KAP STUDY ON SARS AMONG HOSPITAL WORKERS IN 4 PUBLIC HOSPITALS IN STATE OF SELANGOR

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ABSTRACT

A self'-administered questionnaire were sent to 1 public hospitals (HTAR, Tg. Karang, Bunting, Kajang) in Selangor as a cross sectional study. They were subsequently distributed arnong hospital workers and ancillary staffs during the SARS outbreak in March 2003. The purpose of study was to measure knowledge, attitudes and practice (KAP) during the SARS outbreak. Response rate of 83.9% was achieved (448 out of 531). This KAP study approached according to 7 aspects i.e. general knowledge on SARS; perception on management of SARS outbreak; perception on the risk of contracting SARS; readiness to work handling SARS patients, compensation seem Jit to hospital workers, overall universal precautions practiced and training received prior outbreak. Hospital workers were divided to 2 categories; direct possibility of being involved with SARS patients i.e. 47.4% (211 out of 448) and non-directly involved i.e. 52.9% (237 out of 448). Majority of hospital workers were found to be non-directly involved with rnanagement of SARS patients. Hospital workers directly involved with SARS were found to have significant better knowledge on SARS (t= 3.907; p<0.005), perceived better managetnent on SARS by Ministry of Health (MOH) (X 2=21.163; p<0.001) and perceived contracting the disease as higher (χ 2=32.07; p<0.001). However, they had lower readiness to work handling SARS cases (X 2=2.25; p=1.33), but it was not significant. Community health nurses and ancillary staffs have the lowest level of knowledge on SARS. Universal precautions methods practiced more significantly among directly involved hospital workers were checking for body temperatures (p=0.039), wearing musk during examining patients (p=0.0015), work according to policy and guidelines (p=0.023), wearing Personal Protective Equipments (PPE) such as gloves, gowns and shoes when examining patients (p=0.025) but found that there was supply lack of PPE (p<0.005). Majority of staffs directly involved during SARS outbreak chooses compensation through critical allowances payment, followed by insurance coverage for staffs. Training of hospital workers directly involved were not standardized and was lowest on cases rnanagement (87.6%) and decontamination rnethods (88.6%). Conclusion: Health related programs in connection to an outbreak will cause unrest among the workers unless given prior training and input. Without doing so, many will perceive it to be a burden and negatively perceive this responsibility. This leads to poor knowledge pursue of disease and unreadiness to serve the public. Universal precautions against disease and trainings were not stundardized among staffs and this is especially evident in the public health and ancillary workers.

Keywords: health workers, high risk, contagious disease, transmitted, universal precaution.

INTRODUCTJON

The recurrence of severe Acute Respiratory Syndrome (SARS) in China during 2004 has highlighted the continuing threat to human health from infectious disease outbreaks. Transmitted from animals to human; zoonosis caused by a coronavirus, SARS first emerged among humans in the southern Chinese province of Guangdong during November 2002. By March 2003, SARS had spread to neighboring Hong Kong and from there to Toronto, Ontario, and many other areas in a matter of days (Naylor et al. 2004).

The SARS outbreak took a major toll in both of the major metropolitan areas, with deaths, illness, upheaval, collapsing economies and trades and hardship on multiple levels.

Accordingly, thousands of public health and health care workers rose to the occasion and ultimately contained the outbreak in the areas of resources that were suboptimal (Marla 2004). Transmission among healthcare providers remains a threat and adds suffering to the already fragile healthcare system.

LITERATURE REVIEW

According to Dybas (2004), SARS, a viral respiratory illness, is transmitted by person-to-person contact. First reported in Asia in February 2003, the illness spread over the next few months to more than two dozen countries in North America, South America, Europe, and Asia. During the SARS outbreak of 2003, a total of 8098 people worldwide became sick. of these, 774 died. In the United States, there were 192 infected individuals, all of whom recovered.

The SARS disease has brought death and suffering as well as a dramatic economic impact in countries hit by SARS. Despite the

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advances of technology the threat from emerging infectious disease has grown in the past decade, and experts say that it will only get worse (Parry 2003). The lack of a reliable diagnostic test in the early stages of the disease and the similarity between symptoms of SARS and those of other respiratory diseases make it a difficult disease to identify. Even with a sophisticated surveillance system in place, the first case was difficult to detect (Parry, 2003) partly due to ignorance (Parry 2003, Wilson 2004).

The SARS outbreak highlighted poor coordination between hospitals and the public health system. Guidelines may give definition of what constitutes a SARS alert and reconlmendations on the public health management of suspected outbreak but implementation especially in developing countries was poor. Developed countries may already have in place a mechanism for dealing with a major infectious disease, but developing countries are in dire needs to prepare for a potential outbreak.

