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Factors associated with physical activity among young adults with a disability

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The purpose of this study was to examine: (1) total physical activity and (2) the relative importance of functioning and disability, environmental and personal factors for total physical activity among young adults with a disability. The International Classification of Functioning, Disability and Health developed by the World Health Organization was used as a structural framework for a cross-sectional survey, based on a questionnaire. The population studied was 327 young adults (age 18–30) with a disability who were members of interest organizations for persons with disabilities. Using an adapted version of the self-administered short form of International Physical Activity Questionnaire (IPAQ), the sample reported some differences in physical activity related to the type and the onset of disability. Linear regression analyses revealed that personal factors demonstrated more power in explaining the variance in physical activity than both the environmental factors and factors related to functioning and disability. As for the able-bodied, intrinsic motivation and identity as an active person were the factors most strongly associated with physical activity behavior. This should have important consequences for how professionals try to motivate people with disabilities for physical activity, and how they plan and implement rehabilitation.

Regular physical activity for persons with chronic diseases and disabilities have considerable health benefits with the prevention of secondary conditions (Heath & Fentem, 1997; Physical Activity Guidelines Advisory Committee, 2008). Consequently, it has been assumed that people with disabilities are motivated for physical activity for the health benefits (Vaage, 2009) while other studies emphasize the social benefits (Sherrill & Williams, 1996; Groff & Kleiber, 2001). However, there is little knowledge about the determinants of actual physical activity in this population. This is important because studies indicate that young adults (age 18–30) with a disability are less physically active than their able-bodied peers (Grue, 1998; Hanssen et al., 2003). Given the relatively long traditions of sport and physical activity for people with disabilities in Scandinavia, there are surprisingly few studies examining the reasons for this difference. Therefore, more knowledge about the determinants of physical activity for young adults with a disability is needed.

Health conditions as well as personal and environmental barriers may reduce a person's ability to engage in physical activity/rehabilitation (Rimmer, 2006). Based on his own research, Rimmer (2006) recommended to use the International Classification of Functioning, Disability and Health (ICF) as a framework for identifying factors that may impact physical activity among people with disabilities (WHO, 2001). The ICF is a comprehensive classification system designed to capture functioning, and not only medical descriptions of limitations. ICF has two parts, each with two components. Part 1 is about *functioning and disability* related to: (a) body functions and structures; and (b) activities and participation. Part 2 consists of *contextual factors*, including both: (c) environmental factors; and (d) personal factors. With this structure, this classification system may help select the more important factors among the multitude of factors that are related to physical activity for this population. There is also a need for establishing the relative importance of the various ICF factors in the physical activity context.

Selection of variables within the ICF factors

Within the factor functioning and disability, research indicates that the severity of the disability is negatively correlated with physical activity (Jahnsen et al., 2003; Becker & Stuifbergen, 2004). In addition, there has been a call for research on potential differences in

activity patterns between persons with congenital versus acquired disabilities, and between groups of people with different disabilities (Rimmer et al., 1996). Consequently, including information about the type and the severity of the disability appears important.

Evidence exists that shows that environmental barriers to physical activity limit participation in community activities for people with disabilities (Rimmer, 2005; Rimmer et al., 2008). It would appear that information about environmental barriers should be included to fully understand the determinants of physical activity.

Personal factors have also been cited as important (Martin, 2006). One of the most important personal factors for physical activity is motivation. Motivation for physical activity is widely studied among the able-bodied, both in sport (e.g., Roberts et al., 2007) organized exercise (e.g., McAuley et al., 2001), physical education (e.g., Biddle, 2001), and physical activity in general (e.g., Trost et al., 2002). For people with disabilities, the extant research is scarce, but some studies do exist. Martin (2006) found that enjoyment was a critical personal factor in the commitment to disability sport. Martin et al. (1995) reported that adolescent swimmers with a disability reported a strong personal athletic identity. Scelza et al. (2005) reported that lack of motivation, lack of energy, and lack of interest were the most frequently cited barriers to exercise among individuals with a disability. These findings indicate that factors other than health benefits are important for the motivation for physical activity for persons with disabilities. Therefore, there is a need to investigate how motivational variables and exercise identity interact with physical activity.

