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Confidence in managing human monkeypox cases in Asia: A cross-sectional survey among general practitioners in Indonesia

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ABSTRACT

The current re-emergence of human monkeypox (HMPX) is a global concern for endemic and non-endemic countries, but healthcare workers in some regions, like Asia, have less experience with identifying and treating HMPX cases. This study aimed to assess the confidence and its predictors in HMPX case management among general practitioners (GPs), the frontline doctors in Indonesia, and to explore their perspectives on HMPX. Between May and July 2019, GPs in Indonesia completed an online-based survey. The questionnaire collected information on GPs' confidence, perspective, sociodemographic, workplace and professional characteristics, exposure to HMPX information and knowledge on HMPX. A logistic regression analysis was employed to explore the explanatory variables influencing the confidence and the perspective. We included 395 GPs in our analysis (77.4% out of 510 responses received) of which 10.1% and 34.9% were classified having good confidence using an 80% and 70% cut-off for confidence score, respectively. In the adjusted analysis, receiving information about HMPX during medical training was the only variable significantly associated with good confidence (adjusted odds ratio 2.74, 95% confidence interval 1.57 to 4.78 and $p < 0.001$). Approximately 73.6% and 77.9% of GPs agreed that HMPX is an important infectious disease and it has potential to detrimentally impact the Indonesian economy, respectively. In addition, 88.8% of GPs suggested that the disease should be incorporated into the National Medical Curriculum of Indonesia. In conclusion, in case of HMPX outbreak, majority of the GPs in

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Indonesia seem to be less confident in diagnosing and treating cases, using their current knowledge, skills and their workplace facilities. Therefore, a systematic strategy to improve their confidence in managing HMPX is required.

1. Introduction

Human monkeypox (HMPX), caused by the monkeypox virus (MPXV) which belongs to the *Orthopoxvirus* genus, is a zoonotic infection and is characterized by smallpox-like signs and symptoms with a lower case fatality (Beer and Rao, 2019). The similarities with smallpox include timing of symptom onset, rash distribution, and timing of rash occurrence (Petersen et al., 2019b; WHO, 2017, 2018). Since the first HMPX case was reported in the Democratic Republic of the Congo in 1970, several outbreaks and sporadic cases have been reported in west and central African countries (Beer and Rao, 2019). The number of HMPX cases has increased significantly over the past two decades (Durski et al., 2018; Petersen et al., 2019b) and it is now considered the most important *Orthopoxvirus* from a public health perspective because of this increase in cases (Yinka-Ogunleye et al., 2019). Recent HMPX outbreaks were reported in Republic of Congo, the Democratic Republic of the Congo, Central African Republic, Liberia, Nigeria and Cameroon (Beer and Rao, 2019; Ogoina et al., 2019; Yinka-Ogunleye et al., 2019). In the 2017–2018 outbreak in Nigeria, after not being reported for over 20 years, the case fatality rate was 6% (Yinka-Ogunleye et al., 2019). Imported HMPX cases also have been reported in the United States (Reed et al., 2004; Sejvar et al., 2004), the UK (Vaughan et al., 2018), and Israel (Erez et al., 2019). In Asia, the first confirmed HMPX case was reported in Singapore in May 2019; the patient was a Nigerian man who attended a workshop in Singapore (Ng et al., 2019). The emergence of HMPX in different locations throughout the world indicates that this is a problem of global importance.

A recent systematic review suggests that the secondary attack rate may be as high as 10% in unvaccinated contacts (Beer and Rao, 2019). This indicates that there is the potential for human-to-human transmission of MPXV in healthcare facilities between cases and either other patients or healthcare workers (HCWs). Healthcare centers are one important source of MPXV transmission. Healthcare-related transmission have been reported in many countries in Republic of the Congo (Learned et al., 2005), Central African Republic (Nakoune et al., 2017), Nigeria (Yinka-Ogunleye et al., 2019), and the Democratic Republic of the Congo (Petersen et al., 2019a). There is approximately 1% HCWs have been infected for every 100 HMPX cases (Beer and Rao, 2019; Petersen et al., 2019a).

A previous study in an Asian country, Indonesia, found that the knowledge of HMPX among general practitioners (GPs) is very low and approximately only 10% of them had a good knowledge (Harapan et al., 2020). Some reasons have been proposed to explain this low level of knowledge: (a) no HMPX cases have been reported in Indonesia; and (b) the disease is not required to be taught in medical schools in the country according to the Indonesian Standard of Medical Doctor Competency (*Standar Kompetensi Dokter Indonesia,* [SKDI]) (Indonesian Medical Council, 2006).