What is SARS?

Severe Acute Respiratory Syndrome (SARS) is the term being used to describe the serious respiratory illness which has been reported in parts of east and south East Asia, Toronto. Canada, with isolated suspected cases in parts of Europe (Parry 2003). The main symptoms of SARS are high fever, dry cough. shortness of breath, or breathing difficulties. Changes in chest X-rays indicative of pneumonia also occur.

The SARS-associated coronavirus is believed to be of zoonotic origin, and while its natural reservoir or reservoirs are unknown. several exotic species (for example, civet cats and raccoon dogs) sold for consumption in southern China has shown evidence of infection (Jernigan et al 2004, Wilson 2004).

Risk of Transmission

Changes in human demographics. human behavior, and international travel and commerce are additional key factors in emerging infections. Mass movement of people into and between urban areas has exposed more people to infections that were once found only in rural areas. Closer living and working environments in urban areas, such as apartment buildings, office complexes, and hospitals. can further facilitate faster disease spread (Wilson 2004). So Infections move quickly across borders, sometimes even before symptoms develop, as do antibiotic-resistant bacteria.

China. Canada, and other countries that experienced SARS outbreaks lost almost all tourism- and transport-based revenue for weeks or months. Canada documented millions of dollars of lost revenue due to a quarantine that kept workers at home and severely reduced daily activities such as bus travel, theater going, and restaurant dining. Furthermore, the response to SARS isolated people in infected countries from the rest of the world, led to their being unwelcome when they tried to travel abroad. SARS also stressed the countries' health care system, and medical costs soared during the disease outbreak (The Economist, 2003).

SARS AMONG HEALTH CARE PROVIDERS

SARS had spread rapidly by air travel to three continents and appeared to be highly infectious to health-care workers and patients in health-care settings. SARS, a viral respiratory illness, is transmitted by person-to-person contact. One person can have an enormous impact, whether the ill physician whose travel from Guangdong province to Hong Kong resulted in a pandemic or the ill physician, Dr. Carlo Urbani. who alerted the world health community to the SARS epidemic but ultimately, died from the disease (Naylor et al 2004).

Screening was originally recommended only for patients with fever: later. after CDC recommended assessing patients for possible SARS on the basis of fever or respiratory symptoms, triage personnel were instructed to screen patients with either complaint. The screening form encouraged staff to telephone the local public health authority immediately for any patient with the triad of fever, respiratory findings. and SARS risks (Wilson 2004, Jernigan et al. 2004). As time pass by and no more emerging new cases, public health workers and clinicians grew complacent about surveillance and susceptibility testing.

Another potential source of SARS corona virus exposure among hospital workers is laboratories that store specimens containing the virus or that use live virus for diagnostic or research purposes. Since fall 2003, 6 persons have become infected with SARS corona virus in 3 laboratories in Singapore. Taiwan, and China and 1 of these patients infected 7 additional persons through secondary chains of transmission. Laboratory-acquired infection proved to initiate a community outbreak (Naylor et al 2004). Last, it is also theoretically possible that long-term SARS corona virus shedding or recrudescence of SARS in recovered patients could initiate another outbreak. but evidence to

support such events has not been reported (Jerniqan et al 2004).

A missed diagnosis can have serious consequences, since the failure to adequately isolate even l patient with SARS can lead to extensive transmission. The development of effective tools for screening and triage of patients with SARS would allow efficient use of resources in the event of another SARS outbreak. In Toronto and Singapore, SARS was primarily a nosocomial illness largely restricted to health care workers, patients, and visitors exposed in affected hospitals (Jemigan et al 2004). To a lesser extent transmission may occur to other persons who had close contact with known or suspected patients with SARS in household settings. It was detrimentally helpful, where the goal is to hospitalize all patients with SARS for the purpose of infection control, a practice that could overwhelm the health care system.

In Toronto, where community spread was more limited, the proportion of SARS cases among health care workers was even higher at 43.3%. Straightforward protection measures against droplet and contact transmission proved reasonably effective, but the spread of the infection to health care workers added to the stress both areas faced in combating the outbreak (Jernigan et al 2004). Along with other jurisdictions, the areas fought an outbreak, initially; no satisfactory laboratory tests were available to confirm the diagnosis in suspected cases (Chwan-Chuen King et al 2004). Even after reverse transcriptase polymerase chain reaction methods were instituted, rapid confirmation was not possible during pre symptomatic or early stage of infection. Furthermore, both areas also dealt with travel advisories from other jurisdictions that contributed to economic dislocation and public upset.

