Factors associated with coronavirus disease 2019 (COVID-19) among Thai healthcare personnel with high-risk exposures: The important roles of double masking and physical distancing while eating

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To the Editor—Healthcare personal (HCP) are frontline workers in the coronavirus disease 2019 (COVID-19) pandemic, and they are at high risk of COVID-19. Risk factors for hospital-acquired COVID-19 among HCP include prolonged periods of patient care, performing aerosol-generating procedures, lack of adequate personal protective equipment (PPE), and inadequate compliance to infection prevention and control (IPC) policies.[1,2] HCP can also acquire severe acute respiratory coronavirus virus 2 (SARS-CoV-2) from high-risk contact with other HCP with COVID-19 (eg, eating together) and via community and household exposures. Thus, the level of HCP awareness of and adherence to hospital IPC policy is crucial in preventing hospital-acquired COVID-19. To evaluate factors associated with COVID-19 among HCP with high-risk exposures, we compared the type of exposure, use of PPE, and compliance with the hospital IPC policy among exposed HCP who did and did not acquire COVID-19.

From January 1 to December 31, 2021, a case–control study (1 case per 2 controls) was conducted to investigate risk factors associated with COVID-19 among HCP with high-risk exposures at Thammasat Hospital, Thailand. A case was defined as an HCP with a high-risk exposure to a patient or HCP with COVID-19 and who subsequently had reverse-transcription polymerase chain reaction (RT-PCR)–confirmed COVID-19. Controls were randomly selected from the exposed HCP who did not develop COVID-19. All cases and controls had been tested for SARS-CoV-2 at day 0, day 7, day14 after exposure. The definitions of high-risk exposure and hospital-acquired COVID-19 were modified from the CDC guidelines (Supplementary Appendix online).[3] In this hospital, the IPC policy included double masking (a cloth mask over a medical mask), maintaining physical distance (≥2 m) while dining and when attending hospital activities, and performing hand hygiene according to the World Health Organization Five Moments.[4] Furthermore, use of an N95 respirator, face shield and googles, gloves, and gown were required when performing aerosol-generating procedures.[4] Information collected were derived from the occupational health database included demographics, type of exposure, the use of PPE during exposure, COVID-19 vaccination history, and compliance with the hospital IPC policy. The study outcomes were factors associated with COVID-19 among HCP with high-risk exposures. All analyses were performed using SPSS version 26 software (IBM, Armonk, NY). We used χ^2 tests to compare categorical variables. Independent *t* tests were used for continuous data. All *P* values were 2-tailed, and $P < .05$ was considered statistically significant. A multivariate analysis was conducted to evaluate factors associated with COVID-19 among HCP. Adjusted odd ratios (aORs) and 95% confidence intervals (CIs) were calculated.

During the study period, there were 440 high-risk exposures; 124 HCP had confirmed COVID-19 and 248 uninfected HCP were randomly selected as controls. The median age of infected HCP was 29 years (range, 24–38). Most infected HCP had no comorbidities (Table 1). We did not detect significant differences between the 2 groups in relation to baseline characteristics, working department, or vaccination history (Table 1). Type of exposure, duration of exposure, and PPE use during exposure among cases and control were compared (Table 1). By multivariable analysis, factors associated with COVID-19 included eating at the same nonpartitioned table (aOR, 4.33; 95% CI, 2.44–7.91) or partitioned table (aOR, 3.55; 95% CI, 2.01–6.25) with index cases, face-to-face contact within 2 m of index cases without appropriate PPE (aOR, 2.59; 95% CI, 1.56–4.29), and prolonged duration of exposure to index cases (aOR, 9.44; 95% CI, 6.27–12.61). Conversely, the use of double masks during exposure (aOR, 0.38; 95% CI, 0.20–0.72) was protective against COVID-19.

Our study yielded several important findings. First, eating at the same table with an index case was associated with COVID-19 among exposed HCP. The risk remained unchanged for those using a partitioned table. These findings suggest that preventing transmission of SARS-CoV-2 depends on maintaining an appropriate distance (≥2 m) at the dining table. In addition, HCP usually have lunch or dinner in their working unit, therefore, the ventilation of the dining room is also important, as was shown in a previous study that reported poor ventilation (<1 L/s per person) and air distribution to be associated with COVID-19.[5] Second, the use of double masks during exposure was protective against COVID-19. This finding supports the recommendation of using double masks in Thai healthcare settings.[6,7] However in a Thai multicenter survey, the use of double masks during exposure remained suboptimal among HCP (71.5%), which led to a call for a national policy to support the use of double masks among HCP.[8] Third, prolonged period of patient care has been recognized as a factor associated with COVID-19 among HCP.[9] Prolonged periods of patient care might make it difficult to maintain appropriate PPE compliance. Thus, policies to balance workloads among HCP are needed. Finally, although lack of compliance with several

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Table 1. Comparison of Characteristics of HCP With High-Risk Exposures to COVID-19 Who Did and Did Not Acquire COVID-19