The current re-emergence of HMPX requires not only a prevention strategy but also early detection, quick response and proper management from frontline HCWs in the region. HCWs should be knowledgeable about the clinical symptoms of HMPX to be able to quickly identify, report, and manage the new cases to prevent outbreak. With very rare cases and relatively new disease in the region (Ng et al., 2019) and lack of knowledge of HMPX (Harapan et al., 2020), frontline HCWs might have no confidence managing the cases if a HMPX outbreak occurred. This problem has been shown for other emerging infectious diseases; in Taiwan, for example, more than 70% of nurses expressed a lack of confidence being involved in managing severe acute respiratory syndrome (Hsu et al., 2006). The present study was undertaken to assess GPs' confidence in one of the Asian countries, Indonesia, in facing HMPX cases based on their current knowledge, skills and their workplace facilities. In addition, this study also sought to assess their perspective on HMPX.

2. Methods

2.1. Study design, setting and participants

Following the design and setting of previous studies (Harapan et al., 2017a; Harapan et al., 2018a; Harapan et al., 2019), an online cross-sectional study was conducted in Indonesia between 25 May 2019 and 25 July 2019. The population was all registered GPs. In Indonesia, a GP is awarded after a course of six years and a clinical internship in medical schools. Afterwards, GPs are eligible to complete non-clinical higher degrees (i.e. master's and doctoral degrees) or enroll in residency programs to become a specialist doctor. GPs completing the non-clinical degrees are still considered GPs, whereas GPs completing residency training are considered specialists and not GPs. GPs are the frontline HCWs in Indonesia. They are responsible for the diagnosis, treatment, and prevention of a wide range of diseases. Citizens must first visit with a GP at a community health center before being able to be referred to a higher-level hospital (Harapan et al., 2018b; Yufika et al., 2020). Because no similar study had been conducted, to calculate the sample size it was assumed that 50% GPs would have good confidence. There are 50,198 GPs in Indonesia in 2019; and using a confidence interval of 95% and a 5% margin of error, 382 respondents were required as minimum sample size. To recruit study participants, using a convenience sampling method, the invitations to complete the survey were distributed to the social media platform (WhatsApp, Facebook and Instagram) and sent by email to the members of doctor groups or organizations (Indonesian Medical Association and Indonesian General Practitioner Association). The survey was made using Survey Monkey. Up to two reminders were sent after the initial message. No randomization was conducted. Before participating, the candidates were provided with information on the aims of the study, its expected benefits, the study team members and contact details of the principal investigator. They also informed that they could exit the survey at any point. Those who agreed to participate were asked to provided their consent to participate. The survey was estimated to take approximately 7–10 min to be completed.

2.2. Study instrument and variables

A questionnaire was designed and developed to assess the GPs' self-confidence as well as their perspective on HMPX. The questionnaire covered a vary explanatory variables such as sociodemographic data, workplace characteristics, medical professional characteristics, exposure to HMPX information and knowledge on HMPX. The content of the questionnaire was evaluated by a committee consisting two medical microbiologists and a family medicine doctor. A pilot study was conducted among fifteen GPs and corrections were made accordingly.

2.3. Measures

2.3.1. Response variables

The main dependent variable in this study was GPs' self-confidence to diagnose and treat the HMPX cases based on their current knowledge, their current skills and the current facilities of their workplace. To ascertain the confidence, participants were asked three questions: (a)

"*Are you confident to diagnose monkeypox cases based on your current knowledge and skills?*"; (b) "*Are you confident to diagnose monkeypox cases based on the ability of your current facility to do diagnostic test?*"; and (c) "*Are you confident to manage monkeypox cases, if any, based on your current knowledge and skills*?" The possible responses were "yes" or "no" in which the "yes" response was given a score of one while "no" response was given score of zero. The score of each question were summed into a single scale ranging from 0 to 3, in which higher scores indicate better confidence. This scoring system has been used previously (Harapan et al., 2017a; Harapan et al., 2018a; Harapan et al., 2018b; Harapan et al., 2019).

In addition, respondents were also asked their perspectives on HMPX, including: (a) whether HMPX is an important disease in Indonesia; (b) whether HMPX could detrimentally impact the national economy of Indonesia; (c) whether the government should provide trainings on HMPX to HCWs; and (d) whether HMPX should be included in the National Medical Curriculum in Indonesia.

2.3.2. Explanatory variables

a Sociodemographic data

Sociodemographic data of the participants such as gender, age, educational attainment, type of job, current location, and monthly income were collected. Age was grouped into those 30-years-old or younger and older than 30-years old to make ages comparable to previous work (Harapan et al., 2018a; Harapan et al., 2019). Educational attainment was dichotomized into GP and GP with master or doctorate degree while type of job was divided into GP and GP with residency.