The woman in the emergency ward of a Canadian hospital has no idea of her ultimate fate. Within a week, the woman had died a victim of severe acute respiratory syndrome (SARS). The nurse and doctor who took care of the woman, and a receptionist who handed the woman forms to fill out. will soon be in critical care. In Hong Kong, the outbreak spread first in the community, but eventually 22% of all persons affected were health care workers (Dybas, 2004).

SARS spread to 11 (58 percent) of Toronto's acute care hospitals with severe physcological and physiological impact (Chan 22004). Unrecognized SARS among inpatients with underlying illness caused resurgence, or a second phase, of the outbreak, which was finally controlled through active surveillance of hospitalized patients. The transmission of SARS in Toronto was limited primarily to hospitals and to households that had had contact with patients (Svoboda et al. 2004). For every case of SARS, health authorities should expect to quarantine up to 100 contacts of the patients and to investigate 8 possible cases. During an outbreak, active in-hospital surveillance for SARS-like illnesses and heightened infection-control measures are essential.

The importance of infectious control measures

Infection-control measures were implemented by public health teams together with hospital staff. Hospitals were required to screen all patients, staff members, and visitors for risk factors for and symptoms of SARS, and workers were required to use gloves, gowns, eye protection, and N95 respirators for all contact with patients. Similar measures were instituted for outpatient sites. and clinics were established for the assessment of SARS. Close contacts (henceforth referred to as contacts) were people who cared for, lived with, or had face-to-face contact (within l m) with a person with SARS or direct contact with the respiratory secretions or bodily fluids of a person with SARS (Svoboda et al. 2004).

In hospitals in which SARS was transmitted to multiple staff members and patients, it was difficult to identify all possible exposures within the 10-day incubation period. Therefore, all persons in a hospital were considered contacts and quarantined for the l0 days after their last day in the hospital. 5743 health care workers were placed in work quarantine. "Work quarantine" was established to prevent a shortage of essential health care staff. Members of the hospital and paramedic staff under work quarantine were permitted to go to work, where they followed the infection-control precautions. When they were not at work, they were quarantined at home. Staff illness in Hospital A was first recognized on March 21, and the hospital was closed on March 25 (Naylor et al 2004). The transfer of inpatients with incubating or unrecognized SARS between institutions resulted in nosocomial transmission in additional sites; health care workers who were employed at more than one site also transmitted SARS.

A surge of cases followed within a group of hospital staff members whose exposures were related to prolonged resuscitation and intubations in a patient who was critically ill with SARS. This resurgence led to the refinement of infection-control measures for high-risk, aerosol-generating procedures. SARS in Toronto was primarily a nosocomial illness, largely restricted to persons who were exposed in affected

hospitals and household contacts (Svoboda et al 2004, Naylor et al 2004, Najme Ahmed et al 2005). Once SARS symptoms were recognized, the infection-control measures that were instituted worked well. However. within hospitals, severe restrictions due to SARS resulted in delays in treatments for cancer and surgeries, and the continuous, universal use of N95 respirators and other forms of personal protection was stressful for health care workers. From Svoboda et al (2004), the spread of SARS-CoV by means of respiratory droplets can be controlled with less restrictive measures (e.g., the use of surgical masks in quarantine).

In Hong Kong, the outbreak spread first in the community, but eventually 22% of all persons affected were health care workers (Naylor et al 2004). In Toronto, where community spread was more limited, the proportion of SARS cases among health care workers was even higher at 43%. Straightforward protection measures against droplet and contact transmission proved reasonably effective, but the spread of the infection to health care workers added to the stress both areas faced in combating the outbreak.

Institutional infection control was undercut by shortages in personnel and deficits in knowledge of fiontline caregivers (Marla 2003). Neither jurisdiction had enough infection control practitioners and infectious . disease specialists. For example. 42% of Canadian hospitals fail to meet the current US standard of 1 infection control practitioner (generally nurses or laboratory technologists) per 250 active care beds; 80% cannot attain the new Canadian standard of 1 infection control practitioner per 175 active care beds. In both Hong Kong and Toronto, failure of institutional syndromic surveillance allowed SARS cases to go undetected and contributed to secondary spread of the outbreak after an initial wave of SARS cases. Both reviews highlighted concerns about a widespread lack of knowledge of basic principles of infection control on the part of health care workers, presumably because few had ever faced a serious outbreak of infectious disease. This situation, along with deficiencies in provision of personal protective equipment in multiple sectors of both health care systems, contributed to complaints and grievances about occupational health and safety in health care settings in Hong Kong and Toronto. Physical institutional deficiencies were also evident. Hong Kong had poorly designed ventilation systems, lack of basic hand-washing and sanitary facilities, and a shortage of single rooms with independent bathrooms. This contributed to inefficient logistics that hampers full healthcare workers compliance with universal precautions methods. In the Toronto area, only 3.8% of acute hospital beds were in single, negative pressure rooms. A number of hospitals lacked infection-control areas in their emergency departments. Risk communication to health care workers and with the general public was uneven, compounded by the lack of certainty about diagnosis, treatment, and epidemiology throughout the outbreaks (Weinstein 2004).

