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The impact of COVID-19 on private and public primary care physicians: A cross-sectional study



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ABSTRACT

Purpose: Primary care physicians (PCP) are at a high risk of contracting COVID-19 as they manage patients with fever or respiratory symptoms, but it is intuitive that private and public practice PCPs may face different challenges during this pandemic. This study compared work- and non-work-related concerns, COVID-19's impact on personal and professional lives, and perceived pandemic preparedness between private and public PCPs in Singapore.

Methods: 216 PCPs who were a registered member of either the National University Polyclinics, National University Health System Primary Care Network or College of Family Physicians Singapore, participated in this online cross-sectional study. The data collection period lasted from 6th March 2020 to 29th March 2020.

Results: A final sample of 172 questionnaires were analysed. Private PCPs tended to be older and more experienced. Perceived COVID-19 exposure and overall preparedness was high in both groups. More private PCPs perceived their exposure risk as unacceptable, aOR = 3.96 (1.07, 14.62); that they should not be caring for COVID-19 patients, aOR = 3.55 (1.23, 10.24); and perceived more stigma against their loved ones, aOR = 4.27 (1.74, 10.44). Private PCPs felt less well-trained, aOR = 0.05 (0.01, 0.23); and supported, aOR = 0.14 (0.03, 0.63).

Conclusions: Private PCPs are more likely to be self-employed or work in smaller practices where COVID-19 infection could mean loss of livelihood. As a healthcare system without primary care is crippled in its ability to manage outbreaks, authorities should respond appropriately to the needs of their general practitioners and family physicians.

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Introduction

In the battle against the COVID-19 pandemic, what is often unseen is the critical role of primary care [1–3]. Patients with respiratory symptoms or fever are still likely to be seen by a primary care physician (PCP), putting these medical professionals at risk of contracting COVID-19 infection as it is difficult to distinguish between COVID-19 from other acute respiratory illnesses with swab testing [3].

However, primary care is not a homogenous sector; models of care around the world range from predominantly publicly funded,

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to privately funded, to hybrids of both [4]. Primary care in Singapore is provided by private practice PCPs who operate their own general practices (GP) or family medicine clinics (FMC), as well as public practice PCPs who staff the government subsidised group practice clinics known as polyclinics. Locally, private practice PCPs account for the vast majority (approximately 79%) of the primary care out-patient demand [5].

Although primary care forms a key line-of-defence during this COVID-19 crisis, it is almost intuitive that private and public PCPs face different challenges. Being small to medium businesses, private PCPs are often not as well-resourced in terms of manpower, medical supplies, and personal protective equipment (PPE) compared to publicly funded healthcare institutions [6–8]. Prior studies on primary care during the H5N1 pandemic in 2009 have also suggested that public PCPs tend to be better trained and prepared for outbreaks than their private practice contemporaries [2,9].

As the pandemic shows no sign of slowing, it is critical that PCPs continue to be supported in their front line role. However, as the challenges faced by private and public PCPs can be considerably different, this study was performed to examine their work- and non-work-related concerns, perceived impact of COVID-19 on personal life and work, and perceived pandemic preparedness among PCPs. In addition, differences in concerns, perceived impact, and level of pandemic preparedness between private and public PCPs were evaluated.

Materials and methods

Ethical approval

This study was approved by the National University of Singapore's Institutional Review Board (Reference Code S-20-071) in accordance with the Declaration of Helsinki. Written informed consent was sought and obtained from all participants.

Study design and setting

A cross-sectional online questionnaire design was utilised for this study. Face-to-face contact between the research team and potential participants was unfeasible as Singapore had implemented Disease Outbreak Response System Condition (DORSCON) “Orange” during the data collection period (6th March 2020 to 29th March 2020). This meant that COVID-19 safe distancing and other outbreak control measures were enforced nationwide. These included the deferment of face-to-face meetings and large-scale events, segregation of organisational workforces into business continuity teams, and suspension of inter-school activities for all students. At this point, hospitals and other clinical institutions also began to segregate care for patients with upper respiratory symptoms and those without, so as to reduce risks of transmission.

Potential participants were recruited via one-stage cluster sampling in three primary care organisations: National University Polyclinics (NUP), National University Health System Primary Care Network (NUHS PCN), and College of Family Physicians Singapore (CFPS). The CFPS is a registered society that provides continued professional development for family medicine physicians in Singapore [10]. NUHS is one of three regional health systems in Singapore. Corresponding with the western region of the country, this regional health system contains a catchment area of approximately 1.1 million residents [11]. The NUP and PCN are constituent organisations that manage public and private primary care clinics respectively within this catchment area [12,13].