Because autonomous functioning and social interaction may be a particular challenge for people with disabilities, self-determination theory (SDT) was used as a motivational approach for this study. The theory assumes that the basic needs for autonomy, competence and relatedness are sought to be satisfied. According to Ryan and Deci (2000), these basic needs apply to all people regardless of gender, group or culture, and presumably disability. SDT differentiates motivation in terms of the degree to which it has been internalized, suggesting that the more fully it is internalized, the more it will be the basis for autonomously regulated behavior. There are five different degrees of motivational regulation: external regulation, introjected regulation, identified regulation, integrated regulation and intrinsically regulated motivation, from the least to the most fully internalized form of regulated motivation respectively. Recently, research based on SDT has demonstrated the importance of intrinsic and self-determined motivation for adherence to physical activity and exercise for populations without disabilities (Thogersen-Ntoumani & Ntoumanis, 2006; Chatzisarantis & Hagger, 2008).

One's identity as a physically active person (an exercise self-schema) is another personal factor that has demonstrated the importance of physical activity for individuals with disabilities (Sørensen, 2006). Self-schemas are cognitive structures that affect how people process information, motivational processes and regulate behavior (Kendzierski, 1988). People tend to try to maintain consistency in their self-schemas, meaning that exercise-schematic individuals will increase their focus on and process more information of physical activity and demonstrate active participation. Studies have demonstrated that exercise schematics were more likely to start and continue with physical activities than non-exercise schematics (Kendzierski, 1988).

Studies indicate that physical activity may impact perceived physical and mental health as well as the quality of life for adults with a disability (Roe et al., 2008; Lannem et al., 2009). We wished to confirm that increased perceived physical and mental health may also be associated with physical activity for people with a disability.

Thus, the purpose for this study was to examine: (1) total physical activity and (2) the relative importance of functioning and disability, environmental and personal factors for total physical activity among young adults with a disability. Based on previous research (Jahnsen et al., 2003; Rimmer, 2005; Scelza et al., 2005; Martin, 2006; Rimmer et al., 2008), associations between both functioning and disability, environmental factors, personal factors, and total physical activity were expected.

Materials and methods

Study population

The population studied were young adults (age 18–30) with a disability who were members of interest organizations for persons with disabilities ($N = 998$). The population included members of organizations for people with cerebral palsy ($n = 399/40.0\%$), spina bifida, and hydrocephalus ($n = 116/11.6\%$), spinal cord injuries ($n = 66/6.6\%$), muscle diseases ($n = 127/12.7\%$), and visually impaired ($n = 290/29.0\%$).

Design and data collection

The study was designed as a cross-sectional survey, and data were collected with questionnaires. The questionnaires were sent to the participants through the interest organizations. A reminder was sent out after 3 weeks. An electronic version was offered to the visually impaired and for those who so preferred. Participants were informed about the electronic questionnaire through the information letter with the questionnaire, together with an informed consent form. The study was approved by the Regional Medical Committee for Research Ethics in Norway.

Measures

Physical Activity

Physical activity was assessed using an adapted version of the self-administered short form of the International Physical Activity Questionnaire (IPAQ). This measure assesses the total vigorous intensity physical activity, total moderate intensity physical activity, total time walking, and the time spent sitting during the last 7 days. Time spent sitting was excluded in this study because it has no meaning to ask wheelchair users to report their time spent sitting during the last 7 days. IPAQ short form has been developed and tested for use with adults with an age range of 15–69 years and has shown acceptable reliability and validity (Craig et al., 2003). IPAQ had been translated into Norwegian previously and has been used by the Survey of Living conditions (Wilhelmsen, 2009).

The examples of vigorous and moderate intensity activities used were not relevant for our sample. The IPAQ protocol allows the use of culturally applicable examples (IPAQ Research Committee, 2005). According to this, "fast wheeling/pushing in wheelchair" (vigorous intensity), "wheeling/pushing the wheelchair with moderate speed" (moderate intensity), and "wheeling/pushing the wheelchair" as an alternative to walking was included. IPAQ provides a continuous variable (metabolic equivalent − minutes pr. week = MET-minutes per week) that was used as the dependent variable. There is no report on this measure being used on populations with disabilities. In order to check the construct validity, an alternative measure was used as a comparison. This was a description of leisure time activity with four answering alternatives, frequently used by the National Institute of Public Health (Graff-Iversen et al., 2008). Albeit, there is a difference between total physical activity (IPAQ) and leisure time physical activity; it will provide an indication of the activity level. With this difference in mind, a reasonable correlation with results from the IPAQ Short Questionnaire ($r_s = 0.632$, $P < 0.001$) was demonstrated. For additional information, the participants reported what type of activity they participated in through an open question.

