

# Survey on adoption of measures to prevent nosocomial infection by anaesthesia personnel

M. Askarian<sup>1</sup> and A.A. Ghavanini<sup>2</sup>

تقصي مدى تبني العاملين بالتخدير لتدابير اتقاء العدوى بالمستشفيات  
مهرداد عسكريان، أحمد علويان قواني

الخلاصة: تم توزيع استبيان على العاملين في التخدير من مختلف المستويات التعليمية في مستشفيات تقع جنوب جمهورية إيران الإسلامية، بقصد تقييم المعارف والمواقف والممارسات لديهم حول مكافحة العدوى في المستشفيات. وقد استخدمت الاختبارات التالية لتحليل الاستجابات؛ خي مربع للاعتداد، وفيشر للمضبوطة ومعامل الترابط لسبيرمان. وتدل النتائج على أن التدابير التي اتخذت للوقاية من سراية العدوى أثناء التخدير لم تكن كافية في مستشفياتنا؛ إذ كان تطبيق التدابير الكافية لمكافحة العدوى مرتبطاً ارتباطاً يُعتدُّ به بمعتقدات الذين أجابوا على الاستبيان حول إمكانية أن يتسبب التخدير بحدوث العدوى للعاملين بالتخدير أو للمرضى. لذلك كان من الضروري زيادة مستوى المعارف لدى العاملين في التخدير، وزيادة وعيهم بمخاطر العدوى، بُغية تحسين إجراءات مكافحة العدوى بينهم.

**ABSTRACT** To assess the knowledge, attitudes and practices of anaesthesia personnel regarding infection control in hospitals, a questionnaire was distributed to anaesthesiology personnel of different educational levels in the hospitals of southern Islamic Republic of Iran. Chi-squared significance, Fisher exact and Spearman rho correlation coefficient tests were used to analyse the responses. The results suggest that measures to prevent infection transmission during anaesthesia are inadequate in our hospitals. The implementation of adequate measures to control infection was significantly associated with respondents' beliefs as to whether anaesthesia can cause infection in anaesthesia personnel and/or patients. Increasing the knowledge base of anaesthesia personnel and raising their awareness as to the risk of infection are necessary to improve infection control procedures by anaesthesia personnel.

## Enquête sur l'adoption de mesures par le personnel anesthésiste en vue de prévenir les infections nosocomiales

**ABSTRACT** Afin d'évaluer les connaissances, attitudes et pratiques du personnel anesthésiste en ce qui concerne la lutte contre l'infection dans les hôpitaux, un questionnaire a été distribué aux anesthésistes de différents niveaux de formation dans les hôpitaux du sud de la République islamique d'Iran. La valeur significative du khi-carré, le test Fisher exact et le test du coefficient de corrélation de Spearman ont été utilisés pour analyser les réponses. Les résultats laissent penser que les mesures destinées à prévenir la transmission de l'infection durant l'anesthésie sont insuffisantes dans nos hôpitaux. L'application de mesures adéquates pour lutter contre l'infection était associée de manière significative aux croyances des personnes interrogées quant à la question de savoir si l'anesthésie peut causer l'infection chez le personnel anesthésiste et/ou les patients. Il est nécessaire d'accroître les connaissances du personnel anesthésiste et de le sensibiliser davantage au risque d'infection afin d'améliorer les procédures de lutte contre l'infection mises en œuvre par le personnel anesthésiste.

<sup>1</sup>School of Medicine; <sup>2</sup>Health System Research Unit, Vice-Chancellery for Clinical Affairs; Shiraz University of Medical Sciences, Shiraz, Islamic Republic of Iran.

Received: 30/08/01; accepted: 27/11/01

## Introduction

Anaesthesia personnel are important points of focus in hospital infection control. Performing procedures where there is a possibility of contact with blood and body fluids exposes them to the risk of blood-borne infections [1,2]. A study by Phillips and Monaghan found that 20% of laryngoscope blades and 40% of handles were positive for occult blood [3]. The presence of blood is an indicator of potential cross-infection, since biological fluids such as blood and saliva are known to transmit infectious diseases. The problem may be prevented by implementing additional precautions.

Although strategies have been developed to reduce the risk of hospital health care workers contracting infections [2], adequate precautions are often not taken for many routine procedures [4].