Physicians who were either (1) a PCP practicing within a NUP or NUHS PCN clinic, or (2) a CFPS member, and had a registered email address within these respective organisations were eligible for this

study. All physicians within these organisations who met the eligibility criteria were contacted via email invitation. This resulted in a sampling frame of 2,866 email addresses (162 from NUP, 73 from NUHS PCN, and 2,631 from CFPS).

Study measures

The online questionnaire consisted of four self-administered sections. Participants were not able to skip sections or individual items. After providing demographic data, participants responded to three sections on work- (7 items) and non-work-related (8 items) COVID-19 concerns, perceived impact of the outbreak on personal life and work (10 items), and perceived pandemic preparedness (7 items). These items were adapted from studies conducted on healthcare professionals during the H5N1 outbreak [2,14]. Response categories for these items consisted of 4-point Likert-type scales (i.e. strongly disagree, disagree, agree, strongly agree).

Analyses

All analyses were conducted using IBM SPSS Statistics Version 22.0 [15].

PCPs were dichotomised into private (i.e. general practitioners, family medicine clinics, locums) and public (i.e. polyclinics, restructured hospitals) practice. Demographic data was summarised using frequencies and proportions. Responses for each item from the three sections were dichotomised into “agree” (i.e. agree, strongly agree) and “disagree” (i.e. disagree, strongly disagree), and Cronbach's alpha was used to evaluate internal consistency for the items in each section. Chi-square and Fisher's exact tests were used to compare proportions.

Logistic regression was used to present crude odds ratios (OR) between private and public practice PCPs for the items in each section, as well as adjusted odds ratios (aOR) controlling for gender and ethnicity. As collinearity was observed between age and years of medical experience (Spearman correlation coefficient, $\rho = 0.91$), age was also utilised as a covariate for regression analyses involving non-work-related concerns and perceived impact, whereas years of medical experience was used for work-related concerns and perceived pandemic preparedness.

Results

Sample demographics

Two hundred and sixteen PCPs provided consent for this study, a 7.53% response rate (Table 1). Questionnaires were included in the analyses as long as the participant had completed demographics and all items in at least one section (i.e. work-related concerns), leaving a final sample of 172 participants. Most significantly, private PCPs were generally older ($p < 0.01$) and had more years of medical experience ($p = 0.01$); these two demographic variables were found to be collinear ($\rho = 0.91$).

Work- and non-work-related concerns

The majority of PCPs in both groups agreed that they were at high risk of COVID-19 exposure (89.3% private vs. 87.0% public), but accepted that this risk was part of their profession (90.3% private vs. 87.0% public) (Table 2). However, private PCPs were more likely to agree that they should not be caring for COVID-19 patients (19.4% private vs. 7.2% public), aOR = 3.55 (95% CI = 1.23, 10.24). More private PCPs also felt that their COVID-19 exposure risk was unacceptable (13.6% private vs. 4.3% public), aOR = 3.96 (95% CI =

Table 1
Summary of sample demographics.

	Private PCP (n = 103)	Public PCP (n = 69)	χ^2	p
Gender, male (%)	59 (57.3)	30 (43.5)	3.15	0.07
Age range, n (%)				
20–29 years	5 (4.9)	12 (17.4)		
30–39 years	35 (34.0)	31 (44.9)		
40–49 years	25 (24.3)	22 (31.9)		
50 years and above	38 (36.9)	4 (5.8)	25.10	<0.01
Ethnicity, n (%)				
Chinese	86 (83.5)	54 (78.3)		
Malay	1 (1.0)	2 (2.9)		
Indian	7 (6.8)	12 (17.4)		
Others	9 (8.7)	1 (1.4)	8.92*	0.02
Marital status, n (%)				
Single	17 (16.5)	10 (14.5)		
Married	83 (79.6)	58 (84.1)		
Divorced	3 (2.9)	1 (1.4)		
Widowed	1 (1.0)	0 (0.0)	1.16*	0.90
Years of medical experience, n (%)				
10 years or fewer	33 (32.0)	35 (50.7)		
More than 10 years	70 (68.0)	34 (49.3)	6.04	0.01

* Fisher's exact test was used due to small expected cell counts.

