Comparative efficacy of interventions to promote hand hygiene in hospital: systematic review and network meta-analysis

Nantasit Luangasanatip,[1 2] Maliwan Hongsuwan,[1] Direk Limmathurotsakul,[1 3] Yoel Lubell,[1 4] Andie S Lee,[5 6] Stephan Harbarth,[5] Nicholas P J Day,[1 4] Nicholas Graves,[2 7] Ben S Cooper[1 4]

EDITORIAL by Muller
PERSONAL VIEW, p 21

[1]Mahidol-Oxford Tropical Medicine Research Unit, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand
[2]School of Public Health, Queensland University of Technology, Brisbane, Australia
[3]Department of Tropical Hygiene, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand
[4]Centre for Tropical Medicine and Global Health, Nuffield Department of Clinical Medicine, University of Oxford, Oxford, UK
[5]Infection Control Program, University of Geneva Hospitals and Faculty of Medicine, Geneva 1211, Switzerland
[6]Departments of Infectious Diseases and Microbiology, Royal Prince Alfred Hospital, Sydney 2050, Australia
[7]Institute of Health and Biomedical Innovation, Queensland University of Technology, Brisbane, Australia
Correspondence to:
N Luangasanatip, Mahidol-Oxford Tropical Medicine Research Unit, 420/6 60th Anniversary Chalermprakiat Building; 3rd Floor, Rajvithi Road, Bangkok Thailand 10400 **nantasit@tropmedres.ac**

Cite this as: *BMJ* 2015;351:h3728
doi: 10.1136/bmj.h3728

This is a summary of a paper that was published on thebmj.com as *BMJ* 2015;315:h3728

thebmj.com
Hand hygiene (*BMJ* 2001;323:411)

STUDY QUESTION

What is the relative effectiveness of the WHO multimodal intervention (WHO-5) and other strategies for improving compliance with hand hygiene in healthcare workers in hospital settings?

SUMMARY ANSWER

Promotion of hand hygiene with the WHO multimodal strategy is effective at increasing compliance with hand hygiene in healthcare workers, and there is evidence that combining it with goal setting, reward incentives, and accountability interventions can lead to further improvements.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

In 2005 WHO launched a campaign to improve hand hygiene in healthcare settings by promoting a multimodal strategy consisting of five components: system change, training and education, observation and feedback, reminders in the hospital, and a hospital safety climate. The current review shows that this strategy is effective and that additional interventions (used in conjunction with the WHO campaign elements) including goal setting, reward incentives, and accountability can lead to further improvements.

Selection criteria for studies

We searched Medline, Embase, CINAHL, NHS Economic Evaluation Database, NHS Centre for Reviews and Dissemination, Cochrane Library, and the EPOC register (December 2009 to February 2014); studies were selected by the same search terms in previous systematic reviews (1980-2009). Reviewed studies included randomised controlled trials, non-randomised trials, controlled before-after trials, and interrupted time series studies implementing an intervention to improve compliance with hand hygiene among healthcare workers in hospital settings and measuring compliance or appropriate proxies. All studies met the Cochrane Effective Practice and Organisation of Care Group quality criteria for inclusion. Data synthesis was performed separately for different study designs. The primary evidence synthesis was based on studies measuring compliance by direct observation. When studies had not used appropriate analytical methods, we re-analysed primary data. Random effects and network meta-analyses were performed on studies reporting directly observed compliance when they were considered sufficiently homogeneous with regard to interventions and participants.

Primary outcome

Compliance with hand hygiene measured by using opportunities with prespecified indications or by using proxies linked to compliance such as consumption of soap and alcohol hand rub.

Main results and role of chance

Of 3639 studies retrieved, 41 met the inclusion criteria (six randomised controlled trials, 32 interrupted time series, one non-randomised trial, and two controlled before-after studies). Meta-analysis of two randomised controlled trials showed the addition of goal setting to the WHO multimodal strategy was associated with improved compliance (pooled odds ratio 1.35, 95% confidence interval 1.04 to 1.76; I^2=81.0%). Of the 22 interrupted time series pairwise comparisons, 18 showed stepwise increases in compliance, and all but four showed a trend for increasing compliance after the intervention. Network meta-analysis indicated considerable uncertainty in the relative effectiveness of interventions, but nonetheless provided evidence that WHO-5 is effective, and that compliance can be further improved by adding interventions including goal setting, reward incentives, and accountability.