Functioning and disability

The type of disability was inferred by which interest organization the participants belonged to (e.g., visually impaired). Mobility function was measured on a three-level scale ranging from: 1. "I can walk indoors and outdoors without any aids"; to 3. "I am completely dependent on using a wheelchair". For visual function, the scale ranged from: 1. "Can walk around outdoors without a guide or guide dog"; to 3. "Need guiding (or guide dog) when I am outdoors". Participants also responded to the question about whether their disability was congenital or acquired.

The need for personal mobility aids was measured by answering "Yes" or "No" to the question: "Are you in need of mobility aids to move around indoor or outdoor"? Finally, the need for personal care was measured by one item asking how much time they spent on daily care procedures, indicating on a four-level scale ranging from: "Less than 1 h"; to "More than 3 h".

Environmental factors

Rimmer et al. (2000) developed a measure of barriers to exercise, which contained some environmental factors for individuals with a disability in the United States. The instrument was not suitable for this study due to cultural differences. For the identification of specific environmental variables, both some of that research (Rimmer, 2006), the advice of an expert group at a rehabilitation center using physical activity as the means of rehabilitation (Beitostølen Healthsports Centre), as well as interviews with parents and patients were used. Three activities in the local community were rated on a scale from 1 (not at all true) to 3 (very true) on easy access to facilities, good opportunities for transportation, low costs, available assistance, adapted activities, adapted facilities and a feeling of being welcome to the actual site (e.g., "The activity is well adapted to fit my ability"). As an expression for general environmental availability, a mean score was generated from all seven ratings.

The functionality of personal activity equipment was assessed by a mean score derived from how well the three statements about the equipment described their situation (e.g., "My personal activity equipment is functional and improves my ability"). The scale ranged from: 1 "Not at all true"; to 5 "Very true". The participants also reported available time for activity (e.g., "I have the time to engage in leisure-time physical activity"), availability of information about activities (e.g., "Information about appropriate activities is easily available"), the subjective feeling of having sufficient energy (e.g., "I have energy to do physical activity in my leisure time") and available activities in the local community (e.g., "There are opportunities for me to be physically active in my local environment"). The scales for the last four statements ranged from: 1 "Not at all true"; to 5 "Very true".

Personal factors

Motivation for physical activity was measured by the Exercise Self-Regulation Questionnaire (SRQ-E) (Ryan & Connell, 1989) that assesses domain-specific types of motivation regulation (external, introjected, identified, and intrinsic). The responses were given on a 7-point Likert-type scale ranging from "very true" to "not at all true". The Relative Autonomy Index (RAI) and average scores were calculated for each subscale, and the subscale for intrinsic motivation was used because it provided the most clear expression of the autonomous part of the continuum. The SRQ-E was translated into Norwegian by a bilingual researcher. Back translation into English by a second bilingual translator was performed to ensure conceptual accuracy. Psychometric properties of the SRQ-E were established with a sample from the United States (Rockafellow et al., 2006).

Exercise self-schema was measured as described by Kendzierski (1988). The scales consist of three items describing (on a scale from 1 to 11) the person as an exerciser, and whether he/she consider this as an important aspect of their self-image. The scoring criterion to determine the "exerciser schematics" group was when a minimum of two items on both scales were scored eight or higher. The participants who did not meet this standard were classified as "non-exerciser schematics". The internal consistency and convergent validity of the scale have been demonstrated when compared with exercise behavior measures (Kendzierski, 1988). Principal Component Analysis based on the present data extracted only one factor, accounting for 70.4% of the variance with an acceptable internal consistency ($\alpha = 0.91$).