STUDY DESIGN

Objectives of this study were to describe and compare among SARS and non SARS workers:

a. By demographical factors - Age, years in service, place of work, occupation.
b. Knowledge of disease
c. Attitude towards disease (Perception): How staffs perceive management of SARS outbreak, risk of contracting disease, willingness to work and compensation mechanisms deemed suitable.
d. Overall universal precautions practiced by hospital workers directly involved with SARS.
e. Overall training received by hospital workers directly involved with SARS.

METHODOLOGY

A cross sectional study was done from May till June 2003; where 4 public hospitals were purposely chosen i.e. Klang General Hospital (Hospital Tengku Ampuan Rahimah or HTAR), Tanjung Karang Hospital, Banting Hospital and Kajang Hospital. Self administered questionnaires were given to all the staffs including ancillary staffs that were working during these 2 months period.

In the questionnaire, staffs were asked the fill their socio-demographic background. These included their respective hospital, age, place of work (A&E, Wards, Clinic), occupations including physicians, medical officers, medical assistants, hospital attendants. community nurses, trained staff nurses, Radicare workers (private outsourced workers that maintains cleanliness, laundry supplies and hazardous waste management), X-ray technologists or ambulance drivers. Hospitals workers were also divided to whether they were directly involved in examining or treating patients suspected of SARS or not directly involved with outbreak management of SARS.

These data provide the basis of further division to SARS workers (directly involved) and non SARS workers (not directly involved) obtained for comparison. Universal sampling was done for all the respondents. Inclusion criteria included all level of staffs that were working during the time of study and agreed for participation.

20 questions on knowledge (yes and no answers) were assessed regarding: epidemiology of SARS, its causes, methods of transmission and the symptoms manifested.

Attitudes were assessed regarding 4 different aspects. They were, staffs owns perception towards management of disease outbreak by Ministry of Health, their perception to the risk of infection and staffs perception on willingness to work during the outbreak. Perception on compensation methods deemed favorable were also asked.

Lastly, practice was assessed by evaluation of self universal precautions and family's protection techniques used during outbreak.

Analysis of the data by SPSS version 11.0 and missing data were excluded from analysis. Descriptive statistics will be given and statistical analyses used are student's t-test, chi square and Anova.

BACKGROUND OF STUDY

All 4 hospitals are hospitals from the public sector. They provide highly subsided services to the state of Selangor general populations. 2 hospitals i.e. Klang General Hospital and Kajang Hospital are with specialist status, while Banting and Tanjung Karang Hospitals are peripheral hospitals without specialist status.

Klang General Hospital serves as a tertiary referral hospital whereby it serves as Selangor's top public referral centre besides Kuala Lumpur Hospital. They were also among the hospitals that were certified to cater to such a outbreak where by prior training and logistics support were allocated to these hospitals especially the Accident and Emergency Department where 90% of suspected cases were seen. Kajang Hospital is also a hospital with specialty services and seen as a referral hospital. It caters for the Hulu Langat-Kajang population.

Suspected cases with SARS, patients who were exposed to known SARS or suspected cases, the general public with cough, fever and people with history of travel to suspected areas, will also be seen at the A & E department for the necessary investigations and treatment. The media hype about SARS has somewhat raised awareness and the general public had become more sensitized to the disease.

RESULTS

Descriptive and statistical analysis

Response rate of 83.9% was achieved (448 respondents out of 534 questionnaires given out). Delineation by hospitals, respondents mainly came from the HTAR (61.7%), followed by Kajang Hospital (12.3%), Tanjung Karang Hospital (16.1%) and Banting Hospital (9.8%).

Table 1: Background by Hospitals and Involvement with SARS According To Hospital Workers.

	Hospitals	SARS	Non SARS	Total
1	HTAR Klang	126(59.7%)	150(63.6%)	61.7%
2	H.Kajang	31(14.7%)	24(10.2%)	12.3%
3	H.Banting	16(7.6%)	28(11.9%)	9.8%
4	H.Tg.Karang	38(18%)	34(14.4%)	16.1%
	Total	**211**	**236**	**100%**

Greater number of staffs were found to be in the category of not directly involvement with SARS (239 out of 448; 53.3%), compared to workers who were directly involved with SARS cases (209 out of 448; 46.7%).

Data on age was normally distributed. Mean age for staffs directly involved was 36.7 years (SD 10.02) and mean years of length of service was 12.2 years (SD 10.42). Mean age for non SARS workers are 35.8 years (SD 10.94) and mean years of length of service was 9.5 years (SD 6.6). Directly involved SARS workers were found to be significantly older (t=2.22;

p=0.027) but the length of service of these categories was not significant.

