

definitely leads to increased risk of death among those with established CVD. In that context, the comment in an accompanying editorial by Sayer and Kirkwood is noteworthy;⁴ one way that reduced skeletal muscle strength increases incident CVD and its fatality, may be through it being a biomarker of the ageing process across the life course. Put simply, reduced grip strength might be a marker (or does it participate in the process too?) for vascular ageing in those with lower chronological age. This fits in well with the exploratory analysis by the authors showing its superiority as a risk factor over blood pressure and physical activity for CVD. This has important implications for South Asians who tend to have lower grip strength. Only 10% women and 5% men of South Asian ethnicity were represented in the tertile group with highest grip strength.

While grip strength had a robust association with non-cardiovascular mortality, surprisingly it did not correlate strongly with incident non-CVD, even falls and fractures which might be expected to increase with lower muscle strength. This could be due to upper limb strength not being a surrogate for lower limb strength that is required to prevent falls and the contribution of other factors such as balance. Even simpler could be the explanation⁴ that falls and injuries are not ascertained with same rigour in observational studies as the hard end-points such as mortality, MI and stroke. That it increased case-fatality rates for these conditions, once again directs us to the intriguing hypothesis

that reduced muscle strength means, or causes (one does not know which at this point) an accelerated ageing process. Future work will undoubtedly put one of the spotlights on benchside for elucidating the pathways that connect grip strength with mortality and CVD. But it is the prospect of clinical trials investigating the impact of increasing grip strength on mortality and CVD, which is going to provide insightful times ahead for the clinician.

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Washing your hands of respiratory infections? Learn from the internet!

Little P, Stuart B, Hobbs FDR, Moore M, Barnett J, Popoola D, Middleton K, Kelly J, Mullee M, Raftery J, Yao G, Carman W, Fleming D, Stokes-Lampard H, Williamson I, Joseph J, Miller S, Yardley L. (Primary Care and Population Sciences Unit, University of Southampton, Southampton; National Institute of Health Research [NIHR] Research Design Service South Central and Centre for Applications of Health Psychology, University of Southampton, Southampton; Department of Primary Care Health Sciences, University of Oxford, Oxford; University of Birmingham, Birmingham; Research and Surveillance Centre RCGP, Birmingham; and West of Scotland Specialist Virology Centre, University of Glasgow, Glasgow, UK.) An internet-delivered handwashing intervention to modify influenza-like illness and respiratory infection transmission (PRIMIT): A primary care randomized trial. *Lancet* 2015;**386**:1631–9.

SUMMARY

This study was an open-label, randomized trial conducted in the UK. It assessed the effect of an internet-delivered intervention to modify handwashing techniques in reducing the incidence of respiratory tract infections (RTIs) among adults above 18 years of age.

Participants were enrolled using computerized lists of general practitioner practices in the UK by sending them invitations through emails. Patients with severe mental problems, those with terminal

illness or those having a dermatological problem that would restrict their handwashing were excluded from the study. Participants were randomly assigned to either receive access to the internet-based intervention for handwashing along with a baseline questionnaire regarding the same or no access to the intervention or questionnaire. An additional cohort was also enrolled where participants were randomly assigned to an intervention group in which they received the internet-based intervention with no baseline questionnaire and a control group that received no intervention but a baseline questionnaire. This cohort was added later in the study because it was reported that administration of the baseline questionnaire might prompt changes in handwashing behaviour.

A total of 20 066 participants were enrolled from January 2011 to March 2013, spread over three winter seasons during the study period, which is the infective period for RTIs. Four internet-based sessions were provided once a week to study participants, which included information regarding influenza, role of handwashing in spread of disease and developing healthy practices.

Participants were supposed to provide details regarding several outcomes, which were measured by online login at 4, 8, 12 and 16 weeks of the initial login. The number of episodes of RTIs and their duration were documented by self-reporting because these measures could be remembered and recalled over a few weeks. The number of index individuals reporting at least one episode of RTI were also noted using structured questionnaires at the end of 16 weeks. Index persons were also supposed to report whether household members suffered from a similar illness during the week before the onset of symptoms in the index person, denoting transmission of infection from a co-inhabitant and also if any household member suffered from a similar illness following the index person, denoting spread from the index person to other household contacts. They were also asked to report episodes of loose stools or vomiting, which lasted for at least

24 hours. To document the use of healthcare facilities, patients' notes were also reviewed at the end of 12 months after randomization.