Perceived physical and mental health was measured by the Medical Outcome Study Short Form 12 (SF-12). SF-12 consists of 12 items, and the responses were given on a Likert scale with scoring levels from 2 to 6 for the various questions. The physical and mental component summary norm-based scores (PCS and MCS) for SF-12 were calculated after reversing the scores of questions 1, 8, 9, and 10. The SF-12 is widely used and has been validated for use in nine countries (Gandek et al., 1998).

Analyses

All data were entered into SPSS15.0.1 and checked for accuracy by another person. For descriptive analyses, frequency distribution and mean scores were used where appropriate. Comparisons of total physical activity between disability groups and between acquired/congenital disabilities were performed by one-way ANOVA with Bonferroni post-hoc test, or *t*-test. In order to study the association between total physical activity (MET-minutes per week) and the independent variables, bivariate Spearman's correlation analyses were performed. For identifying the relative importance of the factors in explaining the variance of total physical activity, linear regressions for the continuous dependent variables were performed. All models were checked for violations of assumptions. The significance level was set to $P<0.05$.

Results

Participants

A total number of 875 postal questionnaires and 123 e-mailed questionnaires were sent out. Of those, 28 were returned due to wrong or non-functional addresses. The questionnaires were completed and returned to their organizations by 262 young adults, and 75 completed the electronic version. Three participants unable to use either version answered a telephone survey. Two individuals were excluded because they were identified as multivariate outliers. Five participants were too young (under 18 years), and two addressees had died. Ten individuals (or their assistant/relatives) reported as being cognitively challenged and unable to answer the questionnaire. Five persons received the questionnaire twice due to double membership, but returned only one. Six questionnaires were returned incomplete and had to be removed from the analyses. A total of 327 participants between 18 and 30 years with physical disabilities were finally included in the study. The adjusted response rate was 34.6%. Further details are in Table 1.

The distribution of participants across interest organizations was as follows: members from organizations for cerebral palsy ($n=139$, 42.5%); spina bifida, and/or hydrocephalus ($n=36$, 11.08%); spinal cord injury ($n=23$, 7.0%); muscular disease ($n=48$, 14.7%); and visual impairment ($n=78$, 23.9%). Others ($n=3$, 0.9%) were members of an interest organization that did not represent their primary disability. These percentages correspond reasonably well with the percentages in the total population. Among those who did not answer the questionnaire ($n=619$), the mean age was 23.8 years, (SD = 3.7), and there were 316 (51.1%) females, which is quite similar to the sample (cf. Table 1).

Descriptive statistics

The information about impairments given in the questionnaire by each participant was congruent with his/her membership status in the organizations.

Table 1. Descriptive data of the sample and variables within the ICF factors ($N=327$)

Variables	*n*	%	*M*	*SD*
Physical activity				
MET-minutes per week			1595	1985
Functioning and disability factor				
Impairments				
Mobility impairment	246	75.2		
Visual impairment	78	23.9		
Others	3	0.9		
Need for personal mobility aids	184	56.3		
Need for personal activity equipment	157	48.0		
Personal care (more than 3 h/day)	47	14.4		
Employed	73	22.3		
Education (university)	73	22.3		
Environmental factor				
Access to facilities			2.38	.54
Assistance			2.24	.57
Adapted facilities			2.17	.66
Functionality personal activity equipment			2.40	.90
Information about activity			2.47	1.40
Costs			2.53	.56
Available local activities			3.32	1.43
Personal factor				
Gender				
Female	178	54.4		
Male	149	45.6		
Exercise schematics	104	31.8		
Age			24.15	3.88
SRQ-Exercise Intrinsic motivation			4.78	1.59
Physical component summary (PCS)			40.94	10.70
Mental component summary (MCS)			50.27	10.93
Time for activity			4.16	1.11

ICF, International Classification of Functioning, Disability and Health; SRQ, Self-Regulation Questionnaire.

Further, this is similar to the distribution in the population (Conradi & Rand-Henriksen, 2004). The sample reported a mean score of total physical activity of 1520 and 1685 MET-minutes per week, women and men respectively. Within the sample, the group with acquired disabilities reported significantly more physical activity ($M=2464$, SD = 2550) than the group with congenital disabilities ($M=1396$, SD = 1778), $t(73.9)=3.1$, $P<0.01$). One-way ANOVA analysis demonstrated an overall significant difference between types of disability $F(4, 327)=2.97$, $P=0.02$, but Bonferroni post hoc analyses were only significant between cerebral palsy and visual impairment groups (SE = 266.8, $P=0.039$). The most frequently reported activities were dance, swimming, horse-riding, and boccia. Some took part in activities in a gym or fitness center (17.6% women and 10.6% men).

