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Hospitalized patients' knowledge of influenza transmission and prevention

Madam,

For the control of seasonal influenza in hospital settings, current guidelines recommend respiratory hygiene and cough etiquette, wearing of masks and isolation of persons with respiratory symptoms as well as routine infection control practices such as hand hygiene.[1] The application of these measures by healthcare workers and patients is needed to help protect against seasonal influenza, and enhancing seasonal influenza control in hospitals will improve preparedness for an influenza pandemic.[2] Understanding avian influenza and possible pandemics by global populations has been described, but limited data exist regarding in-hospital populations.[3] The objective of this study was to detail the awareness of influenza transmission and prevention among hospitalized individuals.

A prospective study was performed at the 1100-bed Edouard Herriot Hospital (Lyon, France) between 20 June and 24 July, 2006. Patients aged >12 years, hospitalized in short-stay units, were randomly asked to complete a six-item self-administered questionnaire after giving their oral, informed consent. Three questions concerned the routes of inter-individual influenza transmission: aerial spread, direct contacts and indirect contacts. Three questions focused on means of prevention: wearing masks, hand washing and avoiding indirect contact through barrier measures detailed in the French national pandemic plan (http://www.sante.gouv.fr). Correct answers and concordance between knowledge on transmission and prevention underwent descriptive analysis with SPSS version 12.0 (SPSS Inc., Chicago, IL, USA). According to our institution, the study did not need ethics committee approval because it was entirely observational.

Of 92 patients surveyed, 84 (91.3%) completed the questionnaire. Five patients refused to participate, and three did not understand the French language. The male/female ratio was 0.87, and the median age was 39.5 years (range 26–56.75). Table I summarises the correct responses about knowledge of transmission and means of prevention. In total, 21.4% of patients had three correct answers about transmission routes and 34.8% had three correct answers about prevention. Also, the proportion of patients with three correct answers about prevention was higher than the proportion with three correct answers about transmission (not statistically significant: $P = 0.059$). Correct, concordant responses between each route of transmission and its corresponding prevention were 25% for direct contact and hand hygiene, 33% for indirect contact and avoidance of indirect contact, and 62% for the aerial route and mask wearing. Multivariate analysis did not reveal any additional significant results.

Patients lacked knowledge of transmission by direct and indirect contact and its prevention. Furthermore, they knew more about the means of preventing influenza than about the routes of transmission. Patient knowledge was also good in

Table I Description of correct responses related to knowledge of influenza transmission and prevention

Variable	Number ($N = 84$)	% (95% CI)
Correct responses concerning transmission modes		
Influenza is transmitted by the respiratory route	77	91.7 (83.8–95.9)
An individual can be contaminated by touching an object touched by an influenza-infected patient	45	53.6 (43.0–63.8)
An individual can be contaminated by touching the hand of an influenza-infected patient	23	27.4 (19–37.8)
Correct responses concerning prevention means		
Wearing a mask is advised	70	83.3 (74.0–89.8)
Avoiding contacts with objects touched by an influenza-infected patient is advised	55	65.5 (54.8–74.8)
Regular hand washing is advised	35	41.7 (31.7–52.4)

CI, confidence interval.

the area of respiratory transmission as the major route of infection.[4] Transmission by contact seemed to be a minor route in seasonal influenza, which would explain the poor knowledge of patients about this transmission mode.[5] However, transmission by contact may be significant in case of pandemic viruses, but we will not know that with certainty until putative pandemic viruses are identified.[6] The difference between knowledge about transmission and prevention could be the result of prevention campaigns focused on standard hygiene more than on their justification. Santibanez *et al*. noted poorer knowledge of influenza and pneumonia transmission and prevention among the elderly population.[7] We found higher proportions of correct answers, but our population was younger. Leung *et al*. reported greater knowledge of transmission of severe acute respiratory syndrome compared to our results on influenza.[8] However, their study was conducted during an epidemic when the population was probably more aware of severe acute respiratory syndrome.