According to seeing either SARS or non SARS suspected cases; male staffs predominate seeing suspected SARS cases i.e. 58.8% compared with 11.1% for non SARS. Female staffs mostly see the non SARS cases i.e. 89% and only 41.2% deals with suspected SARS cases.

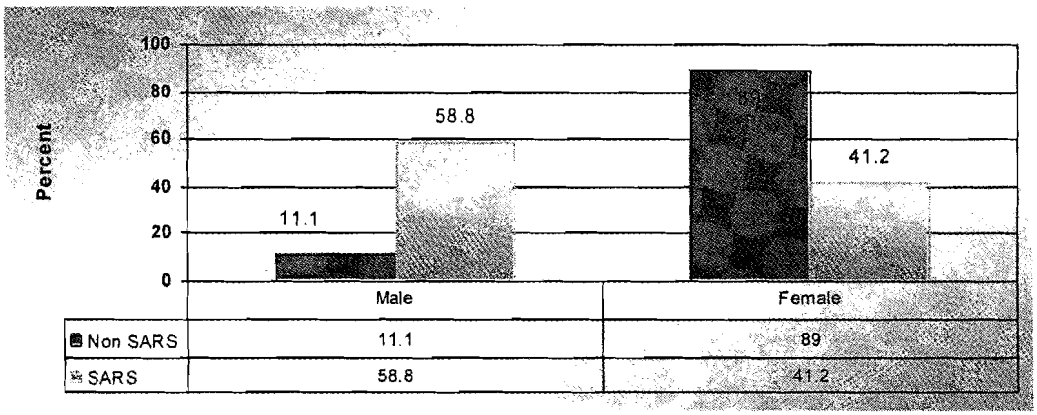

Figure 1: Distribution of Health Workers According to Sex

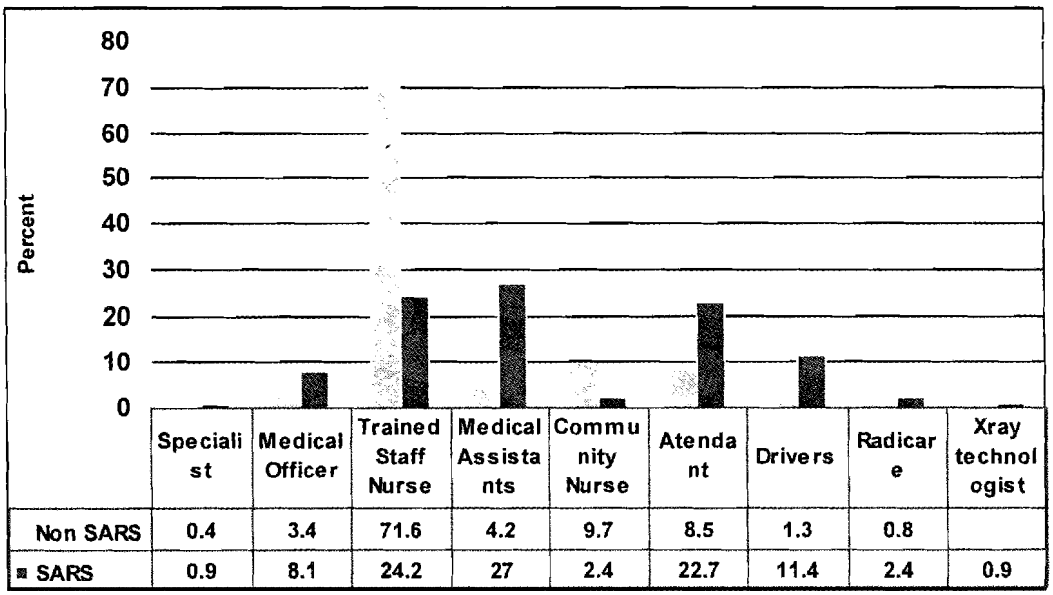

Figure 2: Percentages of Hospital Workers According to Occupation Breakdown.

By Occupation

a) Directly Involved SARS Hospital Workers

According to attendance by healthcare staffs, suspected patients were seen or attended by those who are in SARS workers category (Figure 3). These includes medical specialists who make up of 0.9%, medical officers 8.1%. trained staff nurses 24.2%, medical assistants 27%, community health nurses 2.4%, hospital attendants 22.7%, transported by medical ambulance drivers 11.4%, Radicare workers 2.4% and X-ray technologists 0.9%.

b) Not directly Involved Hospital workers

Not directly involved hospital workers consists of by medical specialist 0.4%, medical officers 3.4%, trained staff nurses 71.6%, medical assistants 4.2%, community health nurses 9.7%, hospital attendants 8.5%, drivers 1.3% and Radicare staffs 0.8%.

