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Review

Impact of observing hand hygiene in practice and research: a methodological reconsideration

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SUMMARY

The purpose of hand hygiene is to break the chain of healthcare-associated infection. In many countries hand hygiene is regularly audited as part of quality assurance based on recommendations from the World Health Organization. Direct observation is the recommended audit method but is associated with disadvantages, including potential for being observed to alter usual behaviour. The Hawthorne effect in relation to hand hygiene is analogous with productivity improvement by increasing the frequency with which hand hygiene is undertaken. Unobtrusive and/or frequent observation to accustom staff to the presence of observers is considered an acceptable way of reducing the Hawthorne effect, but few publications have discussed how to implement these techniques or examine their effectiveness. There is evidence that awareness of being watched can disrupt the usual behaviour of individuals in complex and unpredictable ways other than simple productivity effect. In the presence of auditors, health workers might defer or avoid activities that require hand hygiene, but these issues are not addressed in guidelines for practice or research studies. This oversight has implications for the validity of hand hygiene audit findings. Measuring hand hygiene product use overcomes avoidance tactics. It is cheaper and generates data continuously to assess the compliance of all clinicians without disrupting patient care. Disadvantages are the risk of overestimating uptake through spillage, wastage, or use by visitors and non-clinical staff entering patient care areas. Electronic devices may overcome the Hawthorne and avoidance effects but are costly and are not widely used outside research studies.

Introduction

Healthcare-associated infection (HCAI) is often spread by direct contact. Most cross-infection takes place via the hands of health workers and it is agreed that cleansing hands can break the chain of infection, thus reducing rates of HCAI.[1,2] The importance of hand hygiene is recognized internationally and

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guidelines developed by the World Health Organization (WHO) in 2009 are credited with exerting considerable impact on hand hygiene policy and practice globally.[3–6] The WHO emphasizes the importance of regular monitoring to assess health workers' hand hygiene performance.[5] Monitoring is now undertaken routinely in many countries as part of quality assurance and is regarded as a major contributor to patient safety. Rates of hand hygiene compliance are reported to National Health Service Trust Boards, at similarly senior level in other countries, and are frequently presented on the websites of healthcare providers as an indicator that infection prevention procedures are operating effectively. High levels of hand hygiene compliance are difficult to sustain, and testing new interventions to enhance practice are frequently reported.[2,7] Valid and reliable assessment is also essential to establish effectiveness when such interventions are evaluated.[8] The methodology of hand hygiene audit has thus become an important area of enquiry. Audit can be undertaken by direct observation, consumption of alcohol hand rub/soap, or with electronic/computerized devices.[9]

Direct observation has been described as the 'gold standard' approach to hand hygiene audit.[10] This approach is favoured by the WHO because, at the time the guidelines were published, it was the only method described that could detect all hand hygiene opportunities, the number of times an opportunity is acted on, and appropriate timing of the hand hygiene event in the sequence of care.[5] Observers witness which individuals are complying or failing to comply with hand hygiene protocols, allowing them to intervene to improve performance in real time, identify barriers to compliance (e.g. poor availability of products or facilities), and make redress. Disadvantages are the time-consuming and resource-intensive nature of direct observation, the need to train and periodically re-validate observers, the need for reliability testing to ensure agreement between observers (inter-rater reliability), loss of data when bedside curtains are closed, assumption that hand hygiene opportunities and compliance are defined in the same way in all studies, and that audit captures only a small number of all hand hygiene opportunities that are occurring simultaneously.[8,11] Perhaps the most serious criticism is that the presence of observers has potential to influence health workers' usual behaviour, thus reducing the validity of audit findings.[8] These disadvantages are recognized by the WHO.[5]

Impact of observation on usual behaviour: historical overview

The impact of observation on employees' usual behaviour was first documented during a series of experiments at the Hawthorne Electrical Plant in Michigan, USA, throughout the 1920s and 1930s.[12] Data collectors noticed that productivity increased regardless of the variable being manipulated and concluded that it resulted from employees' awareness that they were under scrutiny. Over the years this phenomenon has become known as the 'Hawthorne effect' and has attracted considerable attention from social scientists undertaking research in experimental and naturalistic settings.[13,14] The results of the Hawthorne experiments have been re-analysed numerous times and the original conclusions questioned because of the large number of variables that could have affected behaviour but were not controlled.[13–15] There is confusion over a precise definition of the Hawthorne effect. It is described inconsistently with little understanding of how any resultant behaviour change is mediated or could be controlled.[15] Empirical research exploring association between observation and altered behaviour has been undertaken mainly in the field of education where some research teams have failed to detect systematic relationship between research participation and improved outcomes.[16] There is a consensus that individuals change behaviour when they are studied but not in a consistent or predictable manner.[15,17,18] Identifying the Hawthorne effect and other tactics of avoidance or deferred activity is important when undertaking and interpreting the findings of hand hygiene audit, given the current emphasis on hand hygiene globally and the importance of health workers' compliance.

Behaviour change during hand hygiene observation: historical overview

Although hand hygiene has attracted a great deal of attention over the last twenty years, this has not always been the case. Like the rest of infection prevention and control, it was a neglected subject and the earliest studies, lacking methodological sophistication, overlooked the possibility that being watched might alter health workers' usual behaviour.[19,20] A study reported in 1994 was one of the earliest to consider the Hawthorne effect.[21] Participants were informed that hand hygiene was being observed but details of what was being documented (cleansing in relation to the activity undertaken and technique) were not disclosed in an attempt to reduce impact on usual behaviour. As hand hygiene research gained momentum, the possibility that watching staff might alter usual behaviour received greater consideration and the idea that a deliberately engineered Hawthorne effect might be used to improve compliance took shape. In the highly cited study by Pittet *et al*. in the Geneva University Hospital, health workers were informed that hand hygiene would be observed but they did not know when audit periods were scheduled.[22] Performance feedback was then used as part of an intervention to encourage increased hand hygiene frequency and reduce rates of HCAI. The Geneva study stimulated interest in hand hygiene and strategies to promote it. Overt observation has been since used as part of other multi-modal interventions to increase hand hygiene compliance.[23–25] This focus on hand hygiene has in turn contributed to increased awareness of the Hawthorne effect. One study reported a 55% increase in use of alcohol hand rub when health workers were aware that they were being watched compared to when they were unaware.[26] Compliance declined from 61% when doctors knew they were being observed to 44% when they were unaware, while in another study hand hygiene compliance was reported to increase in the presence of data collectors known to staff compared with data collection by someone they did not recognize.[27,28] The majority of these studies are associated with significant problems in relation to design and reporting of the audit method, however. Only three studies in which overt observation with performance feedback formed part of a multi-faceted intervention to enhance compliance reported adequate controls.[23–25] In the others, which lacked randomization, it is not clear whether factors other than awareness of scrutiny could have influenced compliance. In two intervention