Bias, confounding, and other reasons for caution

Details of implementation of components of the interventions can vary substantially, and different studies might implement the same programme with different quality of delivery and level of adherence. Both issues are common to many interventions to improve the quality of care in hospital settings and are likely to be responsible for much of the unexplained heterogeneity between studies.

Study funding

This research was part of the Wellcome Trust-Mahidol University-Oxford Tropical Medicine Research Programme supported by the Wellcome Trust of Great Britain (089275/Z/09/Z). BC was supported by the Oak Foundation and the Medical Research Council and Department for International Development (grant No MR/K006924/1).

Mean odds ratios from random effects network meta-analysis model for interventions strategies to promote hand hygiene

Strategies	Description	Mean OR (95% credible interval)
None/current practice	No intervention or current practice	Reference
Single intervention	Single intervention (system change or education)	4.30 (0.43 to 46.57)
WHO-5	WHO-5 components	6.51 (1.58 to 31.91)
WHO-5 + others	WHO-5 plus incentives, goal setting, or accountability	11.83 (2.67 to 53.79)

Effectiveness of two year balance training programme on prevention of fall induced injuries in at risk women aged 75-85 living in community: Ossébo randomised controlled trial

Fabienne El-Khoury,[1 2 3] Bernard Cassou,[4 5 6] Aurélien Latouche,[7] Philippe Aegerter,[4 5 8] Marie-Aline Charles,[2 3] Patricia Dargent-Molina[2 3]

EDITORIAL by Lamb and Lamb

[1]Université Paris-Sud, UMR-S 1018, F-94807, Villejuif, France
[2]Université Paris Descartes, UMR-S 1153, F-75014, Paris, France
[3]Inserm, Centre de Recherche Epidémiologie et Statistique Sorbonne Paris Cité (CRESS), U1153, F-94807, Villejuif, France
[4]UVSQ, UMR-S 1168, Université Versailles St-Quentin-en-Yvelines, France
[5]Inserm, VIMA: Vieillissement et Maladies Chroniques, U1168, F-94807, Villejuif, France
[6]AP-HP, Hôpital Sainte Périne, Centre de Gérontologie, F-75016, Paris, France
[7]Conservatoire National des Arts et Metiers (Cnam), Centre for Research in Computer Science and Telecommunications (Cédric), EA4629, Paris, France
[8]AP-HP, Hôpital Ambroise Paré, Unité de Recherche Clinique, Département de Santé Publique, Boulogne-Billancourt, France
Correspondence to: P Dargent-Molina, Inserm CRESS–équipe ORCHARD, Hôpital Paul Brousse bâtiment 15-16, 16 Avenue Paul Vaillant-Couturier, 94807 Villejuif Cedex, France
patricia.dargent@inserm.fr

Cite this as: *BMJ* 2015;351:h3830
doi: 10.1136/bmj.h3830

This is a summary of a paper that was published on thebmj.com as *BMJ* 2105;351:h3830

STUDY QUESTION

Is a two year programme of balance training exercise effective in reducing injurious falls among women aged 75-85 with diminished balance and gait capacities?

SUMMARY ANSWER

The Ossébo exercise programme was effective in reducing injurious falls and in improving both measured and perceived physical function in this subgroup of at risk older women.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Exercise programmes emphasising balance training reduce the rate of falls in people aged 65 and older living in the community, and recent evidence suggest that they also prevent injuries caused by falls. The Ossébo trial contributes high quality evidence showing that it is feasible to put in place a large scale, long term exercise programme that is safe and effective in reducing injurious falls, even among at risk adults aged over 75.

Design

Pragmatic multicentre, two arm, parallel group, randomised controlled trial with block randomisation stratified on centre and body weight and computer generated allocation sequences.

Participants and setting

Participants were women aged 75-85, living in their own homes with diminished balance and gait capacities. A total of 706 women were included in 20 centres throughout France (352 intervention, 354 control). The intervention consisted of weekly supervised group sessions of progressive balance training offered in community based premises for two years, supplemented by individually prescribed home exercises. Women randomised to the control did not receive the exercise programme.

