

Author Year Country Research Design Score Total Sample Size	Methods	Outcome
<p>de Groot et al. (2020) Netherlands Observational N=96</p>	<p>Population: Gender: males=72, females=24; Mean age=47.8yr; Injury: SCI=57, amputation=14, spina bifida=2, other=19; Mean time since injury=13.2yr. No Intervention: Participants completed a survey which concerned the benefits of participating in the HandbikeBattle event, current sport participation, and experienced barriers and facilitators regarding current sport participation. Outcome Measures: Experienced benefits/losses (fitness, health, handcycling, performance activities in daily life, personal development), exercise and sports participation (average hr per week during last 3mo), experienced barriers and facilitators (personal barriers, environmental barriers, personal facilitators, environmental facilitators).</p>	<ol style="list-style-type: none"> 1. Reported benefits of the HandbikeBattle included fitness level (90%), personal development (81%), daily life activities (66%), and health (64%). 2. The median current sport was 5.0hr/wk. 3. Personal barriers most frequently reported were time (31%), less able to practice sport due to the disability (17%), and pain complaints (15%). 4. Most frequently reported environmental barriers were transport to sport accommodation takes a lot of time (19%), and not enough fellow athletes (16%). 5. Those who participated less in sports indicated more personal ($p=0.004$) and environmental barriers ($p=0.02$), with the largest differences in barriers 'less able to practice sport due to the disability', 'not enough fellow athletes', and 'no suitable sport facilities in my area'.
<p>Amberkar et al (2019) India Observational N=102</p>	<p>Population: Mean age=40.41yr; Gender: males=88, females=14; Level of injury: C1-T1=10, T2-L5=92; Level of severity=complete Mean time since injury=13.39yr; Sports Participants (SCI; n=61): males=56, females=5 No Intervention: Not applicable. Interview survey data from four paraplegic rehabilitation centers in Mumbai to assess sports participation among people with SCI to understand barriers and facilitators. Outcome Measures: Sports participation, facilitators and barriers</p>	<ol style="list-style-type: none"> 1. Sports participation was 60% among SCI participants in the study, all rehabilitation centers either promoted or made sports participation mandatory, probable reason for high rates. 2. Popular sports: basketball 20%,m throwball 16%, cricket 14%, and wheelchair racing 10%. 3. Top facilitators in sport participation were financial security, family support, institutional support i.e., training facilities. 4. Barriers were lack of motivation, low confidence, poor fitness level.
<p>Roopchand-Martin et al. (2018) Jamaica Observational N=48</p>	<p>Population: Mean age: 35.4yr; Gender: males=40, females=8; Injury: complete=28, incomplete=20; Mean time since injury: 43.6mo. No Intervention: Participants completed questionnaires via a phone interview pertaining to barriers to exercise and development of secondary health complications.</p>	<ol style="list-style-type: none"> 1. 25% of participants reported engaging in leisure time physical activity. 2. 60.4% of participants reported exercising but only 12.2% were engaged at levels that would result in health benefits.

	<p>Outcome Measures: The Physical Activity and Disability Scale, Spinal Cord Injury Secondary Conditions Scale and the Barriers to Exercise and Disability Scale.</p>	<ol style="list-style-type: none"> 3. Exercise behavior was similar for those with paraplegia and quadriplegia. 4. The main barriers to exercise were cost of transportation (75%) and not knowing of a fitness center to exercise (58.3%). 5. Most participants had not experienced much secondary conditions in the past three months; however, muscle spasm (31.25%), chronic pain (20.83%) and joint and muscle pain (18.75%) were the more common.
<p>Mat Rosly et al. (2018) Malaysia Observational N=70</p>	<p>Population: Mean age: 39yr; Gender: males=49, females=21; Level of injury: paraplegia=58, tetraplegia=12; Level of severity: AIS A=28, AIS B=6, AIS C=13, AIS D=23; Mean time since injury: 9.6yr. No Intervention: Questionnaires given to individuals attending outpatient SCI rehabilitation programs examining leisure time physical activity (LTPA) and barriers to exercise. Outcome Measures: Abbreviated Physical Activity Scale for Individuals with Physical Disabilities, Barriers to Exercise Scale.</p>	<ol style="list-style-type: none"> 1. 73% of participants did not engage in any form of moderate or vigorous LTPA. 2. The top three barriers to LTPA were costly exercise equipment (54%), pain while exercising (37%) and no access to facilities (36%). 3. No significant differences between moderate-vigorous LTPA participation and non-participation in type of neurological classification or time since injury. 4. The only significant predictors of a higher likelihood of not participating in moderate-vigorous LTPA were age, ethnicity, indicating that transportation was a problem and indicating that health concerns were an issue.
<p>Hwang et al. (2016) USA Observational N=85</p>	<p>Population: Age: 18-34yr=26, 35-54yr=45, 55+=14; Gender: males=56, females=29; Level of injury: cervical=43, other=42; Type of injury: complete=36, incomplete=49; Time since injury: 1-5yr=37, 6-10yr=15, 11+yr=33. No Intervention: Survey that investigated personal, environmental, and activity barriers to participation in leisure time physical activities. The web-based survey was developed for this study. Outcome Measures: Barriers to participation in leisure time physical activities.</p>	<ol style="list-style-type: none"> 1. The three most endorsed (agree or strongly agree) personal barriers were financial resources (53%), not prescheduling physical activities for the week (53%) and pain/discomfort (49%). 2. The three most endorsed (agree or strongly agree) environmental barriers were access to specialized SCI facilities/activities (60%), lack of environmental resources for SCI (54%) and lack of trained staff at facilities (49%). 3. The three most endorsed (agree or strongly agree) activity barriers were lack of adaptive equipment (74%), lack of skills (67%) and terrain I cannot access (52%). 4. Personal barriers had a significant high negative correlation with levels of physical activity ($p<0.0001$).