Associations between physical activity and the ICF factors

Of the variables representing functioning and disability, the question "no need for personal aids" demonstrated the strongest correlation with total

physical activity (cf. Table 2). ''No need for personal activity equipment'', ''being employed in some form of work,'' and ''educational level'' revealed a relatively high association with physical activity, while ''need for more than 3 h daily for personal care'' was significantly associated with a lower level of activity.

Among the environmental factors, ''available local activities'' demonstrated the highest correlation with physical activity, but also ''functional personal activity equipment'', ''adapted facilities at the site'' and ''high level of information about activities'' were positively correlated with physical activity (cf. Table 3).

The strongest positive correlation among the personal factors occurred between physical activity and having a self-schema as a physically active person (exerciser schematics), while PCS and high intrinsic motivation demonstrated relatively high associations with physical activity. There appeared to be no association between activity level and age or gender (cf. Table 4), but it should be taken into consideration that the sample is a selected age group.

Variables explaining the variation in total physical activity

Based on these correlations, separate linear regression analyses for the different components in the ICF were performed. In the analyses, all factors with significant correlations ($P<0.05$) from the correlation analyses were included. The model included MET-minutes per week as the dependent variable and 14 independent variables. In the next step, the variables that contributed significantly to the regression in a hierarchical stepwise regression were included.

It can be assumed that functioning and disability represents basic factors that may impact personal factors such as motivation, self-schema, and perceived physical health. It also may be assumed that environmental factors can affect motivation. Based on these assumptions, the factors representing functioning and disability were entered in the first step of the equation, environmental variables were included in the second step, and finally personal factors were included in the last step of the regression procedure. Attempts to change the order for the entrance of the factors into the equation did not change the main picture.

Seven variables contributed significantly to the equation (cf. Table 5). Together, they explained 31% of the variation in physical activity. Being an ''exerciser-schematic'' represented the strongest contribution, with high intrinsic motivation, low need for personal activity equipment and being used also as significant contributors. Having an acquired disability and high perceived physical health (PCS) also played a role.

Discussion

The amount of physical activity among the young adults with a disability demonstrated some differences between types and degrees of functioning and disability that could be expected (Jahnsen et al., 2003; Becker & Stuifbergen, 2004; Lannem et al., 2009). Those with an acquired disability often have experience in sport or physical activity before acquiring their disability (Sherrill & Williams, 1996). For those with congenital disabilities, it may be a question of overprotection by parents (Grue, 1998). Both may explain the higher physical activity level among persons with acquired disabilities.

The differences in physical activity between the five different disability groups were small. However, those with cerebral palsy were significantly less active than those with visual impairments. In this sample, those with cerebral palsy reported more severe mobility limitations, and this may affect their activity level. The findings are consistent with previous research (Jahnsen et al., 2003; Becker & Stuifbergen, 2004; Lannem et al., 2009).

The young adults with a disability in this study reported less physical activity than a comparable able-bodied national sample of the same age, measured by MET-minutes per week (Anderssen & Andersen, 2004). In that study of able-bodied females ($n = 167$) and males ($n = 144$) aged 18–30 years, they were about three times more active than those in the present study.

Table 2. Bivariate Spearman's correlation analysis between physical activity (MET, minutes per week) and variables within the functioning and disability factor

	1	2	3	4	5	6	7	8
1. Total MET-minutes per week	–							
2. High mobility limitation	−.30**	–						
3. High visual impairment	−.23*	.46**	–					
4. Low need for personal aids	.36**	−.59**	−.45**	–				
5. Low need for personal activity equipment	.22**	−.37**	−.30**	.56**	–			
6. High time for personal care	−.24**	.38**	.57**	−.31**	−.17**	–		
7. Employed	.21**	−.18**	−.18	.22**	.13*	−.12*	–	
8. High education	.21**	−.03	−.22*	.15**	.10	−.08	.33**	–

*$P<.05$; **$P<.01$.

