable and personal factors) tend to have a poorer health status. We would expect a similar relationship to exist for people with disabilities. According to the WHO model, a decrease in health status often leads to an increase in disability via changes in impairment status. Second, attributional style may affect goal directed behavior directly (Fowler & Peterson, 1981; Ravesloot, Seekins, Young, 1998; Schunk, 1982; Wilson & Linville, 1985). People with physical disabilities face a variety of environmental and social barriers on a daily basis. These barriers must be removed before they can engage in many activities; and the removal of these barriers often requires substantial tenacity. If an individual attributes the causes of these barriers to stable, global and personal factors (i.e. a pessimistic explanation) the individual's willingness to engage in activities to remove or overcome the barriers is likely to be reduced. If an individual responds in this way, and gives up on his or her goal to maintain or develop some role-specific behavior, then attributional style has increased his or her level of disability.

Thus, through potential effects on health status and goal directed behavior, attributional style may be one of the risk factors that increases the level of disability an individual who has an impairment experiences. If attributional style is indeed one of these risk factors, then specific cognitive interventions could be used to help individuals develop more optimistic explanatory styles and reduce the level of disability they experience. We conducted three studies to investigate the relationship between respondent's attributional style and their self-reported level of limitation due to secondary conditions.

Semmel, von Baeyer, Abramson, Metalsky, & Seligman, 1982), and the Forced-Choice Attributional Style Questionnaire (FCASQ; Seligman, 1990).

The SCSi (Seekins et al. 1990) was developed to assess the level of time limitation people experience due to secondary conditions. This approach to measuring disability allows participants to consider a wide range of conditions associated with their primary impairment that limit their daily activities. Respondents are presented 43 potential secondary conditions (e.g. Urinary Tract Infections, Pressure Sores, Depression, etc.) along with simple descriptions of each condition. They are asked to rate the amount of time limitation they experience due to each condition on a scale from 0 to 3. The summation of these ratings across secondary conditions is a global measure of the level of limitation individuals experience because of secondary conditions. Table 1 contains a list of the 43 secondary conditions, however, Table 1 does not include the written description of each secondary condition that is included in the SCSi.

Table 1. Secondary Conditions Included in the Secondary Condition Surveillance Instrument

Condition	
Problems with Mobility	Bowel Dysfunction
Joint & Muscle Pain	Bladder Dysfunction
Chronic Pain	Arthritis
Fatigue	Sexual Dysfunction
Physical Conditioning Problems	Communication Difficulties
Difficulties with Access	Postural Hypertension
Contractures	Respiratory Problems
Depression	Urinary Tract Infection
Spasticity	Scoliosis
Sleep Disturbance	Circulatory Problems
Visual Impairment	Anger
Written Communication Problems	Medication Side Effects
Isolation	Hearing Impairment
Eating and/or Weight Problems	Cardio-Vasccular Problems

Condition	
Injuries Related to Loss of Sensation	Capral Tunnel Syndrome
Pressure Sores	Ossification
Autonomic Dysreflexia	Alcohol/Drug Problems
Osteoporosis	Amputations
Diabetes	Care-related Injuries
Equipment Failure	Equipment Injuries
Anemia	Equipment Insuries to Others
Care-Related Injuries to Others	

Seekins, Clay, and Ravesloot (1994) reported internal consistency for the SCSi of .88. Construct validity of the SCSi is supported by factor analytic studies of the scale (Ravesloot, Seekins, & Walsh, 1997). Additionally, this study indicated the SCSi may be used with samples that include individuals who have diverse impairment types. Finally, the total SCSi score correlates .41 with the Craig Handicap Assessment and Reporting Technique (Whiteneck, Charlifue, Gerhart, Overholser & Richardson, 1992), a measure of disability outcome that measures handicap following the model of disability proposed by the World Health Organization. In this present study, participants reported experiencing an average of 14 secondary conditions in the past year which is very consistent with the mean reported in other similar samples (e.g. Seekins, Clay, & Ravesloot, 1994; Seekins & Ravesloot, 2000).

For the studies presented here, the depression item from the SCSi was not included in total SCSi scores. The relationship between attributional style and depression has been well documented and we did not want the results presented here to simply reflect that phenomenon. Additionally, by using the depression item as an independent variable, we were able to assess the relative contribution of attribution style and depression to the amount of limitation people reported due to secondary conditions.