The current location of participants was initially divided into the

Table 1
Unadjusted and adjusted logistic regression analysis showing predictors of confidence facing on human monkeypox infection among general practitioners in Indonesia (good confident *vs.* poor confident using a 70% cut-off) (n = 395)

Variable	*n* (%)	Good confidence *n* (%)	Univariate OR (95% CI)	Multivariate *P*–value	OR (95% CI)	*P*–value
Location of alma mater university						
Java	55 (13.9)	20 (36.4)	1.08 (0.59, 1.95)	0.811		
Sumatra or others *(R)*	340 (86.1)	118 (34.7)	1			
Current workplace location						
Central and eastern of Indonesia	119 (30.1)	43 (36.1)	1.08 (0.69, 1.69)	0.743		
Western of Indonesia *(R)*	276 (69.9)	95 (34.4)	1			
Gender						
Male	125 (31.6)	44 (35.2)	1.02 (0.65, 1.59)	0.940		
Female *(R)*	270 (68.4)	94 (34.8)	1			
Age group						
30-years or younger	275 (69.9)	94 (34.2)	0.90 (0.57, 1.40)	0.634		
>30-years *(R)*	120 (30.4)	44 (36.7)	1			
Education						
GP *(R)*	376 (95.2)	133 (35.4)	1			
GP with master's or doctoral degree	19 (4.8)	5 (26.3)	0.65 (0.23, 1.85)	0.422		
Monthly income (IDR)						
<5 million *(R)*	205 (51.9)	66 (32.2)	1		1	
≥5 million	190 (48.1)	72 (37.9)	1.29 (0.85, 1.95)	0.236	1.16 (0.72, 1.89)	0.545
Type of job						
GP *(R)*	343 (86.8)	123 (35.9)	1			
GP and residency	52 (13.2)	15 (28.8)	0.73 (0.38, 1.37)	0.324		
Type of workplace						
Community health center *(R)*	100 (25.3)	38 (38.0)	1		1	
Private clinic	86 (21.8)	34 (39.5)	1.07 (0.59, 1.93)	0.830	1.36 (0.69, 2.69)	0.370
Private hospital	66 (16.7)	19 (28.8)	0.66 (0.34, 1.29)	0.222	0.88 (0.38, 2.02)	0.759
Public hospital	143 (36.2)	47 (32.9)	0.80 (0.47, 1.36)	0.409	1.12 (0.55, 2.29)	0.764
Location of workplace						
District *(R)*	124 (31.4)	49 (39.5)	1		1	
Regency	150 (38.0)	49 (32.7)	0.74 (0.45, 1.22)	0.240	0.78 (0.41, 1.47)	0.439
Province	121 (30.6)	40 (33.1)	0.76 (0.45, 1.28)	0.294	0.68 (0.35, 1.33)	0.257
Attended province-level conference						
No *(R)*	135 (34.2)	39 (28.9)	1		1	
Yes	260 (65.8)	99 (38.1)	1.51 (0.97, 2.37)	0.070	1.29 (0.78, 2.14)	0.330
Attended national-level conference						
No *(R)*	253 (64.1)	78 (30.8)	1		1	
Yes	142 (35.9)	60 (42.3)	1.64 (1.07, 2.52)	0.023	1.38 (0.85, 2.25)	0.191
Attended international-level conference						
No *(R)*	378 (95.7)	134 (35.4)	1			
Yes	17 (4.3)	4 (23.5)	0.56 (0.18, 1.75)	0.319		
Medical practice experience (years)						
Internship *(R)*	76 (19.2)	20 (26.3)	1		1	
1–2 years	159 (40.3)	55 (34.6)	1.48 (0.81, 2.72)	0.204	1.32 (0.67, 2.57)	0.421
3–4 years	55 (13.9)	23 (41.8)	2.01 (0.96, 4.22)	0.064	1.76 (0.76, 4.08)	0.186
5–10 years	83 (21.0)	29 (34.9)	1.50 (0.76, 2.97)	0.241	1.26 (0.57, 2.78)	0.568
>10 years	22 (5.6)	11 (50.0)	2.80 (1.05, 7.46)	0.039	2.15 (0.70, 6.61)	0.183
Had you ever received information of human monkeypox during medical education						
Never *(R)*	328 (83.0)	100 (30.5)	1		1	
Yes	67 (17.0)	38 (56.7)	2.99 (1.75, 5.11)	<0.001	2.74 (1.57, 4.78)	<0.001
Had ever heard about human monkeypox before						
Never *(R)*	32 (8.1)	6 (18.8)	1		1	
Yes	363 (91.9)	132 (36.4)	2.48 (0.99, 6.17)	0.052	2.32 (0.91, 5.92)	0.078
Knowledge on monkeypox						
Poor *(R)*	358 (90.6)	126 (35.2)	1			
Good	37 (9.4)	12 (32.4)	0.88 (0.43, 1.82)	0.737		

western, central and eastern part of Indonesia. Due to the low number of GPs in the eastern part, we combined the eastern and central regions together. Individual monthly income was measured by asking the participants to choose the closest amount of money from a provided list in Indonesian Rupiah (IDR) and then dichotomized to less than IDR 5 million (equivalent to less than US$ 356.3, using a November 2019 exchange rate) and IDR 5 million or more (US$ 356.3 or more).