Table 3. Bivariate Spearman's correlation analysis between physical activity (MET, minutes per week) and variables within the environmental factor

	1	2	3	4	5	6	7
1. Total MET-minutes per week	–						
2. High access to facilities	.02	–					
3. High assistance	.05	.19**	–				
4. High adaption of facility	.15**	.29**	.33**	–			
5. Low functionality personal activity equipment	−.12*	−.03	−.13*	−.24**	–		
6. High information about activities	.16**	.19**	.17**	.26**	−.11*	–	
7. High available local activities	.36**	.17**	.19**	.32**	−.17**	.49**	–

*$P<.05$; **$P<.01$.

Table 4. Bivariate Spearman' correlation analysis between physical activity (MET, minutes per week) and variables within the personal factor

	1	2	3	4	5	6	7	8
1. Total MET-minutes per week	–							
2. Age	.04	–						
3. Sex	−.01	−.01	–					
4. High intrinsic motivation	.34**	−.01	.01	–				
5. Exerciser schematics	.43**	−.03	−.05	.52**	–			
6. High physical components summary (PCS)	.35**	−.06	.07	.13*	.20**	–		
7. High mental components summary (MCS)	−.01	−.01	.10	.09	.18**	.03	–	
8. High time for activity	.00	−.01	.09	.28**	.26**	.04	.14*	–

*$P<.05$; **$P<.01$.

The number of people in the present study using gyms and fitness centers were comparable with the results from a survey of living conditions (Vaage, 2009). People with disabilities appear to use gyms and fitness centers less than the general population. Vaage indicated that there is an expectation that people with disabilities should use the gym more for health benefits. This would imply that people with disabilities are more motivated for physical activity for the health benefits than other people, an expectation our data does not appear to support. The absence of individuals with a disability in health clubs and fitness centers also has been reported in the United States (Rimmer, 2005). In his study, Rimmer focused on disability unfriendly physical activity environments; inaccessible buildings, lack of equipment, information, staff training, policies, and procedures. Our data indicate that most of the respondents had physical access to one or more physical activities in their local community. On the one hand, there may be some cultural differences at play to explain such differences between the United States and Europe, but on the other hand we may need to look for other explanations.

Explaining the variance in total physical activity

Examining the factors measured by the ICF in the regression analyses, the personal factors demonstrated more power in explaining the variance in total physical activity than either the environmental factors or the factors related to functioning and disability. The personal factors were identity as a physically active person (being an exerciser schematic), and intrinsic motivation. This means that personal ideas about the self and experiences with physical activity appeared to be important factors for involvement in physical activity for those with a disability. The strongest association was demonstrated by having a self-schema as an exerciser. This is congruent with research findings in the general population (Kendzierski, 1988). The finding that athletic identity was associated with a likelihood of continued sports participation among individuals with a disability provides further evidence that this is an important variable (Martin, Smith, & Adamsmushett, 1995).

The other personal factor strongly associated with higher physical activity level was intrinsic motivation. According to the SDF (Ryan & Deci, 2000), it is a question of whether physical activity satisfies the need for autonomy, competence and relatedness. This is interesting in relation to the strong focus of the media and health authorities on the health imperatives of being physically active. However, this represents an externally regulated motivation, which according to the theory is less likely to maintain the behavior in question (Ryan & Deci, 2000). Research on individuals with cerebral palsy has demonstrated that too much physical treatment and training with a health focus early in life may be

Table 5. Summary of hierarchical regression analysis for the variables associated with total physical activity *(N = 327)*

Variable	*B*	*SE B*	β
Step 1[†]			
Acquired disability	1062.8	267.4	0.21**
Low need for personal activity equipment	738.5	208.4	0.19**
Employed	995.9	251.8	0.21**
Step 2[‡]			
Acquired disability	942.8	260.8	0.19**
Low need for personal activity equipment	595.8	204.6	0.15**
Employed	832.8	246.9	0.18**
Available local activities	323.5	71.2	0.24**
Step 3[§]			
Acquired disability	619.4	243.8	0.12*
Low need for personal activity equipment	577.8	195.8	0.15**
Employed	746.3	228.1	0.16**
Available local activities	154.5	69.0	0.11*
High physical component summary (PCS)	22.5	9.5	0.12*
Exerciser schematics	1116.2	232.8	0.27**
High intrinsic motivation	173.2	67.2	0.14**

Dependent variable: Total MET-minutes per week. $R^2 = 0.12$ for step 1, 0.05 for step 2 and 0.14 for step 3. Adjusted R^2 0.31.