The ASQ presents the respondent with 12 events (6 positive and 6 negative) and the respondent is asked to write down and then rate the most likely

cause for each event, if the event occurred to them. In this present study, scores for the six positive events were summed for an attribution to positive events sub scale (ASQ-P) and the six negative events were summed for an attribution to negative events sub scale (ASQ-N). The ASQ has yielded significant correlations with a variety of other variables including depression, school and sports achievement, and health status (Seligman, 1990). Table 2 contains the means and standard deviations for the ASQ sub scales and the SCSI.

Table 2. Means and Standard Deviations for Scales Used in all Three Studies

	SCSI	ASQ-N	ASQ-P	CES-D
Study 1				
M	24.86	76.11	90.65	--
SD	12.27	12.86	11.46	--
Study 2				
M	32.46	76.09	94.44	16.05
SD	18.63	14.10	16.56	11.50
Study 3				
M	32.91	75.46	95.19	16.05
SD	19.41	15.76	18.30	12.65

Results and Discussion

The results supported our hypothesis that attributional style is associated with the reported level of limitation due to secondary conditions. Hierarchical regression analysis was used to investigate the relative contributions of the ASQ sub-scales and depression to the prediction of SCSI scores.

Initially, hierarchical regression analysis was conducted by entering the independent variables in the following order: ASQ-N, ASQ-P, depression item. The ASQ variables were entered prior to depression in these analyses because in hierarchical analyses, variables that are assumed to have causal influences are entered prior to the variables they are presumed to affect (Cohen & Cohen, 1983). For these analyses, our primary interest was in the total possible variance

explained by attribution style rather than the unique variance, in order to assess the unique effects of attribution style on perceived limitation due to secondary conditions. However, because we were also concerned about the total possible overlap in variance accounted for between attribution style and depression, we also calculated results by entering the depression item prior to the ASQ sub scales. The results of this analysis are listed in Table 3.

The results of the hierarchical regression procedure indicated the coefficient for the ASQ-P was not significant; however, the coefficients for the ASQ-N and the depression item were both significant. The regression model derived by entering only the ASQ-N and the depression item into the equation accounted for 57% of the variance in SCSI scores. Thus, participants' attributions for negative events and their self-rated level of depression were highly predictive of the level of disability due to secondary conditions they reported. Entering the depression item prior to the ASQ sub-scales did not change the results substantially. Again, coefficients for the depression item and the ASQ-N were significant but were not significant for the ASQ-P. The only difference was the proportion of variance accounted for by each of the variables.

These results suggest that attributional style is strongly associated with the level of self-reported limitation participants experienced due to secondary conditions. However, these results clearly needed to be replicated on a larger sample of subjects. Additionally, the validity of the single depression item was not known, indicating that a standard depression inventory was also needed to replicate these results. A second study was conducted to address each of these issues and to cross-validate the results from study 1. For this study it was hypothesized that (a) the regression model from study 1 would cross validate on this new sample, and (b) attributional style would be a significant predictor of the level of

disability measured by the SCSl.

Table 3. Multiple Regression Model Parameters at Each Step of the Hierarchical Analysis

	β	ΔR^2	t
Study 1			
Step 1: ASQ-P	.12	.01	.58
Step 2: ASQ-N	.59	.31	3.19*
Step 3: Depression	.56	.26	3.86*
Study 2			
Step 1: ASQ-P	-.08	.01	-.66
Step 2: ASQ-N	.21	.04	1.68
Step 3: CES-D	.52	.26	4.87*
Study 3			
Step 1: ASQ-P	-.33	.11	-2.22*
Step 2: ASQ-N	.34	.11	2.36*
Step 3: CES-D	.54	.21	3.73*

*p<.05

Study 2

Methods

Participants and Procedure

Two hundred twelve individuals with mobility impairments were selected from the case service records of 8 community-based service agencies that serve people with disabilities in two US states. These individuals were mailed a survey about lifestyle and secondary conditions as part of a larger study. Two weeks following the initial mailing, participants who had not yet responded were sent a post-card as a reminder to return their survey. As in study 1, participants were offered 10 dollars in exchange for their participation. One hundred nineteen participants completed and returned the questionnaires for a response rate of 56 percent. Unfortunately, a significant percentage of respondents for this study did not complete the entire ASQ. Only 61.4% of those who returned surveys completed all of the ASQ (n= 73). Thus, analyses in this study were conducted on the data from these 73 individuals who completed all of the ASQ.