		<ol style="list-style-type: none"> 5. Environmental barriers had a significant moderate negative correlation with physical activity ($p < 0.0001$). 6. Activity barriers had a significant low negative correlation with physical activity ($p = 0.001$). 7. Participants who were unemployed or unable to work and those with lower incomes perceived more barriers to leisure time physical activities than those who were working or had potential for being employed and those with higher incomes, respectively.
<p>Cowan et al. (2013) USA Observational N=180</p>	<p>Population: <i>Exercisers (n=115)</i>: Gender: males=72, females=43; Mean age=46yr; Level of injury: paraplegia=47, tetraplegia=68; Level of severity: AIS A-D; Mean time since injury=13yr. <i>Non exercisers (n=65)</i>: Gender: males=40, females=25; Mean age=45yr; Level of injury: paraplegia=31, tetraplegia=34; Level of severity: AIS A-D; Mean time since injury=15yr.</p> <p>No Intervention: Participants completed a questionnaire which concerned demographics and current health, independence level, exercise.</p> <p>Outcome Measures: Demographics and current health, independence level, exercise: modified version of B-PED.</p>	<ol style="list-style-type: none"> 1. No differences between exercisers and non-exercisers for age, gender, injury level, injury duration, education level, employment status, or marital status. 2. The five most prevalent barriers were lack of energy, lack of motivation, lack of time, not knowing where to exercise and cost of the program, and were not associated with participation status. 3. The total number of perceived barriers tended to be higher among non-exercisers versus exercisers. 4. Identifying too lazy, too difficult, or no interest as a barrier decreased likelihood of being an exerciser by 86%, 83%, and 71% respectively. 5. Not liking exercise decreased the likelihood of being an exerciser by 90%.
<p>Cowan et al. (2012) USA Observational N=180</p>	<p>Population: Gender: male=113, female=67; Mean age:47yr; Injury etiology: SCI=180, cervical injury=81.</p> <p>No Intervention: All participants completed a web-based survey of personal characteristics (including household income) and exercise barriers.</p> <p>Outcome Measures: Barriers to Physical Exercise and Disability questionnaire (B-PED), personal characteristics, household income.</p>	<ol style="list-style-type: none"> 1. No differences discriminated exercisers and non-exercisers by gender, age, race, injury level or completeness. 2. Higher percentage of exercisers were full-time employed or married. 3. Non exercisers reported more barriers. 4. Lack of motivation was the most highly prevalent barrier. 5. The most impactful barrier was “too lazy to exercise” and those who reported this as a barrier were 19 times less likely to be exercising.
<p>Kehn and Kroll (2009) USA Observational</p>	<p>Population: Mean age (range): 23-74yr; Gender: males=16, females=10; Level of injury: Tetraplegia=14, Paraplegia=9; Severity</p>	<ol style="list-style-type: none"> 1. Non-exercisers had a significantly longer duration of injury ($p < 0.05$). Other demographic and injury characteristics were not