Several limitations of our study must be emphasized. First, our sample size was limited and may not have been completely representative of all hospitalized patients. Second, we did not separate airborne from droplet transmission. This was to avoid confusion among patients, since precautions are similar for both routes, an area of disagreement among specialists.[5] Third, data on the educational and social background of the study subjects would have been interesting. Fourth, the perceptions of hospitalized patients may be altered by their circumstances.

Continuous infection control efforts to inform healthcare workers about hygiene procedures and influenza prevention need an additional component: effective patient education. For example, in case of a pandemic, the French national plan calls for our hospital to be split into high- and low-viral-density zones. This split then needs to be maintained, and patients will have to be active participants in respecting and maintaining these zone separations.

Future research should focus on actions to improve knowledge about influenza among patients and on the acceptance of respiratory etiquette in conjunction with basic hand hygiene and the utility of alcohol-based gels. A comparable survey of healthcare professionals or students would have been of interest to assess the level of knowledge on influenza. In the perspective of an influenza pandemic, information campaigns on influenza transmission and prevention should be organised promptly, anticipating difficulties which will face infection control professionals in healthcare settings.

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Improved endoscope drying standards

Madam,

I read with interest the letter from Cooke and Kerry regarding the need for improved drying standards for endoscopes and prevention of infection.[1] The letter raises an important issue on endoscope contamination and the importance of drying post-processing; however, I believe that we may indeed be missing an important point in the discussion. Is drying (or the lack of it) the problem or is it inadequate (high-level) disinfection? The definition of 'high-level' disinfection can vary from country to country, but in general refers to the destruction of all vegetative micro-organisms, mycobacteria, small or non-lipid viruses, medium or lipid viruses, fungal spores, and some, but not all, bacterial spores.[2] Therefore, if high-level disinfection has been successful and was not compromised due to inadequate rinsing (e.g. with contaminated water) then why is there a problem with vegetative bacterial contamination? An important example is with some of the historical recommendations regarding endoscope reprocessing, where manual immersion (in contrast to automated reprocessing) remains commonly used.[2] In these guidelines, following high-level disinfection the endoscope (and all channels) should be 'rinsed with sterile, filtered, or tap water to remove the disinfectant/sterilant'. It is clear, considering the levels and types of bacteria that can be found in tap water, that recontamination of the endoscope may occur and therefore rinsing/flushing with alcohol (itself a disinfectant) makes a lot of sense. Similar recontamination in automated washer-disinfectors has been well cited and investigated (as referenced and previously discussed by Cooke[3]), even with higher purity water systems for rinsing. Clearly this is not acceptable according to worldwide standards, but why not control the disinfection and rinsing steps correctly instead of depending on an extra step generally only performed on storage of the device?

In addition to the risk of recontamination, a further debate over the use of alcohol is that it can potentially inactivate vegetative micro-organisms that have survived the disinfection process.

The definition of disinfection is based on a hierarchical list of resistance of micro-organisms to inactivation (from the relatively sensitive lipid, enveloped viruses to the more resistant mycobacteria and bacterial spores) and the requirements under the Spaulding classification of the risk associated with the use of the medical device (critical to non-critical).[2] This list can be challenged and may not be taken for granted based on varying resistance mechanisms of the micro-organisms themselves and the biocide under investigation.[4,5] An example is with the use of aldehydes, where glutaraldehyde and *o*-phthalaldehyde (OPA) may be slowly effective against bacterial spores (such as *Clostridium difficile*) but has been shown to be virtually inactive (or in the case of OPA have decreased activity) against some environmental isolates of mycobacteria.[6,7] Therefore, can this be regarded as truly high-level disinfection when mycobactericidal activity is an important criterion? Perhaps we should be questioning the true outcome of high-level disinfection processes rather than backing them up with alcohol and drying. Alcohol and drying is good practice, but not as a replacement for inadequate disinfection according to standard definitions followed by use of bacteria-free water.

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