As the referral city for southern Islamic Republic of Iran, a large number of procedures are performed in Shiraz. It is a requirement for all of the city's hospitals that strategies to reduce the incidence of infection among hospital workers are adhered to. Our study sought to assess the knowledge, attitudes and practices of anaesthesia personnel concerning infection control in the hospitals of southern Islamic Republic of Iran.

## Methods

The study was carried out during autumn, 2000. Data were collected using a questionnaire containing a total of 69 questions, the first 6 of which related to age, sex, education level, years of experience and type of hospital. The remaining 63 questions were designed to obtain data on the knowledge, attitudes and practices of anaesthesia personnel concerning infection control in their occupational setting.

The questionnaire was initially distributed to 32 anaesthesiology personnel from another geographic location. Opinions from this group were collected and the questionnaire was revised accordingly. Revised questionnaires were then individually distributed by co-researchers to all anaesthesiology personnel in hospitals in Shiraz and neighbouring cities. The co-researchers also collected the completed questionnaires from the same individuals they had distributed them to.

Responses were scored as positive or negative values. Null responses were regarded as negative values. A database was created using *Epi-Info* 6.04 to analyse the data. In addition to proportions and percentages used to describe the data, chi-squared significance, Fisher exact and Spearman rho correlation coefficient tests were used for analysis, with  $P < 0.05$  considered statistically significant.

## Results

Completed questionnaires were received from 203 anaesthesiology personnel, approximately 77% of the total originally distributed. There were 135 (66.5%) male and 68 (33.5%) female respondents. The majority of respondents were aged 30–39 years, and had attained an education level less than a Bachelor of Science degree, followed by anaesthesiology specialists, with 32% of respondents having work experience of more than 10 years. Scores for knowledge, attitudes and practices of the study group are shown in Table 1.

A statistical relationship between practice and previous exposure to orientation classes for hepatitis B virus (HBV) prevention ( $r = 0.294$ ,  $P < 0.001$ ) and for HIV prevention ( $r = 0.387$ ,  $P < 0.001$ ) was shown using Spearman Rho correlation co-

**Table 1 Hospital anaesthesiology personnel questionnaire scores on knowledge, attitudes and practices regarding infection control, southern Islamic of Iran**

Variable	Total score	Mean (s)	25th percentile	50th percentile	75th percentile
Knowledge	15	6.91 (3.12)	5	6	9
Attitudes	4	3.10 (0.84)	3	3	4
Practices	35	18.39 (4.87)	15	18	21

s = standard deviation.

efficient. There was no statistical difference between practice and the level of education ( $r = -0.33$ ,  $P = 0.058$ ).

While over 90% of respondents claimed to be aware of the possibility of infection transmission to patients and personnel, only 34% (69 respondents) indicated that they routinely disposed of the unused portion of all the drugs of the previous patient, with the rest reusing them.

There was a high awareness of the possibility of acquiring HBV (87.5% of respondents) and over 90% were aware of the risk of HIV infection and willing to receive an anti-HIV vaccine were it to become available. However, only 61.5% had received complete vaccination against HBV, with 5.0% never having had the vaccine and only 24.1% of respondents had received any special education for the prevention of HBV. Of these, 42.3% evaluated the educational programmes as impractical because there were not sufficient supplies, such as gloves, gowns, masks, single-use items, medications and safe disinfectant, to be able to adhere to infection control procedures. For educational programmes for HIV prevention, the figures were 26.0% and 38.4% of respondents, respectively.

The association between previous exposure to needle stick injury and history of HBV vaccination was not statistically sig-

nificant ( $r = 0.034$ ,  $P = 0.926$ ). No respondents believed that screening tests for HIV are carried out for every patient prior to surgery. Only one respondent believed that such testing is done for HBV. Most respondents believed that elective surgery should be deferred until appropriate screening is completed if there is a suspicion of HIV or HBV infection (75.9% and 68.7%, respectively). The corresponding figures for emergency surgery were 8.7% and 4.1%, respectively.

Only 17.4% reported wearing gloves during anaesthesia, most of whom did so to prevent infection. Changing gloves for each patient was reported by 72.8%, and scrubbing of hands before putting on gloves by 28.4% of respondents. The principal reason given for not wearing gloves was interference with work, followed by high cost.

Recapping of needles was reported by 66.2% of respondents. There were 31.7% of respondents who reported at least one episode of needle stick injury in the previous 6 months, with 11.9% reporting more than 5 episodes over the same period. Reporting of needle stick injuries to a responsible person was not carried out by 56.8% of the respondents. The main reason given for not reporting was that respondents thought the responsible person unlikely to

act on any report. Indeed, of all needle stick injuries actually reported, no action was taken in 43.7% of cases.