Characteristics	COVID-19 (N = 124)	No COVID-19 (N = 248)	*P* Value
Age, median y (IQR)	29 (24–38)	30 (26–36)	.12
Sex, female, no. (%)	106 (85.5)	196 (79)	.13
Occupation, no. (%)			.62
Physician	13 (10.5)	31 (12.5)	
Nurse and nurse assistant	70 (56.5)	139 (56)	
Others[a]	41 (33)	73 (29.4)	
Comorbidities, no. (%)			
Healthy	107 (86.3)	223 (90.3)	.25
Diabetes mellitus	3 (2.4)	3 (1.2)	.39
Obesity	8 (6.5)	12 (4.9)	.52
Others[b]	17 (13.7)	19 (7.7)	.85
Working department, no. (%)			.46
COVID-19 inpatient department	11 (8.9)	25 (10.1)	
Non COIVD-19 inpatient department	37 (29.8)	102 (41.1)	
Outpatient department	29 (23.4)	50 (20.2)	
Emergency department	9 (7.3)	9 (3.6)	
Others[c]	38 (31.5)	71 (28.6)	
Vaccination history, no. (%)			.22
None	28 (22.6)	38 (15.3)	
1 dose	12 (9.7)	37 (14.9)	
2 doses	70 (56.5)	148 (59.7	
Type of exposure, no. (%)			
Eating at the same nonpartitioned table	38 (30.6)	33 (13.3)	.01
Eating at the same partitioned table	44 (35.5)	58 (23.4)	.01
Sleeping in the same room (both did not wear a mask)	15 (12.1)	36 (14.5)	.52
Working in the same room (both did not wear a mask)	42 (33.9)	105 (42.3)	.12
Face-to-face contact within 2 m without appropriate PPE	57 (46)	82 (33.1)	.02
Contact with body fluids/respiratory secretions without appropriate hand washing	10 (8.1)	17 (6.9)	.67
Performing AGPs without appropriate PPE	24 (19.4)	52 (21)	.72
Duration of exposure, median min (IQR)	15 (15–30)	10 (5–15)	.01
Personal protective equipment used during exposure, no. (%)			
N95 respirator	10 (8.1)	32 (12.9)	.16
Surgical mask	19 (15.3)	56 (22.6)	.10
Double masks (a cloth mask over a medical procedure mask)	14 (11.3)	67 (27)	.01
Face shield or goggles with a surgical mask	10 (8.1)	33 (13.3)	.14

Note. IQR, interquartile range; PPE, personal protective equipment; AGP, aerosol-generating procedure.
[a]Pharmacist or pharmacist assistant, laboratory technician, radiologic technician, medical or nursing practitioner, maid, clerk.
[b]Hypertension, dyslipidemia, asthma, chronic obstructive pulmonary disease, stroke, hyperthyroidism.
[c]Laboratory department, radiology department, operation room, administrative department.

IPC policies showed no significant risk for COVID-19, compliance remained suboptimal.

This study had several limitations. We used a retrospective design, and the relatively small sample size may have limited our ability to identify other factors associated with COVID-19. The nature of a single-center study impairs the generalizability of the results to other settings. We did not include data related to SARS-CoV-2 variants, antibody levels, or other immunological data. Despite these limitations, our findings suggest the need to redefine physical distancing in healthcare dining facilities and to promote good air ventilation and air distribution. Our findings emphasize the need to strictly comply with IPC policy for COVID-19, particularly the use of double masks.

Supplementary material. To view supplementary material for this article, please visit https://doi.org/10.1017/ice.2022.58

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High severe acute respiratory coronavirus virus 2 (SARS-CoV-2) seroconversion rate among geriatric staff from Strasbourg University Hospitals

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To the Editor—The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) emerged in China at the end of 2019 and spread worldwide, leading to the current pandemic. During the first pandemic wave in France, the northeastern region was one of the first and most affected areas. Thus, healthcare workers (HCWs) in the Strasbourg University Hospitals (SUH) were early and intensively exposed to SARS-CoV-2. This exposure varied between hospital departments, notably at the beginning of the pandemic. Some departments were rapidly dedicated to the care of SARS-CoV-2 patients, with earlier implementation and use of personal protective equipment (PPE). In this study, we evaluated SARS-CoV-2 seroprevalence in hospital staff according to department in SUH.

From June 22, 2020, to November 1, 2020, SARS-CoV-2 serology was offered to all hospital staff at SUH. Each participant completed a questionnaire collecting data about their occupational department and the onset of symptoms (ie, type of symptoms and delay expressed in weeks between onset and serum sampling time). Serum samples were tested using an immunochromatographic lateral flow assay (Biosynex COVID-19 BSS, Switzerland, Fribourg) detecting IgM and IgG directed against the receptor binding domain of SARS-CoV-2 spike protein (Supplementary Fig. 1 online). This assay was reported to have overall estimated sensitivity of 93% and clinical specificity of 99%.[1]

Univariable and multivariable analyses were performed using R version 4.0.4 software (R Foundation for Statistical Computing, Vienna, Austria). Statistical significance was set at $P < .05$. Hospital departments were grouped together according to staff exposure risk for multivariable analysis (see Supplementary Material online for statistical analysis detail). This study was approved by the local ethics review committee (record CE-2021-79).

In total, 5,694 HCWs participated in this study. Participant characteristics and serological results of the cohort are presented

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