Significance tests (e.g. t-tests, chi-square and Mann-Whitney U-test) were computed to compare subjects who completed the ASQ with those who did not on all demographic and study measures. The two groups differed only in their level of depression with those completing the ASQ scoring significantly higher (i.e. greater level of depression) than those who did not complete the instrument (M = 17.9 and 12.8, respectively). This difference in samples suggests the study sample may represent a restricted range of depression scores which will be discussed later.

Of those returning surveys for study 2 who completed the entire ASQ, 37 (50.6%) were men, 33 (45.2%) were women and 3 (4%) subjects did not indicate their sex. The mean age of the sample was 40.8 years (SD = 11.6) and on average, participants reported the onset of their impairment occurred 15.3 (SD = 15.0) years prior to this survey. Participants reported a median educational level of 13 years and a median annual income of 11,500 dollars. Finally, of the 73 respondents, 47 had spinal cord injuries and 26 had other physical disabilities (e.g. MS, Arthritis, Cerebral Palsy). Of those with spinal injuries, 25 classified themselves as quadriplegic and 22 as paraplegic.

Measures.

Individuals selected were mailed surveys that included, among other scales, the Secondary Conditions Surveillance Instrument (SCSI; Seekins, Smith, McCleary, Clay, & Walsh, 1990), the Attributional Style Questionnaire (ASQ; Peterson, Semmel, von Baeyer, Abramson, Metalsky, & Seligman, 1982), and the Center's for Epidemiological Study of Depression scale (CES-D; Radloff, 1977).

The CES-D is a brief self-report inventory developed to measure depressive symptomatology in the general population. It includes 20 items scaled on a 4-point Likert-type scale. Radloff (1977) reported the internal consistency assessed by coefficient alpha and Spearman-Brown methods ranged from .85 for the general population to .90 for clinically depressed samples. The CES-D has been found to correlate as highly as .83 with the SCL-90

in a sample of depressed patients. Correlation coefficients ranging from .43 to .60 with a variety of other depression measures have also been reported (Radloff, 1977). Coyle and Roberge (1992), concluded that the CES-D is a valid measure of depression for populations of people who have physical disabilities. In the current study, the CES-D was used as an alternative measure to the single depression item that was used in study 1. However, in this sample, the correlation between the CES-D and the depression item was .68 ($p < .000$). Thus, the single depression item appears to be a valid indicator of depression for this population. Means and standard deviations for the scales used in this study can be found in Table 2.

Results and Discussion

The results of study 2 clearly provided support for one of our hypotheses: The regression model derived in study 1 cross-validated very well on data from study 2. This cross-validation was accomplished by applying the regression coefficients derived in study 1 for the ASQ-N and depression item to the data from study 2.

Using the study 1 coefficients, predicted values for the SCSi were computed using the study 2 data. These predicted SCSi scores correlated significantly with the actual SCSi scores from study 2 ($r = .64, p < .000$). Thus, cross-validating the regression model from study 1 accounted for 41% of the variance in the data from study 2.

Next, to further investigate the role of depression in the relationship between attributional style and disability, a hierarchical regression analysis was conducted using the ASQ sub scales and the CES-D. The order of variable entry for these analyses was ASQ-P, ASQ-N, and CES-D. This analysis uncovered a significant relationship between the CES-D and SCSi, but it did not result in statistically significant effects for either the ASQ-P or the ASQ-N. Given that the ASQ sub scales were entered before the CES-D in this analysis, overlap between the CES-D and the ASQ sub scales is not responsible for the absence of a relationship between the ASQ and the SCSi in these data.

Inspection of the pattern of missing data within the ASQ suggested that participants' omission of items within the scale was not random. Table 4 presents the percentage of respondents omitting each item of the ASQ. This table indicates that individuals in this sample omitted items having to do with romantic relationships and employment at a rate somewhat higher than items about other life areas. This pattern of results suggests that the ASQ may not be an appropriate measurement instrument for mail-based surveys with this population. Individuals with physical impairments are often particularly frustrated by their attempts to work and develop intimate relationships (Wright, 1983).

