BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY AND OCCUPATIONAL HEALTH AND SAFETY AGENCY FOR HEALTHCARE IN BC MANUAL LIFT DEVICE TO REDUCE MSI AMONG HOME SUPPORT WORKERS IN BC

Introduction

Community health workers (CHWs) who provide homecare services (i.e., assistance with daily activities that often require transferring and repositioning tasks) face unique occupational health and safety (OH&S) issues because their workplace is a person's private home. Transferring and repositioning clients produces considerable stress on a CHW's spine and upper limbs and there is an even greater risk for injury if a client collapses unexpectedly.

Although mechanical lifting devices, such as ceiling lifts, have been shown to reduce the risk of injury to healthcare workers (Engst et al., 2005; Ronald et al., 2002), ceiling lifts are rarely available to CHWs in clients' homes because they are prohibitively expensive and often inappropriately designed for home use.

The purpose of this project was to evaluate the usability of a low cost, manually operated, ceiling lift device designed and built specifically for home use by researchers at the British Columbia Institute of Technology (BCIT) Health Technology Research Group in 2001.

Methods

In 2004/2005, the manual lift device was installed into the homes of 20 community residents (clients). Thirty-eight CHWs, assigned to work with these clients, agreed to participate in the study and use the lift device for a period of one year. The interview was administered to the CHWs and the clients when the lift was installed, and then repeated at 6 and 12 months after installation. The interview questions assessed:

- psychophysical factors, such as perceived comfort with the lift device
- perceptions of the use of lift devices as an assistive aid, and
- the environmental context for the lift/transfer action.

Twelve (60%) clients, and the eleven (31%) CHWs who worked with them, completed all 3 interviews. Of the eight clients that withdrew from the study, one had an unsatisfactory experience with the lift, while the remaining clients' conditions improved and no longer required the lifts.

WorkSafeBC injury data and claim cost information was collected from participating home support agencies for each of the CHWs using the lift device. Injury reports were collected for the intervention year and for the 12 months immediately prior to installation.

To evaluate the lift device, three research questions were addressed:

- What psychological barriers to acceptance of lift/transfer aids do CHWs and their clients experience? How do the CHWs and their clients rate the lift device in terms of comfort, safety, and acceptability?
- Are CHW's musculoskeletal injury (MSI) rates reduced after using the lift device for one year in the homes of high- risk clients? Is the total cost of compensation (medical costs, replacement wages and compensation wage) for MSI reduced after using the lift device for one year in
- B. the homes of high-risk clients?

About OHSAH

The Occupational Health and Safety Agency for Healthcare (OHSAH) is a joint union-employer organization with a mission to work with all members of the British Columbia (BC) healthcare community. Our goal is to reduce workplace injury and illness in healthcare workers and return injured workers to the job quickly and safely. This is achieved by developing guidelines, best practices, and innovations for effective programs in occupational health and safety. Emphasis is placed on knowledge translation and dissemination. For more information about our Agency, please visit our website: www. ohsah.bc.ca

BCIT Health Technology Research Group

BCIT's Health Technology Research Group focuses on medical and assistive device development and evaluation. Projects range from the design and fabrication of clinical-ready devices to the evaluation of commercial products. Small medical device start-ups, world-class research hospitals, industry associations, and government organizations from across Canada have benefited from this group's extensive expertise and unique research facilities.

BCIT Lift Device

In 2001, WorkSafeBC funded BCIT to design and build an affordable mechanical lift device suitable for home use. The result was a manually operated ceiling lift device, designed specifically for the home environment, that complies with national and international safety and performance specifications, including

- ISO 10535, CSA, and WorkSafeBC
- is compatible with commercially available slings and ceiling tracks, and can be retailed for approximately half the cost of automated ceiling lift devices (less than \$2,000), including the track, sling and track installation

General features of the device include:



- folding arms with handles to suspend the sling and for ease of carrying and transporting from place to place
- a drive mechanism with a noiseless one-way roller bearing
- 400 lbs
- . webbing
- 6. casing.