By working place

Most of the suspected SARS cases were seen at the Accident and Emergency Department as the first stop of medical intervention (66.4%), some were admitted in the wards for tests and investigations (28.4%) and some seen at the medical specialist clinics for follow ups (5.2%).

Knowledge

Mean knowledge of all hospital staffs regarding SARS methods of spread and symptoms manifestation-S was 14.40 ± 2.50. Generally, distribution of knowledge among the staffs was normal.

Mean knowledge was higher among SARS workers (14.95 ± 2.54), than among the non SARS workers (14.04 ± 2.32). There was significant difference between these two categories at t=3.907 (p<0.005). These would be expected as the staffs involved with seeing and treating suspected SARS patients have to critically expertise themselves with the methods of spread and symptoms manifestations.

Mean knowledge among occupations showed that medical officers present with the highest score on knowledge (28.39 ± 2.87) and was statistically significant (F=3.102; p=0.002). Community health nurses (mean knowledge 25.83± 3.27) and ancillary staffs (attendants, drivers and Radicare workers; range of knowledge 24.00 - 26.34) were among the least knowledgeable categories.

Table 2 : Distribution of Knowledge By Occupation

Total knowledge

Pekerjaan	Mean	N	Std. Deviation
pakarPerubatan	27.3333	3	,57735
Pegawai Perubatan	28.3889	18	2.87257
Jururawat Terlatih	26.3632	190	2.39923
Pembantu Perubatan	26.9492	59	1.87932
Jururawat Masyarakat	25.8421	19	3.27046
Atendan	26.3443	61	1.97387
Pemandu	25.5455	11	1.43970
Radicare	25.0000	7	.57735
Juruxray	24.0000	2	.00000
Total	26.4703	370	2.33518

Perception

a) Perception on management of outbreak by Ministry

Healthcare staffs who are involved with the SARS outbreak, perceived management of the recent SARS outbreak by MOH as positively better than healthcare staffs who were not involved with the SARS. Staffs who were not involved with the outbreak, perceived less positively on how SARS outbreak was managed by the MOH. Differences on view on management by MOH was found to be different statistically (χ 2=21.163; p<0.001) (Table3).

This is probably due to the fact the personnel's involved with the outbreak are higher ranking officers that are also involved in local management of their unit at hospital levels. Thus they are more willing to accept and condone orders directed by the higher hierarchy of the Ministry level. They also understand thus perceive better that these orders or guidelines set by the Ministry are for the benefit of the staffs and the overall good performance of their respective hospitals.

b) Perception on risk of transmission

Questions on perception on risk of transmission were done on all categories of hospital workers either directly on not directly involved.

Total healthcare staffs who were involved with the SARS outbreak were 206 out of 441: (46.7%). 159 out of 206 directly involved staffs (77.2%) perceived risk to contact the disease as high. This is not difficult to see; given the extreme conditions and close contact, directly involved hospital workers have with suspected cases seen at the A&E, wards or hospital compounds.

235 respondents out of total 441 (53.3%) were hospital workers not directly involved with SARS. 119 out of the 235 respondents not directly involved (50.6%), also perceived themselves as high risk of transmission (Table 3).

Test for association between category of workers and perceive risk of infection was significant ($X^2=32.07$; $p<0.001$).

c) Perception on willingness to work

Healthcare staffs who were not involved with the outbreak, perceived themselves more willing to work (64.3%) than healthcare staffs who were involved with the outbreak (56.8%).

Healthcare workers who were directly involved, put themselves at risk by treating and examining suspected cases during the times of outbreak. A meager amount of extra time allowances and on call compensation was not seen as a fit compensation mechanism to motivate them to work willingly.

These results were seen as a reluctant ness of the healthcare staffs' part to continue working under extreme pressure and doubtful conditions serving the general public. Ancillary healthcare staffs that was more willing to work was paid for extra duty and as they were not in direct contact with susceptible cases, not directly involved healthcare staffs was more willing to work during these outbreak periods. However, no statistical significance was found between categories of staffs and willingness to work (($X^2=2.25$; $p<0.133$) (Table 3).

Table 3: Staffs Perception on Management of the Outbreak, Risk of Infection and Willingness to Work.