Table 2
Work- and non-work-related concerns.

	Private PCP (n = 103)	Public PCP (n = 69)	OR (95% CI)	aOR* (95% CI)
Work-related concerns, agree (%)				
My job would put me at great exposure risk	92 (89.3)	60 (87.0)	1.26 (0.49, 3.21)	1.30 (0.49, 3.42)
I am afraid of falling ill with COVID-19	70 (68.0)	50 (72.5)	0.81 (0.41, 1.58)	0.83 (0.40, 1.72)
I should not be looking after COVID-19 patients	20 (19.4)	5 (7.2)	3.08 (1.10, 8.66)	3.55 (1.23, 10.24)
The risk I am exposed to is not acceptable	14 (13.6)	3 (4.3)	3.46 (0.96, 12.53)	3.96 (1.07, 14.64)
I accept that the risk of contracting COVID-19 is part of my job	93 (90.3)	60 (87.0)	1.40 (0.54, 3.63)	1.39 (0.52, 3.74)
I might look for another job because of the risks	11 (10.7)	1 (1.4)	8.13 (1.03, 64.50)	12.05 (1.44, 100.82)
It is acceptable if my colleagues resign because of their fears	57 (55.3)	36 (52.2)	1.14 (0.62, 2.09)	0.74 (0.58, 2.14)
Non-work-related concerns, agree (%)				
People close to me would be at high risk of getting COVID-19 because of my job	77 (74.8)	48 (70.6)	1.23 (0.62, 2.45)	1.12 (0.55, 2.28)
In particular, I would be concerned for my spouse/partner	82 (79.6)	53 (77.9)	1.11 (0.52, 2.33)	0.96 (0.44, 2.08)
In particular, I would be concerned for my parents	79 (76.7)	52 (76.5)	1.01 (0.49, 2.09)	0.98 (0.46, 2.09)
In particular, I would be concerned for my children	80 (77.7)	50 (73.5)	1.25 (0.62, 2.55)	1.29 (0.62, 2.69)
In particular, I would be concerned for my close friends	59 (57.3)	37 (54.4)	1.12 (0.61, 2.08)	1.07 (0.56, 2.06)
In particular, I would be concerned for my work colleagues	76 (73.8)	50 (73.5)	1.01 (0.51, 2.03)	1.22 (0.58, 2.56)
People close to me would be worried for my health	80 (77.7)	60 (88.2)	0.46 (0.19, 1.11)	0.42 (0.17, 1.05)
People close to me would be worried as they may get infected by me	71 (68.9)	49 (72.1)	0.86 (0.44, 1.69)	0.79 (0.39, 1.60)

Cronbach's alpha for all items = 0.88 (Private PCP); 0.85 (Public PCP).

Frequencies may not add up to total study sample size due to missing data.

* Public PCP used as reference group; adjusted for gender, ethnicity (dichotomised as "Chinese", "non-Chinese"), and years of medical experience (for work-related concerns) or age (dichotomised as "39 years and below", "40 years and above"; for non-work-related concerns).

1.07, 14.62). Lastly, more private PCPs agreed that they would consider looking for another job because of the risks (10.7% private vs. 1.4% public), aOR = 12.05 (95% CI = 1.44, 100.82). There were no significant differences in non-work-related concerns between private and public PCPs.

Perceived impact of the outbreak on personal life and work

Over two-thirds of PCPs in both groups responded equally that they would be more stressed at work (73.0% private vs. 72.7% public) and have to perform work not normally done by them (70.0% private vs. 71.2% public) (Table 3). Compared to public PCPs, more private PCPs felt that people would avoid their family members because of their profession (33.0% private vs. 12.1% public), aOR = 4.27 (95% CI = 1.74, 10.44).

Perceived pandemic preparedness

Agreement was high (72.3%–96.8%) for most items in this section in both groups, except that private PCPs were less likely to receive training for infection control at the workplace (63.0% private vs. 96.9% public), aOR = 0.05 (95% CI = 0.01, 0.23) (Table 4). Private PCPs were significantly less likely to agree that they had a source of advice for the use of PPE [(79.0% private vs. 96.9% public), aOR = 0.14 (95% CI = 0.03, 0.63)], and were less confident that their workplaces were prepared [78.0% private vs. 90.8% public, aOR = 0.35 (95% CI = 0.13, 0.97)] or had a preparedness plan [(75.0% private vs. 93.8% public), aOR = 0.21 (95% CI = 0.07, 0.66)] for the COVID-19 outbreak. Nonetheless, more private PCPs felt that supplies of PPE in their workplace were sufficient (88.0% private vs. 72.3% public), aOR = 2.81 (95% CI = 1.21, 6.53).