*$P < .05$; **$P < .01$.

[†]Functioning and disability.

[‡]Environmental factors.

[§]Personal factors.

detrimental to motivation for physical activity later in life (Jahnsen et al., 2003). It may well be that an overemphasis on the health consequences of the population with disabilities may partially explain the lower physical activity levels.

The participants in this study reported perceived physical and mental health, and this represents the participants' experience of their functioning and disability. As demonstrated before, there was a clear association between physical disability and perceived physical health (PCS) (Roe et al., 2008). Further, perceived physical health demonstrated a significant positive correlation with the activity level. This supports the findings discussed earlier about the severity of mobility limitations that may affect the activity level. Perceived physical health may be a practical barrier for physical activity, but it is not necessarily a motivational issue.

In summary, personal factors (exercise self-schema, intrinsic motivation and perceived physical health) appeared to explain more of the variance in total physical activity than environmental factors and factors related to functioning and disability. The importance of personal factors support the findings by Scelza et al. (2005).

However, one environmental factor was important. Existing activity possibilities in the local community contributed significantly to the total physical activity equation. Several other environmental variables demonstrated meaningful correlations, emphasizing the importance of functional personal activity equipment, and strengthens our assumption that there is a need to improve the distribution of, and access to, such equipment. It makes sense that available local activities make it easier to be physically active, for example by reducing the need for transportation and time. The National Governing Body for Sport over the past 10 years has the experience that environmental factors are central in accommodating athletes with various disabilities (Sorensen & Kahrs, 2006). However, it should be taken into consideration that these findings are from a small country that has reasonable resources to spend on facilitating participation in sport for individuals with a disability.

Only a few of the indicators of functioning and disability emerged as important correlates of total physical activity in this study. Employment was positively associated with physical activity, and higher education was significantly correlated with physical activity, even though it did not contribute significantly to the regression model. The relationship with education is consistent with the data from the general population (Vaage, 2009), and in the present study, it may indicate higher functional capability. The same could be argued in relation to employment, even though it may be argued that those who are used may have less time to engage in physical activity.

Limitations of the study

The adjusted response rate was relatively low, which limits the generalizability of the findings. It is likely that those within the population who are the most interested in physical activity are overrepresented. Other studies have had similar problems, both among able-bodied (Anderssen & Andersen, 2004) and in populations with disabilities (Washburn et al., 2002) Measurement of physical activity by self-report is in itself a challenge, and in particular among people with disabilities (Washburn et al., 2002). Another limitation is the cross-sectional nature of the study because causal relationships cannot be determined. The participants were recruited through their interest organizations, but there is no information about individuals with a disability who are not members of organizations. It may be debated whether members of organizations are more or less resourceful than individuals who choose not to be a member (Grue, 1998).

Perspectives

The findings of this study indicated differences in activity levels among young adults with acquired and

congenital disabilities, and between persons with cerebral palsy and visual impairment, which is an important reminder of the heterogeneity of the population of individuals with a disability. Comparison with other studies indicated that young adults in this study were less physically active than their able-bodied peers, demonstrating that it may be more difficult to be physically active with a disability than without. However, the personal factors explained more behavioral variance in physical activity than the other factors of the ICF. As with the able-bodied, identity as an active person and intrinsic motivation were the most important factors for explaining the variance in total physical activity behavior (Kendzierski, 1988; Thogersen-Ntoumani & Ntoumanis, 2006). The same has been demonstrated among people with psychiatric illness (Sørensen, 2006). These findings have important implications for efforts to motivate people with disabilities to engage in physical activity, and how rehabilitation is implemented. To motivate individuals with a disability, forging an identity as an exerciser and increasing perceptions of autonomy and intrinsic self-regulation are the strategies that have the potential to have the greatest impact. Functioning and disability and environmental factors also played a role, albeit a more minor one in this study.

Key words: physical activity, intrinsic motivation, self-determination, self-schema, environmental factors.

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