Consequences of falls and estimates of effect of intervention

Consequences	Control (n=354)	Exercise (n=352)	HR* (95% CI)
Total No of falls (rate†)	640 (0.92)	533 (0.79)	0.88 (0.77 to 1.00)
No of participants who had at least one fall	222	189	—
No of injurious falls (rate†):			
Total	397 (0.56)	305 (0.45)	0.81 (0.67 to 0.99)
Moderate	310 (0.44)	237 (0.35)	0.81 (0.65 to 1.00)
Serious	87 (0.12)	68 (0.10)	0.83 (0.60 to 1.16)
No of participants who had at least one injurious fall	189	170	—

*Adjusted for centre and computed with a "shared frailty" model.
†Rate per woman year=total No of events (fall related outcomes) divided by total No of woman years of follow-up in each group.

Primary outcome

Falls were monitored monthly by the calendar cards method. Whenever a fall was reported, the participant was called to confirm the fall and for collection of further information on its circumstances and consequences. Falls were classified by a geriatrician blinded to group assignment into one of three categories (no consequence, moderate, severe) based on physical damage and medical care. The primary outcome was the rate of injurious falls (moderate and severe). The two groups were compared for rates of injurious falls with a "shared frailty" model.

Main results and the role of chance

There were 305 injurious falls in the intervention group and 397 in the control group (hazard ratio 0.81, 95% confidence interval 0.67 to 0.99; P=0.04). The reduction in severe falls (68 in the intervention group and 87 in the control group) was of the same order of magnitude (0.83, 0.60 to 1.16).

Harms

Seven adverse events were reported in the intervention group. Four happened during group exercise sessions (wrist fracture, twisted ankle, two bruises); one before (bruise from a fall while waiting for the session to begin) and two after (bruise, lumbago from fall on the way back home).

Bias, confounding, and other reasons for caution

There were incomplete data on falls for 105 (14.9%) participants who either died (five in intervention group, six in control group) or withdrew from the study (53 and 42, respectively) at various points. Sensitivity analysis with a worst case scenario, however, shows that the risk of bias from attrition was probably low.

Generalisability to other populations

The findings could be generalised to many women aged 75-85 who are at moderate risk of falls and injuries (neither too fit nor too frail).

Study funding/potential competing interests

The sponsor of the Ossébo study was "Assistance Publique-Hôpitaux de Paris" (AP-HP). The project was supported by two grants from the French Ministry of Health, and by grants from the French National Research Agency, the National Institute of Health Prevention and Education (INPES), and the Council of the Ile-de-France region.

Trial registration number

ClinicalTrials.gov (NCT00545350).

Sacrospinous hysteropexy versus vaginal hysterectomy with suspension of the uterosacral ligaments in women with uterine prolapse stage 2 or higher: multicentre randomised non-inferiority trial

Renée J Detollenaere,[1 2] Jan den Boon,[1] Jelle Stekelenburg,[3] Joanna IntHout,[4] Mark E Vierhout,[2] Kirsten B Kluivers,[2] Hugo W F van Eijndhoven[1]

[1]Department of Obstetrics and Gynaecology, Isala, PO Box 10400, 8000 GK Zwolle, Netherlands
[2]Department of Obstetrics and Gynaecology, Radboud University Nijmegen Medical Centre, Nijmegen, Netherlands
[3]Department of Obstetrics and Gynaecology, Medical Centre Leeuwarden, Leeuwarden, Netherlands
[4]Radboud Institute for Health Sciences, Radboud University Nijmegen Medical Centre, Nijmegen, Netherlands
Correspondence to:
R J Detollenaere
r.j.detollenaere@isala.nl

Cite this as: *BMJ* 2015;351:h3717
doi: 10.1136/bmj.h3717

This is a summary of a paper that was published on thebmj.com as *BMJ* 2015;351:h3717

thebmj.com
Uterine prolapse (*BMJ* 2007;335:819)

STUDY QUESTION

Is uterus preserving vaginal sacrospinous hysteropexy non-inferior to vaginal hysterectomy with suspension of the uterosacral ligaments in women requiring surgery for uterine prolapse stage 2 or higher?