Table 3
Perceived impact of the outbreak on personal life and work.

	Private PCP (n = 100)	Public PCP (n = 66)	OR (95% CI)	aOR* (95% CI)
I would be afraid of telling my family about the risks I am exposed to	20 (20.0)	16 (24.2)	0.78 (0.37, 1.65)	0.75 (0.34, 1.67)
People would avoid me because of my job	43 (43.0)	20 (30.3)	1.74 (0.90, 3.35)	1.73 (0.87, 3.44)
People would avoid my family members because of my job	33 (33.0)	8 (12.1)	3.57 (1.53, 8.34)	4.27 (1.74, 10.44)
I would avoid telling other people about the nature of my job	14 (14.0)	18 (27.3)	0.43 (0.20, 0.95)	0.49 (0.22, 1.10)
There would be adequate staff at my workplace to handle the increased demand	42 (42.0)	32 (48.5)	0.77 (0.41, 1.44)	0.67 (0.35, 1.30)
There would be more conflict amongst colleagues at work	31 (31.0)	17 (25.8)	1.30 (0.65, 2.60)	1.19 (0.57, 2.49)
I would feel more stressed at work	73 (73.0)	48 (72.7)	1.01 (0.50, 2.04)	1.02 (0.49, 2.12)
I would have an increase in workload	64 (64.0)	47 (71.2)	0.72 (0.37, 1.41)	0.72 (0.36, 1.45)
I would have to work overtime	45 (45.0)	35 (53.8)	0.70 (0.38, 1.31)	0.70 (0.36, 1.35)
I would have to do work not normally done by me	70 (70.0)	47 (71.2)	0.94 (0.48, 1.87)	0.94 (0.46, 1.91)

Cronbach's alpha for all items = 0.79 (Private PCP); 0.79 (Public PCP).

Frequencies may not add up to total study sample size due to missing data.

* Public PCP used as reference group; adjusted for gender, ethnicity (dichotomised as "Chinese", "non-Chinese"), and age (dichotomised as "39 years and below", "40 years and above").

Table 4
Perceived pandemic preparedness.

	Private PCP (n = 100)	Public PCP (n = 65)	OR (95% CI)	aOR* (95% CI)
I have received training for infection control at my workplace	63 (63.0)	63 (96.9)	0.05 (0.01, 0.23)	0.05 (0.01, 0.23)
I have received adequate personal protective equipment training	85 (85.9)	59 (90.8)	0.62 (0.22, 1.70)	0.60 (0.21, 1.72)
I have someone to turn to if unsure of the use of personal protective equipment	79 (79.0)	63 (96.9)	0.12 (0.03, 0.53)	0.14 (0.03, 0.63)
My workplace has a preparedness plan for a COVID-19 outbreak	75 (75.0)	61 (93.8)	0.20 (0.07, 0.60)	0.21 (0.07, 0.66)
My workplace is prepared for a COVID-19 outbreak	78 (78.0)	59 (90.8)	0.36 (0.14, 0.95)	0.35 (0.13, 0.97)
I am personally prepared for a COVID-19 outbreak	89 (89.0)	57 (87.7)	1.14 (0.43, 2.99)	0.96 (0.35, 2.63)
The is sufficient supply of personal protective equipment for use in my workplace	88 (88.0)	47 (72.3)	2.81 (1.25, 6.32)	2.81 (1.21, 6.53)

Cronbach's alpha for all items = 0.87 (Private PCP); 0.87 (Public PCP).

Frequencies may not add up to total study sample size due to missing data.

* Public PCP used as reference group; adjusted for gender, ethnicity (dichotomised as "Chinese", "non-Chinese"), and years of medical experience.

Discussion

The present study examined and compared COVID-19 concerns, impact, and pandemic preparedness between private and public PCPs. While each country's primary care model is unique, our findings here cover common themes that may have significant implications for other healthcare systems around the world.