Healthcare Staffs Category	Staffs Perception					
	On management		Risk of infection		Willingness to work	
	Low n (%)	High n (%)	Low n (%)	High n (%)	Low n (%)	High n (%)
Directly involved	59 (28.6)	147 (71.4)	47 (22.8)	159	89 (43.2)	117 (56.8)
Not directly involved	119 (50.6)	116 (49.4)	116 (49.4)	119 (50.6)	84 (35.7)	151 (64.3)
Total	178 (40.4)	263 (59.6)	163 (37.0)	278 (63.0)	173 (39.2)	268 (60.8)
Statistical Analysis	$\chi^2=21.163$ *p<0.001		$\chi^2=32.07$ *p=<0.001		$\chi^2=2.25$ p=0.133	

Significant at p<0.05

Compensations Fit

The healthcare staffs were assessed on whether they felt payment mechanisms were needed; and if needed the methods of payment or incentives mechanisms they seem as fit for the duty they've performed during the SARS outbreak. Responses for these questions were lukewarm when only 279 out of 441 respondents (63.3 %) answered the issue. The low response rate was probably felt as a waste of time for the staffs to answer the question; as usually no proactive action by the higher level managers in the organization who will attend to these compensation and allowances issues promptly.

4 methods of payment mechanisms were asked or perceived to be most favorable to the staffs; 4 of these methods included payment for critical service allowances (elaun khidmat kritikal), appreciation certificates (sijil penghargaan), awards of excellence (anugerah khidmat cemerlang) or insurance coverage (perlindungan insuran).

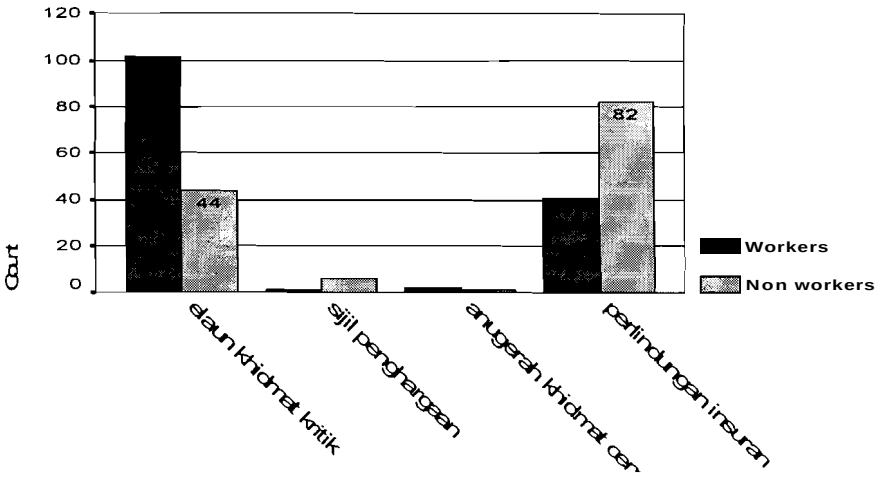

Figure 3: Compensations seen fit according to hospital workers perception.

Practice

All respondents who were directly involved during the outbreak were assessed of their universal precaution practices during this outbreak. The response rate was 180 respondents out of 209 hospital workers who were directly involved in the outbreak (86%).

Respondents were asked 10 questions regarding universal precautions practices utilized during arid post working hours. Likert scales answers were given from numbers 1, 2 and 3 (1 for always, 2 for sometimes and 3 for never). 10 precautions methods were asked if practiced routinely during the time of outbreak. 8 questions were direct questions, while two of the questions (number 6 and 9) were inverse questions.

Practices found to be done *significantly* by all the staffs include:

- Checking for body temperatures (p=0.039)
- 'Wearing mask during examining patients (p=0.0015)
- 'Work according to policy and guidelines (p=0.023)
- Wearing Personal protective equipments (gloves, gowns, gloves, shoes) when examining or treating patients (p=0.025)
- Lack of supply of Personal protective equipments (p<0.005)

Practices found *not to* be *significant* were:

- Bringing family members to a doctor if they fall ill (p=0.63)
- Washing hands **only after** reviewing or treating patients (p=0.068)
- Bathing and changing to clean new clothes after examining patients (p= 0.577)
- Taking supplements such as Vitamin C (p=0.325)
- Wearing PPE **only when** examining or treating patients (p= 0.190)

These actually reflect adherence to universal precautions as control measure. Practices seen here to be significant, are routine developed universal precautions taken as safety measures against further spread of the SARS virus. Wearing PPE is seen as an important measure against disease infection and for control purposes. However a significantly majority of respondents gave the reason of lack of supply of PPE was a major cause of forgoing this simple universal precaution measure. Most of respondents comply with wearing PPE including mask during treating or examining patients seen during this outbreak and they follow set by the MOH.