Components were either custom made, off-the-shelf, or purchased from Waverley Glen Systems Inc., a Canadian lift manufacturer based in Toronto, Ontario.

A patent is pending with both the US Patent Office and the PCT for the novel features such as the folding arms, the ergonomic chain, the noiseless operation, and the magnetic clutch. BCIT is also seeking a licensing deal with a lift manufacturer for the proprietary lift technology. Note: The beta prototype design is not suitable for full scale production.

Next Steps

Given the variety of barriers influencing the adoption of lifts in the home environment, further investigation is needed to address a key question: Are there barriers in the "system", or within stakeholder groups that preclude the effective adoption of lifts? Both BCIT and OHSAH will investigate the "macro health system" issue in a follow up study during 2007.

Conclusions

Results of this usability study indicate that a cost effective, manually operated, ceiling lift device was acceptable to CHWs and their clients, and did not increase the risk of MSI during the one year study period. The majority of clients strongly agreed that if lift devices were affordable, they would be willing to have them in their homes.

The study identified a complex array of variables influencing adoption of lift devices into private homes, including client and CHW attitudes. Results indicate that clients and CHWs may be more accepting of ceiling lifts with training, demonstrations, and education with respect to increased CHW safety, as well as increased client mobility and safety.

1. a novel ergonomic chain for raising and lowering the lift mechanism

4. a magnetic clutch to ensure that the lift device cannot lift more than



Results

PSYCHOSOCIAL BARRIERS TO ACCEPTANCE OF LIFT/TRANSFER AIDS

CHWs (N=11)

CHWs felt that their clients:

- think the use of any assistive device, including lift equipment, suggests a loss of independence (>80%)
- are in denial of a condition and feel they don't need a lift (23%)
- would be more willing to have lifts in their homes if the devices were more affordable (>90%)
- lack understanding of the benefits with respect to increased mobility and safety for both themselves and their CHWs.

Only 1 in 5 CHWs explained that use of a lift improved CHW safety.

CHWs most commonly cited proper training, proper techniques, and installing a lift as solutions for reducing injuries.

LIFT DEVICE COMFORT, SAFETY AND ACCEPTABILITY

Compared to transfers without a lift CHWs device, using the BCIT lift device: **>90**% was less physically stressful overall

- provided greater overall comfort 70% felt safe and secure
- was easy to complete transfers with Over 90%

Over 70% of CHWs reported that they would be extremely likely to use the BCIT lift device in a client's home.

CHWs and clients indicated that the following features of the lift were acceptable:

- noise level (low)
- improved.
- time for transfer (no increase)

Authors



Chris Back, BSc, CCPE Georgina Hackett, MASc, PEng Annalee Yassi, MSc, MD, FRCPC Kevin J.P. Craib, M.Math, Ph.D., P.Stat



Nancy Paris, MASc, PEng James Watzke, PhD Helen Heacock, PhD Sara Frederking, DipIT, MKTG



Clients (N=12)

Clients report resistance to the lift devices because they: do "not like the appearance" are afraid of the unknown are in denial of a condition and feel they do not need a lift Clients suggested that they: would be more willing to have lifts in their homes if the devices were more affordable (>60%) would benefit from an explanation of the advantages of lift devices with respect to increases in their mobility and safety would benefit from demonstrations of lift devices, and before purchase would need to know how a device works, how it's maintained, how much it costs, and how much installation would damage the home. feel their CHWs are not at all likely to sustain an injury while transferring them (50%) Clients most commonly cited proper techniques, installing a lift, and CLIENTS pre-assessing situations as solutions for reducing injuries.

>80%

Over 90% >80% by 12 months

smoothness of the lift and lower * features identified for improvement, in addition to the drive chain. CHWs also indicated that device portability could be

Client Handling Injuries and Compensation Costs

Participating CHWs did not report any injuries in the year prior to installing the lift, and no client handling injuries were reported during the intervention year. Therefore, while no injuries were attributed to the use of the lift device, a reduction in injury rates could not be ascertained and a change in compensation costs was not determined.