Physical activity and subjective well-being among people with spinal cord injury: a meta-analysis

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CRD summary

The review found a significant positive relationship between physical activity and subjective well-being in people with spinal cord injury. The authors’ conclusions are appropriate and reflected the evidence base, but shortcomings in the review process and variability in the definitions of physical activity and subjective well-being, suggest that the reliability of these conclusions is unclear.

Authors’ objectives

To assess the relationship between physical activity and subjective well-being (including specific constructs of subjective well-being) among people with spinal cord injury, and to determine whether study design explains inconsistencies found in individual studies.

Searching

EMBASE, CINAHL, MEDLINE, PsycINFO and SPORT Discus were searched for studies published in the English language prior to February 2008; search terms were reported. Reference lists of retrieved studies and reviews were also searched.

Study selection

Studies assessing the relationship between physical activity and subjective well-being in participants with spinal cord injury were eligible for inclusion. Studies were required to have: a majority (51% or more) of participants with a spinal cord injury; physical activity measured directly or indirectly or categorised as physically active or inactive by investigators, at least one measure of subjective well-being; and adequate data provided for the calculation of effect sizes;

Most participants were either paraplegic or tetraplegic. Physical activity was defined as: participation in a program or intervention in nine studies, being an athlete in four studies; activity frequency in six studies; and self reported energy expenditure in one study. Subjective well-being was mostly measured as depressive symptoms or life satisfaction.

The authors did not state how studies were selected for the review.

Assessment of study quality

The authors did not state that they assessed the validity of the included studies.

Data extraction

Data were extracted on study design, operational definitions of physical activity and subjective well-being, and raw figures for the calculation of effect sizes. Correlation coefficients (r) were calculated for each study; studies were considered positive if physical activity was associated with better subjective well-being and negative if physical activity was associated with poorer subjective well-being. For studies with more than one effect size, an average effect size was calculated. Study authors were contacted for incomplete or missing information where necessary.

Two reviewers independently extracted data, with discrepancies discussed and resolved through consensus.

Methods of synthesis

Studies were pooled in meta-analyses to examine the correlation between physical activity and subjective well-being (all measures combined), life satisfaction and depressive symptoms, using a random-effects model and controlling for sampling error. The mean observed correlation, with 95% confidence intervals (CI), variance due to sampling error, 95% credible interval, and fail-safe N were calculated. The mean observed correlation was interpreted according to
Cohen's guidelines as follows: r of 0.1 representing a small effect, r of 0.3 representing a moderate effect and r of 0.5 representing a large effect. The critical effect size was set at r=0.2, representing a small to moderate effect size.

Results of the review
Twenty-one studies were included in the review (n=2,354 participants, range 7 to 985). One study was a randomised controlled trial, two studies had a non randomised experimental design, twelve studies had a cross-sectional design and six studies had a pre-post single group design.

Physical activity had a significantly small to moderate positive relationship with subjective well-being (broadly defined) (r 0.25, 95% CI 0.19 to 0.31). Small to moderate positive relationships were also reported for physical activity and life satisfaction (r 0.23, 95% 0.16 to 0.23) and depressive symptoms (r 0.22, 95% 0.16 to 0.28). Results from the credible interval suggested that the results were generalisable across studies. Results from fail-safe N suggested that five studies with non significant effects would be needed to reduce the effect size (r) to less than 0.2 for overall subjective well-being, but only one or two studies were required in the separate analyses of life satisfaction and depression.

Comparison of results by study design indicated that experimental and quasi-experimental study designs had stronger patterns of association between physical activity and subjective well-being than non-experimental (cross-sectional) studies (experimental r 0.38, 95% 0.30 to 0.46; non-experimental r 0.24, 95% CI 0.17 to 0.31). The credible interval suggested that both study types had generalisable results; fail-safe N was eight for experimental studies and two for non-experimental studies.

Authors' conclusions
There was a statistically significant positive relationship between physical activity and subjective well-being among people with spinal cord injury.

CRD commentary
The research question was clearly expressed and inclusion criteria were appropriate, although broadly specified. Five databases were searched and attempts were made to find other studies by reviewing reference lists of retrieved studies. Eligible studies were written in English, so there was a possibility of language bias. No attempts were made to find unpublished studies; calculation of fail-safe N for the meta-analyses indicated few non-significant studies would be needed to overturn results, so publication bias could not be ruled out. Methods were appropriate for data extraction, but methods were not reported for selection of studies and validity assessment, so reviewer error and bias could not be ruled out.

Both physical activity and subjective well-being were broadly defined and contained a wide variety of different constructs and dimensions; this meant the decision to pool the studies in meta-analyses may not have been appropriate. Inspection of the forest plots indicated some evidence of heterogeneity, but this was not measured. The authors acknowledged that few of the included studies provided measurement reliability data, so bias associated with unreliable measurement of subjective well-being could not be ruled out. The authors' conclusions reflected the evidence base; attempts were also made to examine the robustness of their findings by exploring the influence of study design.

However, there were some shortcomings in the review process, the quality of the included studies was unknown, and there was wide variability in the types of physical activity and subjective well-being that were not taken into account. This suggests that the reliability of the authors' conclusions is unclear and should be considered tentative.

Implications of the review for practice and research
Practice: The authors stated that physically active people with spinal cord injury may enjoy better subjective well-being.

Research: The authors stated that more high quality experimental studies are required to assess different constructs of subjective well-being and use validated measures of physical activity, that evaluate dimensions such as type, frequency, intensity and duration of physical activity.
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