Table 4. Missing Data for the Application of the Attribution Style Questionnaire in Study 2

Scenario	% Missing
Romantic Interpersonal Scenarios	
Spouse is treating you more lovingly	18.8
Your date goes badly	15.8
Average	17.3
Paid Employee Scenarios	
You unsuccessfully look for a job	14.6
You apply for a position and get it	10.7
You get a raise	13.4%
Average	12.9
Other Scenarios	
A compliment on appearance	2.1
You become very rich	8.0
You don't help a friend with a problem	8.6
Audience reacts negatively to your talk	8.6
You do a project that is highly praised	8.0
A friend acts hostilely to you.	10.1
Can't finish work that is expected of you	9.5
Average	7.8

It is impossible to determine the degree to which the results for study 2 are a product of the large percentage of missing data. However,

if the relationship between depression and the SCSI is heteroscedastic with high depression and high SCSI scores more closely related than low scores on the two instruments, then these results may be a product of the truncated range of depression scores. That is, a heteroscedastic relationship between the CES-D and the SCSI might over-estimate the correlation between these variables when the range of depression scores is truncated as it was in this sample. Under these circumstances, the results would inaccurately estimate the variance accounted for by the ASQ-N.

Clearly, the application of the ASQ in study 2 was different from its application in study 1. Recall that in study 1, the ASQ was mailed to individuals who were to complete the instrument prior to an individual interview. In study 2, questionnaires were mailed to individuals with no further contact from the researchers either implied or requested.

Because of the missing data in study 2, a third study was conducted using the ASQ and CES-D. The same hypotheses for study 2 were again tested in the third study.

Study 3

Methods

Participants and Procedures

Participants were selected from community-based service agencies serving people with disabilities in three US states. They were recruited to participate in a health promotion demonstration project for individuals with spinal cord injury (SCI). All subjects completed the survey with the expectation they would have further contact with the researchers. Hence, this administration of the ASQ was similar to that of study 1.

Fifty-three participants were contacted to participate in the health promotion workshop. Of these, 31 agreed to participate in the workshop resulting in a 58.5% response rate. Additionally, 327 other individuals with SCI were mailed questionnaires. Thirty-eight returned the questionnaires with no follow-up reminders, resulting in an 11.6% response rate. Although

this represents a low return rate, there were no statistically significant differences between those who participated in the workshop and those who participated in the comparison group on either demographic measures or measures of disability outcome and attributional style. Thus, a total of 69 subjects were recruited for this study.

Overall, women represented 43.5% of the sample ($n = 30$), and men represented 53.6% ($n = 37$). Two participants did not indicate their gender. Participants reported a mean age of 36.7 ($SD = 10.2$) and had sustained their injury on average 11.2 ($SD = 8.12$) years prior to the survey. The median educational level was 13 years and median annual income was 10,000 dollars. All participants reported having a spinal cord injury: 23 (33%) reported paraplegia, 31 (45%) reported quadriplegia, and 15 participants did not indicate either para- or quadriplegia.

Measures

Participants were mailed questionnaires that included the same measures that were used in study 2. These included the Secondary Conditions Surveillance Instrument (SCSI: Seekins, Smith, McCleary, & Walsh, 1990), the Attributional Style Questionnaire (ASQ: Peterson, Semmel, von Baeyer, Abramson, Metalsky, & Seligman, 1982) and the Center's for Epidemiological Study of Depression scale (CES-D: Radloff, 1977).

As in the previous study, there was also missing data for the ASQ in this study, and again, only data from subjects who completed the entire ASQ were included in the analyses ($n = 46$). Although the missing data was substantial, it was somewhat less than in the previous study. Of those surveyed, 67% completed the entire ASQ. As in study 2, significance tests were again computed to compare ASQ responders with non-responders. For these data, there were no significant differences between the two groups on any of the demographic or study variables.

The pattern of missing data in this study mirrored what was seen in study 2 with participants selectively omitting items that involved romantic relationships and work. This pattern of results

further suggests that the ASQ may not be the best possible measure of attributional style for this population.

Results and Discussion

Results for study 3 supported both stated hypotheses. The regression model from study 1 replicated again, this time accounting for 44% of the variance in the data for study 3. In addition, a hierarchical regression analysis indicated the ASQ-N accounted for a significant proportion of variance in the SCSI scores beyond what could be accounted for by the CES-D. Results for the hierarchical regression analyses are listed in Table 3. In this analysis, the order of independent variable entry was ASQ-P, ASQ-N and CES-D. The results indicated that the ASQ-P accounted for 11% of the variance in the SCSI. The ASQ-N accounted for an additional 11% of the variance after the ASQ-P had been entered and the CES-D accounted for another 21% of the variance after both ASQ sub scales had been entered. Taken together, the ASQ-P, ASQ-N and CES-D accounted for 43% of the variance in SCSI scores. However, once the ASQ-N was entered into the equation in step 2, the regression coefficient for the ASQ-P was no longer significant indicating significant overlap of the variance accounted for by the two sub scales. As in study 2, the regression coefficient for the ASQ-N remained significant even when the CES-D was entered first.