<p>N=26</p>	<p>of injury: complete=11, incomplete=9; Time post injury: 1-32yr. No Intervention: Semi-structured interview guide was developed to explore core areas such as experiences with exercise before and after injury, logistics of current exercise regimen, barriers and facilitators of exercise, perceived benefits of exercise, perceived impact of exercise on secondary conditions. Each interview lasted between 20-30min. Analysis was conducted on patients who were exercisers vs. non-exercisers. Outcome Measures: Patients' experiences with exercise pre/post injury, barriers and facilitators to being active and perceived health impact measured after phone interview.</p>	<p>significantly different between exercisers and non-exercisers. 2. Similar barriers for both groups were reported. 3. Non-exercisers reported low return on physical investment, lack of facilities, equipment cost, fear of injury and lack of personal assistance as barriers to exercise. 4. Facilitators reported by exercisers included motivation, availability of accessible facilities and personal assistants, weight management and fear of health complications.</p>
<p>Vissers et al. (2008) Netherlands Observational N=32</p>	<p>Population: Mean age: 45yr; Gender: males=24, females=8, Severity of injury: tetraplegia=12, paraplegia=20; Mean time post injury: 103.5mo. No Intervention: Semi-structured interview. Outcome Measures: Response to retrospective & cross-sectional questions. 10 topic areas: subject & lesion characteristics, daily physical activity, attitude towards an active lifestyle, social activities, health, quality of life, coping, care requirements, other factors.</p>	<p>1. Most important barriers: <ul style="list-style-type: none"> ● In current situation: store & building accessibility, physical & mental health issues. ● After discharge: emotional distress, self-care difficulty & mental health problems. ● ↑ importance of barriers after discharge vs. current situation. 2. Most important facilitators: <ul style="list-style-type: none"> ● In current situation: daily physical activity preparation, physical activity stimulation & social activity preparation, in rehab center. ● After discharge: social support (family, friends, society). </p>
<p>Kerstin et al. (2006) Sweden Qualitative N=16</p>	<p>Population: Mean age: 36.0±10.6yr (range 21-61); Gender: males=12, females=4; Mean time post-injury: 8.6±9.8yr (range 2-41); Severity of injury: tetraplegia (8), paraplegia (8) No Intervention: In-person and telephone semi-structured interviews Outcome Measures: Major themes relating to the factors that promote participation in physical activity</p>	<p>1. Cognitive and behavioral strategies: role models, creating routines and goals, recalling previous experiences and acquiring new knowledge, accepting assistance. 2. Environmental solutions: accessibility, social support, equipment and funding. 3. Motivation: gaining and maintaining independence, improving physical appearance, becoming a role model 4. being competitive, establishing a self-image as physically active, becoming part of a social network. 5. New frames of reference: learning to live with narrower physical margins.</p>
	<p>Population: Mean age: 44.1yr; Gender: males=50, females=22; Severity of injury: paraplegia-complete (36%), incomplete (11%); tetraplegia - complete (19%),</p>	<p>1. 73.6% wanted to be engaged in an exercise program and 79.2% thought it would be helpful. Despite this, only 45.8% were currently</p>

<p>Scelza et al. (2005) USA Observational N=72</p>	<p>incomplete (17%), ambulatory (17%); Mean time post-injury= 13.1yr No Intervention: Cross-sectional survey Outcome Measures: The Barriers of Physical Exercise and Disability survey; The Perceived Stress Scale.</p>	<p>participating in an exercise program.</p> <ol style="list-style-type: none"> 2. Perceived Barriers: 37.5% health problems that caused a cessation in exercise (pain & fractures; 37.5%), 22.2% injured during exercise (sprains & pulled muscles), 31.9% facilities (discomfort, lack of accessibility & privacy). 3. Exercise Concerns: 54.2% lack of motivation, 41.7% lack of energy, 40.3% program cost, 36.1% lack of local exercise program knowledge, 33.3% lack of interest, 31.9% lack of time. 4. Concerns of those with Tetraplegia were greater than paraplegia: health issues cause a cessation in exercise (p=0.043), difficulty to engage in exercise (p=0.024), health issue concerns prevented exercise (p=0.035). 5. Increased levels of perceived stress were related to increased concerns (p=0.036).
<p>Levins et al. (2004) USA Qualitative N=8</p>	<p>Population: Mean age: 42yr; Gender: males=5, females=3; Level of injury: T1-low thoracic levels; Mean time post-injury: 25.6yr. No Intervention: Semi-structured interviews Outcome Measures: Major themes relating to barriers and facilitators to participation in physical activity</p>	<ol style="list-style-type: none"> 1. Individual influences: loss of an able identity, redefining self; turning points 2. Societal influences: environmental and attitudinal barriers, material environment (structural, financial), societal attitudes.
<p>O'Neill et al. (2004) UK Observational N=33</p>	<p>Population: SCI=27, Guillain-Barre Syndrome=6. Gender: males=27, females=6. No Intervention: A telephone survey was completed capturing patients' perception of the effect of sport on rehabilitation. Outcome Measures: Sports participation.</p>	<ol style="list-style-type: none"> 1. 45.5% of participants previously participated in regular sporting activity. 2. During inpatient admission, at least one sport was tried by 72.7% of participants (bowling, archery, swimming, table tennis, basketball and darts). 3. 14 participants reported regular sporting activity post discharge. 4. Those who regularly exercised were mostly male, aged 16-35yr, had exercised previously. 5. Cardiovascular training was the most popular exercise activity (training at a gym, n=6; swimming, n=3; bowling, n=2). 6. The general benefit of sporting activity was recognized by 78.8% and the rehabilitation benefit by 69.7%. 7. Self-reported benefits from participants (n=26) included

		increases in fitness, quality of life, confidence and social contact. 8. Two top reasons for not exercising were poor accessibility (n=5) and not interested in sports (n=5).
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