All respondents used regional block needles only after sterilization, and 93.5% used laryngoscope blades after cleansing. Disinfectant (75.4%) and detergent (16.2%) were the main agents employed to clean laryngoscope blades. Table 2 summarizes the data obtained on the cleaning of anaesthesia instruments by respondents.

Cleaning oral airways between use was significantly related to respondents' belief of whether anaesthesia could cause infection in the patient ( $P < 0.04$ , Fisher exact test). The same was true for the daily cleansing of the stethoscope ( $\chi^2 = 4.19$ ,  $df$

$= 1$ ,  $P < 0.05$ ). How respondents handled needles was significantly related to their belief of whether anaesthesia could cause infection in anaesthesia personnel ( $\chi^2 = 6.68$ ,  $df = 1$ ,  $P < 0.01$ ).

## Discussion

Unfortunately, adequate procedures to prevent infection transmission during anaesthesia are not in place at our hospitals. For example, gloves are worn only by 17.4% of personnel, and adequate cleaning of instruments is rarely carried out. The problem seems to be a global one, with one study carried out in the early 1990s in the United

**Table 2 Hospital anaesthesiology personnel practices regarding cleaning/sterilizing of anaesthesia instruments, southern Islamic Republic of Iran**

Instrument	Cleansed/sterilized between uses (%)		Cleaning/sterilizing agent used (%)		
	No	Yes	Disinfectant	Detergent	Tap water
Laryngoscope blades	6.5	93.5	75.4	16.2	8.4
Magill forceps	20.7	76.3	73.5	16.7	7.6
Breathing circuits	85.3	14.7	62.5	31.3	6.2
Connectors	69.5	30.5	65.2	26.1	8.7
Oral airways	4.5	95.5	75.5	19.3	5.2
Endotracheal tube	3.5	96.5	80.8	15.0	4.2
Sphygmomanometer cuff (daily)	85.4	14.6	37.2	44.2	18.6
Sphygmomanometer cuff (whenever contaminated)	20.9	79.1	38.5	44.7	16.8
ECG electrodes/wires (daily)	70.8	29.2	50.7	5.8	43.5
Pulse oximeter (daily)	61.2	38.8	52.3	3.5	44.2
Stethoscope (daily)	61.5	38.5	86.2	4.3	9.6
Anaesthesia machine	71.5	28.5	68.9	1.4	29.7
Soda lime container	39.8	60.2	39.8	22.8	37.4

ECG = electrocardiogram.

States of America also showing that these measures were not implemented by a majority of the members of the Association of Anaesthetists [5].

One of the important aspects of infection prevention by anaesthesia personnel is to reduce the risk of HIV and HBV infection. The rate of HBsAg positive sera in anaesthesia personnel in different regions has been shown to range from 0% to 18% [6-9]. Most of these infections are transmitted to anaesthesia personnel via contaminated percutaneous injuries, a potentially preventable event [10]. Immunization against HBV is another means of prevention [11]. Unfortunately, these measures had not been adopted by many of the anaesthesia personnel in our hospitals. Recapping of needles was carried out by 66.2% of respondents, with 31.7% having experienced at least one episode of needle stick injury in the previous 6 months and 11.9% having experienced more than 5 episodes in the same period. Only 61.5% had received complete vaccination against HBV and 5.0% had never received the vaccination. Only 24.1% had received special education

for prevention of HBV, and only 26.0% for HIV.

Although more than 90% of respondents claimed to be aware of the possibility of infection transmission to patients and personnel, many either used incorrect infection prevention procedures or used none at all, suggesting in fact a lack of detailed knowledge of infection control. We therefore conclude that an effective strategy for infection control by anaesthesiology personnel must address this gap in detailed knowledge by implementing training programmes in accordance with the findings of the study.

## Acknowledgements

This work was supported by the Shiraz University of Medical Sciences (Grant No. 79-991). The authors also wish to thank those who participated in the study; Leila Jaafarzadeh, who helped in the collection of data from all hospitals and S.H.R. Tabatabae, for his statistical analysis.

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#### Note from the Editor

We would like to draw our readers' attention to the subject and author indexes for Volume 7 (2001) which are published in Arabic, English and French and which are distributed as an insert in the present issue.