Mobility devices to promote activity and participation: a systematic review

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CRD summary
This review reported that poor quality data precluded any conclusions about the effects of mobility devices on activity and participation in individuals who were mobility impaired. This cautious conclusion appears to be reliable, given the data limitations.

Authors' objectives
To assess the effectiveness of different kinds of mobility device interventions on activity and participation in real life contexts for people with mobility limitations.

Searching
CINAHL, HTA, MEDLINE, PsycINFO, EBM Reviews, Cochrane Central Register of Controlled Trials (CENTRAL) and SweMed were searched from 1996 to 2008. Search terms were reported. No language limitations were applied. Two relevant conference proceedings and one relevant journal were searched. Reference lists of retrieved studies were checked for further studies. Only published studies and conference proceedings appeared to be included in the review.

Study selection
Controlled studies that reported both baseline and follow-up data on the effects of any type of mobility device on activity and participation of people with mobility limitations in real world situations were eligible for inclusion in the review. Both qualitative and quantitative studies were eligible for inclusion. Laboratory-based studies were excluded. Eligible participants were adults (at least 18 years old) with mobility limitations due to injury, disability, aging or chronic illness. Types of eligible mobility devices included crutches, walking frames, manual/powered wheelchairs, and rollators. Eligible secondary outcomes included mobility, frequency of use without personal assistance, quality of life, user satisfaction and adverse events.

Included studies assessed a variety of mobility devices. A quarter of the studies assessed the effects of powered wheelchair interventions; other interventions included rollators, individually adjusted wheelchairs, push-rim activated wheelchairs, a special brand walker and a special brand powered wheelchair. All of the studies were published from 2003 onwards. Three of the studies were carried out in Sweden. Mean age of participants ranged from 38.3 to 82.4 years. The percentage of males ranged from 19% to 86.4%. Where stated, participants had a variety of different conditions. Individually identified conditions included spinal cord injury, knee osteoarthritis, Alzheimer's disease and stroke. Outcomes were assessed using 21 different instruments, one third of which were study-specific questionnaires. Follow-up ranged from two weeks to five months; the most commonly reported duration was three months.

Studies were independently assessed by two reviewers to determine inclusion. Disagreements on inclusion of full papers were resolved through discussions between four reviewers.

Assessment of study quality
The methodological quality of each study was assessed by two reviewers who used the modified criteria of Borghouts et al. Criteria included: sufficient description of the population selection, inclusion/exclusion criteria and prognostic factors; use of an adequate sample size and follow-up duration; dropout rate below 20%; whether outcome measures and data were congruent with the aims; whether confounders were controlled for; and whether psychometric properties of outcome measures were reported. External validity and applicability were assessed using criteria adapted from those of Schekelle et al. (further details were reported). Discrepancies were resolved through discussion. Final consensus was reached by four reviewers.

Data extraction
Study data were extracted by two reviewers who used a standardised form. Discrepancies were resolved through discussion. Final consensus was reached by four reviewers. The direction of effect size and significance was reported for each outcome.
Methods of synthesis
Studies were summarised using a narrative synthesis.

Results of the review
Eight studies (n=363) were reported in the review: one randomised controlled trial (RCT); four controlled studies; and three follow-up studies (before and after). Two studies were of high, internal and external methodological quality. Sample sizes ranged from 15 to 205, but only one study had more than 100 participants.

Clinically significant effects (at least 10% difference in effect size) were reported in all studies, but statistically significant effects were observed only for four outcomes (activity/participation, mobility, user satisfaction and quality of life). Two studies reported positive effects for mobility device interventions on individually prioritised problems in activity and participation. One study reported a positive effect on engagement and interaction in society. Another study showed an increase in the range of activities performed by participants after the intervention. Two studies reported significant improvements in quality of life. The highest-quality study (a before and after study), reported that powered wheelchairs increased activity and participation as well as quality of life in stroke patients.

Adverse effects associated with mobility interventions were reported in three studies and included difficulty in disassembly, accident rate and slightly increased number of falls.

Authors' conclusions
No conclusions about the effectiveness of mobility devices and their effects on activity and participation could be drawn due to the poor quality of data.

CRD commentary
This review assessed a clearly defined question. A number of databases were searched and no language restrictions were applied. It appeared that only published studies were included, so there was a risk of publication bias; inclusion of conference proceedings likely reduced this risk. Attempts were made to reduce the risk of reviewer error and bias during all stages of the review process. Different study designs were included in the review. The methodological quality and external validity of each study was assessed using published criteria; however, a before and after study was judged to be of higher quality than a randomised controlled trial. Most studies had methodological flaws that may have affected data reliability and all were limited in sample size. Given the differences between the study characteristics, a narrative synthesis appeared appropriate. Overall, the review was well conducted and the cautious conclusions appear to reliably reflect the methodological limitations of available data.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that further research was required in the form of well-designed long-term comparative studies of mobility devices and their effects on the activity and participation of mobility-impaired people in real-world life. Such studies should focus on only one assistive technology type to allow the effectiveness of that specific type of device to be assessed. Assessments should use standardised outcome assessments.

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