SUMMARY ANSWER

After 12 months' follow-up, sacrospinous hysteropexy was non-inferior to vaginal hysterectomy with suspension of the uterosacral ligaments for recurrent prolapse of the apical compartment (uterus or vaginal vault) with bothersome bulge symptoms or repeat surgery.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Vaginal hysterectomy is the standard treatment for uterine prolapse worldwide, but uterus preservation during surgery is gaining popularity. This study shows that women can avoid hysterectomy and opt for uterus preservation when uterine prolapse needs to be surgically corrected.

Design

Multicentre randomised controlled non-blinded non-inferiority trial with block randomisation and 1:1 computer generated allocation.

Participants and setting

Four Dutch non-university teaching hospitals. The study included 208 healthy women with uterine prolapse stage 2 or higher requiring surgery and with no history of pelvic floor surgery.

Primary outcomes

Recurrent prolapse stage 2 or higher of the uterus or vaginal vault (apical compartment) evaluated by the pelvic organ prolapse quantification system in combination with bothersome bulge symptoms or repeat surgery for recurrent apical prolapse at 12 months' follow-up. Secondary outcomes were overall anatomical recurrences, including recurrent prolapse of the anterior compartment (bladder) or posterior compartment (bowel), or both, and functional outcome, complications, hospital stay, postoperative recovery, and sexual functioning.

Outcomes at 12 months' follow-up after surgery for pelvic organ prolapse (intention to treat analysis)

Outcomes	No (%) of women: Sacrospinous hysteropexy (n=102)	No (%) of women: Vaginal hysterectomy (n=100)	Difference (95% CI)
Recurrent apical prolapse (uterus or vaginal vault) stage ≥2 with bothersome symptoms or repeat surgery for apical prolapse	0 (0)	4 (4)	−3.9 (−8.6 to 0.7)
Overall surgical failure: prolapse POP-Q stage ≥2 (any compartment) or repeat surgery or pessary use	52 (51)	49 (49)	1.9 (−11.8 to 15.7)
Composite outcome success: no prolapse beyond hymen and absence of bothersome bulge symptoms and no repeat surgery or pessary use	91 (89)	83 (83)	6.1 (−3.6 to 15.8)

POP-Q=pelvic organ prolapse quantification.

Main results and the role of chance

By intention to treat, sacrospinous hysteropexy was non-inferior to vaginal hysterectomy with suspension of the uterosacral ligaments for surgical failure of the apical compartment after 12 months. The failure rate was 0/102 (0%) in the sacrospinous hysteropexy group and 4/100 (4%) in the vaginal hysterectomy group (difference −3.9%, 95% confidence interval for difference −8.6 to 0.7). Non-inferiority of sacrospinous hysteropexy was also shown in per protocol analysis. Overall anatomical recurrences, functional outcome, quality of life, complications, hospital stay, measures on postoperative recovery, and sexual functioning did not differ between the two interventions.

Harms

Five serious adverse events were reported during hospital stay. One death occurred in the vaginal hysterectomy group related to postoperative ileus and aspiration pneumonia. None of the events was assumed to be related to the type of surgery.

Bias, confounding, and other reasons for caution

The findings are based on a relatively short follow-up period of 12 months. Data from registry studies suggest that the highest risk of prolapse surgery after hysterectomy is in the first two postoperative years. The women consented to follow-up for 60 months after surgery.

Generalisability to other populations

All women with uterine prolapse stage 2 or higher were invited to participate in the study, and concomitant repair of anterior or posterior vaginal prolapse was allowed, including anti-incontinence surgery. Procedures were performed or supervised by experienced gynaecologists familiar with both interventions, and residents were allowed to perform either of the procedures under direct supervision. We excluded women with abnormal uterine bleeding or abnormal ultrasonography findings of the uterus or ovaries because hysterectomy is preferred in these patients. We also excluded women who wanted to preserve fertility.

Study funding/potential competing interests

This study was supported by an unrestricted grant from the Isala research foundation. JdB received and MEV receives consulting fees from Astellas. HWFvE receives honorariums from Johnson & Johnson, AMS, and Bard Medical.

Trial registration number: trialregister.nl NTR1866