Concerns faced by our private PCPs would likely be similar to that faced by GPs and family medicine physicians all over the world as they continue to combat the pandemic. A significantly higher proportion of private PCPs expressed concerns in having to manage COVID-19 patients and – in the face of unacceptable infection risk – could consider looking for another job. These concerns are likely to be even higher among GPs in other countries, where concerns over the adequacy of PPE supplies and deaths within the front line medical community have been reported [16,17], compared to our study in which over 88% of private PCPs felt that their supply of PPE was sufficient (at least at the time of data collection).

On the other hand, public PCPs working in government supported institutions accepted the associated risks related to potential exposure to COVID-19 patients. This finding could have been influenced by various factors. Firstly, the support rendered to private and public PCPs could be vastly different. For example, while the World Health Organization (WHO) has recognised the mental health burden on healthcare professionals and the need for institutions to provide psychological help for their staff, this is intuitively more difficult to facilitate among a diverse group of private PCPs [18,19]. Private PCPs in our sample were also generally older than public PCPs, and hence would have been working since the Severe Acute Respiratory Syndrome (SARS; where 54% of infected cases were healthcare workers) and H5N1 pandemics [20]. As much less information on COVID-19 was available during the data collection period (at an earlier stage of the pandemic), the fear of mortality or permanent disability from contracting COVID-19 could have evoked vivid memories of the SARS and H5N1 experience among the older private PCPs.

In addition, private PCPs are often self-employed and their absence from work as a result of contracting COVID-19 could be detrimental to their livelihoods. This has been reflected locally and in other healthcare systems, where private GPs have also suffered a tremendous loss in revenue as patients deferred primary care visits to reduce risk of COVID-19 transmission [8,21]. Perhaps a possible suggestion to health authorities in the post-pandemic era is to consider implementing policies to support PCPs financially should they fall ill in the line of duty during a public health crisis. Much like an insurance policy, this could help instil more confidence in the private primary care sector to continue their essential services without the fear of losing their main source of income.

Moreover, the important role of governmental support for both private and public PCPs in pandemics is apparent from our findings. Despite differences between the two groups, overall perceptions of pandemic preparedness were relatively high within the sample. This could be due in part to the Public Health Preparedness Clinic (PHPC) scheme, an opt-in national programme that provides participating private PCPs additional infection control training and supply of PPE when activated during a public health emergency [22]. Regardless, without information, guidelines and resources from health authorities, PCPs may feel isolated and unassisted in performing their crucial roles; a fact that has been made clear elsewhere [6,23].

Limitations of the study

As a cross-sectional online survey conducted at the onset of COVID-19 response measures in Singapore, our study has several limitations. Firstly, the low response rates could have resulted in selection bias. PCPs who were able to respond to the survey could have differing opinions from those unable to do so due to various reasons, stemming from varying constraints due to clinical schedules and personal preferences. Secondly, the cross-sectional nature of the study means that perspectives could have changed

since the data was collected, especially given rapid developments in the global COVID-19 situation. It would be interesting to understand how PCPs' concerns and preparedness levels evolve over time, and whether observable differences between private and public PCPs persist after national COVID-19 initiatives are implemented.

Conclusions

Nonetheless, this study represents a novel attempt to understand the concerns and preparedness of the primary care community towards COVID-19 as they continue to serve on the front lines. We have highlighted that private practice PCPs are impacted differently, and face separate challenges, compared to their public practice counterparts. As any healthcare system's ability to manage infectious disease outbreaks will undoubtedly be crippled without an effective primary care sector, we urge health authorities to carefully consider and respond appropriately to the needs of their private GPs and public PCPs.

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Ethics approval

This study was approved by the National University of Singapore's Institutional Review Board (Reference Code S-20-071) in accordance with the Declaration of Helsinki. Written informed consent was sought and obtained from all participants.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare no financial, general or institutional competing interests.

CRediT authorship contribution statement

Jerrald Lau: Conceptualization, Methodology, Formal analysis, Writing - original draft, Writing - review & editing. **David Hsien-Yung Tan:** Conceptualization, Methodology, Writing - review & editing. **Gretel Jianlin Wong:** Methodology, Formal analysis, Writing - review & editing. **Yii-Jen Lew:** Conceptualization, Writing - review & editing. **Ying-Xian Chua:** Conceptualization, Writing - review & editing. **Lian-Leng Low:** Methodology, Writing - review & editing. **Gerald Choon-Huat Koh:** Methodology, Writing - review & editing. **Thiam-Soo Kwek:** Methodology, Writing - review & editing. **Sue-Anne Ee-Shiow Toh:** Conceptualization, Writing - review

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