Table 4: Staffs Directly lnvolved and Training Given During Outbreak

Training prior involvement	Yes	No	Total
Training on cases management	162	19	185
	87.6%	10.3%	100.0%
Training on transmission of SARS and it's preventions methods	164	12	176
	93.2%	6.8%	100%
Training on proper personal protective equipments (mask, glove, gowns) usage	159	7	166
	95.8%	4.2%	100%
Training on SARS screening, transport and protocol management in the wards	162	5	167
	97.2%	3.0%	100%
Training on utilities and utensils decontamination methods	148	19	167
	88.6%	11.4%	100%
Training on Ministry's guidelines	156	10	166
	94.0%	6.0%	100%

The last section was targeted towards hospital staffs directly involved during the SARS outbreak. In this section, 6 questions on training prior involvement with the patients' management in the clinics or wards were asked. Answers were in the form of yes (score=1) or no (score=2).

- They were asked on;
- Training on cases management
- Training on transmission of SARS and preventions methods
- Training on proper personal protective equipments (mask, glove, gowns) usage
- Training on SARS screening, transport and protocol management in the wards
- Training on utilities and utensils decontamination methods
- Training on Ministry's guidelines.

Response from hospital staffs directly involved during the outbreak was only 185/ 239 (77.4%). The rest of the directly involved group of staffs didn't complete the questionnaire.

Training of hospital staffs in infection control, how transmission occurs and possibility of spread to the staffs or their families was a very real possibility (Alice et al. 2003). During outbreaks, hospital workers are at high risk for nosocomial infections. Many hospital staffs became infected before confirmation of cases and isolation of suspected cases with SARS.

From the table above, we can see that most of the trainings were given to the hospital staffs involved during the outbreak. Training on suspected or confirmed cases management (87.6%), transmission of SARS and it's prevention methods (93.2%), training on proper personal protective equipments (mask, glove, gowns) usage (95.8%), training on SARS screening, transport and protocol management in the wards (97.2%), training on utilities and utensils decontamination methods (88.6%) and training on Ministry's guidelines (94.0%). From the training coverage seen, the proportions of hospital staffs directly involved and given prior training was not 100%. This shows that adequacy on training of staffs on importance of SARS managements was not standardized to all the staffs directly involved with the containment of this deadly highly contagious disease. Spread to hospital staffs and subsequently families/ community were relatively easy had all the suspected cases managed by these hospitals were actual cases of SARS.

CONCLUSION

These data showed lack of training to hospitals staffs that should be corrected and properly elucidated. Further complacency will cause further deteriorations in the control measures of infectious diseases in hospitals and its workers. Policies by top level management and proper training should be facilitated to hospitals staffs in hospitals to prevent secondary spread to communities (Hy A Dwosh et al 2003, Weinstein 2004).

Training of hospital staffs in infection control, methods of transmission and possibility of spread to the staffs or their families was a very real possibility (Alice et al. 2003). During

outbreaks, hospital workers are at high risk for nosocomial infections. Many hospital staffs became infected before confirmation of cases and isolation of suspected cases with SARS (Hy A Dwosh et. al. 2003). The fact that community health personals are lacking in the knowledge of infectious diseases as it is felt as distant from them; further emphasizes the extreme need and urgency on proper maintenance and continuous improvement in training, knowledge, awareness with a state of vigilance.

There are several limitations to this study. The analysis done was based on the assumptions that hospital staffs directly involved with suspected cases, do truly see cases with clinical symptoms or manifestations of SARS like, and thus truly are exposed.

Meanwhile hospital staffs that were not directly involved did not see any suspected cases of SARS. But this fact perceived by the hospital staffs will actually influence their knowledge, perception and attitudes to their infection control measures practiced. The mere fact when the hospital staffs perceived that they were not involved with SARS cases or suspected cases actually, the adherence to infectious control measures and knowledge will deteriorate and reflect their less need to do so. This reflects the significance difference found on the level of SARS knowledge. This is against the fact that rigorous isolation, universal and barrier precautions are an effective means of controlling the spread of disease in the hospital setting (Alice et al. 2003, Hy A Dwosh et al. 2003). The sampling of the hospitals for the study was more of purposive sampling, by right it should have been a multistage with random sampling of different levels of ancillary and professional hospital workers. That would be more reflective of the KAP of hospital staffs of whole state of Selangor.

As professionals, public health staffs and clinicians as hospitals staffs working for the general public health aspects, this increased risk must be met with an extensive ethics issue whether to continue serving the public and further possible exposure or remaining at the background or absenteeism from work (Landers 2004).

SARS has passed but it may recur. The ever changing façade of old or new and deadly diseases like Creutzfeldt-Jakob; Escherichia coli; human immunodeficiency virus; V. cholerae, Tuberculosis, Japanese encephalitis. Avian-flu virus etc. will come and go. Without the effective use of infection control knowledge and practice control of out breaks in hospital setting will be a losing battle.

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