An episode of RTI was defined as the presence of two symptoms of RTI for at least one day or one symptom of RTI for at least two consecutive days. The definition of an influenza-like illness used in this study included the presence of a high temperature, either feeling very hot or very cold or measured temperature of more than 37.5 °C, sore throat, cough, running nose, or systemic features such as headache, severe fatigue, severe muscle aches or severe malaise.

It was found that significantly fewer participants in the intervention group (51%) reported episodes of RTI than in the control group (59%). Also, a reduced number of such episodes were noted in the households of participants in the intervention group. The severity and duration of illness in those who developed infections were also noted to be less in the intervention group. Also, medical consultations and antibiotic prescriptions were fewer in the intervention group.

The authors concluded that a web-based intervention for promoting handwashing reduced respiratory and gastrointestinal infections among index individuals as well as the spread of the disease to household members. They also opined that the intervention has a potential to be effective during a pandemic to control disease spread in view of the widespread availability of access to the internet.

COMMENT

Influenza is a highly communicable disease¹ and poses a huge burden on health facilities all over the world.² Antigenic shifts³ and drifts lead to frequent changes in strains from time to time, leading to failure of available drugs and vaccines against influenza. Thus, prevention of spread is important in controlling the disease burden.

The most common modes of transmission of influenza and other influenza-like RTIs are droplet spread⁴ and hand-to-face contact.⁴ Handwashing has been shown to be effective in reducing the rates of disease transmission among children.⁵ It has been observed that people often use the internet as their source of health-related information.⁶ This study was done to assess the effectiveness of an internet-based handwashing intervention in reducing the number of RTIs among adults. A previous study in 2010 had shown that internet-based hand-hygiene measures significantly reduced the incidence of influenza-like illnesses among students of a university living in hostels.⁷

Considering that the internet is the first source of health information accessed by individuals during a pandemic, this study (PRIMIT) was undertaken on a large scale to test the hypothesis that a web-based intervention for handwashing reduces the incidence and spread of RTIs. The four weekly sessions provided to the participants in the intervention group contained different contents in each session to maintain interest and retention of the participants in the study. Outcomes were adequately recorded on the basis of self-reporting and non-responders were further contacted through additional structured telephone calls. Simplified definitions were used for RTI and influenza-like illness, which made self-reporting possible without the need for a formal medical examination. Although the participants were more likely to be women, and less deprived individuals, but adequate randomization with such a large sample size did not affect the results. Self-reporting was used for data collection as it was the only feasible

method in such a large sample. Similar results on the questionnaires at the end of 1 and 4 months and other outcome measures as assessed from patients' notes such as reduced number of medical consultations and antibiotic prescriptions, proved that reporting bias was not significant.

This study provides robust evidence in support of the importance of handwashing in preventing RTIs among adults. It strengthens the utility of handwashing practices in addition to the use of masks and cough etiquettes that prevent spread by droplets.

Although the absolute difference in the incidence of RTIs in the two groups was small (51% in the intervention group and 59% in control group; $p < 0.0001$), the overall effect on a large population would be significant.

This study should encourage further work to assess similar techniques for promoting handwashing in other settings such as schools, nurseries, dormitories and refugee camps, where close contact is prevalent and facilitates spread of diseases.

Implications for India

With a burgeoning population and a high incidence of infectious diseases, RTIs often spread like a bushfire in India. The annual 'epidemics' of swine flu (H1N1 influenza) are known to cripple healthcare services. The need for better hand hygiene is beyond doubt. However, unlike the setting of this study (UK) where internet access is nearly universal, only 19.2% of Indians have access to the internet. The rapidly increasing use of mobile internet services on smartphones might change this situation in future. Presently, it may not be practical to use an internet-based method to promote better hand hygiene in India. Rather television and radio could be used to disseminate the message of handwashing in preventing the spread of RTIs.

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