These results are important because they replicate the results of the cross-validated regression model from study 1 using the CES-D, a more common measure of depression. Thus, as in study 1, these results suggest that attributional style is strongly associated with the level of limitation due to secondary conditions reported by people who have a physical impairment.

General Discussion

Three studies were conducted to investigate the hypothesis that attributional style is associated with the level of limitation people experience from secondary conditions following the onset of an impairment. The results from three separate studies provided mixed support for

this hypothesis. In two of the three studies, the negative attribution sub scale of the ASQ accounted for a significant and substantial proportion of variance in the level of limitation respondents reported from secondary conditions.

For the studies presented here, disability was defined using the WHO model of disability (World Health Organization, 1999). The WHO model of disability suggests that disability occurs when one's participation in social roles is limited by interactions between one's impairment, the environment and personal factors. The studies presented here suggest that attributional style may contribute to such limitation via one's self-assessment of functional capacity. We included a standard measure of depression to assess whether or not the partial correlation of attributional style and self-assessment of functional capacity would be significant.

If attributional style were merely synonymous with depression, then the association between attributional style and reported functional limitation would have added nothing new to what is already known about depression and disability outcome. However, it appears from these studies that changes in attributional style may potentially impact not only depression, but also disability outcome more directly. These results are consistent with attributional style research that has demonstrated a causal relationship between attribution and achievement.

Beyond the psychological impact of attributional style on disability, the impact of attributional style on health status is another potential mechanism that may explain these results. Most of the secondary conditions included in the SCSI are medical conditions. Thus, these results may indicate that people with a pessimistic attributional style experience not only more limitation from secondary conditions, but also more secondary conditions themselves. For example, people with pessimistic attributional styles may experience urinary tract infections that limit their activities more frequently than people with more optimistic attributional styles.

Research has linked attributional style to immune system function (Seligman, 1990). These results

could reflect the impact of attributional style on the incidence of secondary conditions via effects on the immune system. Clearly, prospective research that examines the relationship between attributional style, immune function and secondary conditions is needed to clarify this issue.

Although the results presented here indicate a significant relationship between attributional style and level of disability experienced from secondary conditions, limitations in all three studies restrict interpretation of these results. First, the results are based on cross-sectional data and consequently, causal direction of these results cannot be determined. Thus, while it seems likely that attributional style contributed to participants' self-rating of limitation, this is only one possible interpretation of the results presented here. Of course, it is also possible that limitation due to secondary conditions leads to higher ASQ-N scores. The self-report methodology used for this study is another limitation. It may be that attributional style is associated with participants' ratings rather than the actual degree of limitation they experience.

These results also highlight a problem with using the ASQ for measuring attributional style in this population. The proportion of missing data in two of the three studies was clearly problematic. Examination of the pattern of missing data from these studies indicated that people consistently omitted responses to the employment and intimate relationship scenarios of the questionnaire. These scenarios represent specific and difficult challenges faced by individuals with a physical impairment. Some of the survey participants communicated a strong negative emotional reaction to these scenarios. Given this reaction to the survey and the high percentage of missing data, it is recommended that another measure of attributional style be developed for future research with this population.

The results of these studies have exciting implications for the treatment of a subset of people who have an impairment. For some individuals, cognitive interventions that affect attributional style may have an impact on the degree of disability they experience from an

impairment. Thus, these results support the application of at least one type of behavioral medicine intervention with people who have physical disabilities. Another benefit from this line of research is the added rationale such research gives people for engaging in a psychotherapeutic process. Helping people recognize the positive effects cognitive-behavioral treatment can have on disability outcome may help some individuals get past the stigma often associated with psychological treatment.

Finally, a word of caution. Practitioners must recognize that disability results from an interaction between person and environmental variables. It is inappropriate to address only the intra personal needs of an individual who may need assistance with environmental modification as much, if not more, than a psychotherapeutic intervention. Thus, practitioners and researchers must be sensitive to the range of issues confronting people with disabilities. Nonetheless, the results of these studies suggest that future research on the use of cognitive-behavioral therapy techniques with people who have physical disabilities may result in better health status and quality of life for many individuals.

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