b Workplace characteristics

In this domain, the participants were asked about the type and location of the workplace. Type of workplace was divided into community health center (known as *Pusat Kesehatan Masyarakat* [*Puskesmas*]), private clinic, private hospital and public hospital. The location of workplace was divided into district, regency and province, which can be classified as rural, sub-urban or urban setting.

c Professional characteristics

The participants were asked their alma mater and the length of

Table 2
Unadjusted logistic regression analysis showing predictors of perspective on human monkeypox infection among general practitioners in Indonesia (agree *vs.* disagree) (n = 395)

Variable	Question 1 Agree (%)	OR (95% CI)	Question 2 Agree (%)	Agree (%)	Question 3 Agree (%)	OR (95% CI)	Question 4 Agree (%)	OR (95% CI)
Location of Alma Mater University								
Java	34 (61.8)	0.52 (0.29, 0.95) *	36 (65.5)	0.47 (0.26, 0.88) *	52 (94.5)	0.21 (0.05, 0.95) *	45 (81.8)	0.50 (0.23, 1.08)
Sumatra and others (*R*)	257 (75.6)	1	272 (80.0)	1	336 (98.8)	1	306 (90.0)	1
Location								
Central and Eastern Indonesia	75 (63.0)	0.47 (0.30, 0.76) *	85 (71.4)	0.59 (0.36, 0.98) *	114 (95.8)	0.17 (0.03, 0.87) *	101 (84.9)	0.58 (0.31, 1.11)
Western Indonesia (*R*)	216 (78.3)	1	223 (80.8)	1	274 (99.3)	1	250 (90.6)	1
Gender								
Male	80 (64.0)	0.50 (0.31, 0.79) *	96 (76.8)	0.91 (0.55, 1.50)	120 (96.0)	0.18 (0.03, 0.94) *	107 (85.6)	0.63 (0.33, 1.20)
Female (*R*)	211 (78.1)	1	212 (78.5)	1	268 (99.3)	1	244 (90.4)	1
Age group								
≤30-years or less	197 (71.6)	0.70 (0.42, 1.16)	216 (78.5)	1.11 (0.67, 1.86)	270 (98.2)	0.92 (0.18, 4.79)	239 (86.9)	0.47 (0.21, 1.05)
>30-years (*R*)	94 (78.3)	1	92 (76.7)	1	118 (98.3)	1	112 (93.3)	1
Education								
General practitioner (GP) (*R*)	278 (73.9)	1	294 (78.2)	1	370 (98.4)	1	336 (89.4)	1
GP with master's or doctoral degree	13 (68.4)	0.76 (0.28, 2.07)	14 (73.7)	0.78 (0.27, 2.23)	18 (94.7)	0.29 (0.03, 2.56)	15 (78.9)	0.45 (0.14, 1.41)
Monthly income (IDR)								
<5 Million (*R*)	164 (80.0)	1	164 (80.0)	1	200 (97.6)	1	185 (90.2)	1
≥5 Million	127 (66.8)	0.50 (0.32, 0.80) *	144 (75.8)	0.78 (0.49, 1.26)	188 (98.9)	2.35 (0.45, 12.26)	166 (87.4)	0.75 (0.40, 1.40)
Type of job								
GP (*R*)	251 (73.2)	1	267 (77.8)	1	339 (98.8)	1	304 (88.6)	1
Residency	40 (76.9)	1.22 (0.61, 2.43)	41 (78.8)	1.06 (0.52, 2.16)	49 (94.2)	0.19 (0.04, 0.89) *	47 (90.4)	1.21 (0.45, 3.21)
Faculty								
No (GP and non-university staff (*R*)	278 (73.4)	1	297 (78.4)	1	373 (98.4)	1	338 (89.2)	1
Yes (GP and university staff)	13 (81.3)	1.57 (0.44, 5.64)	11 (68.8)	0.61 (0.21, 1.80)	15 (93.8)	0.24 (0.03, 2.13)	13 (81.3)	0.53 (0.14, 1.92)
Type of workplace								
Community health center (*R*)	76 (76.0)	1	82 (82.0)	1	99 (99.0)	1	92 (92.0)	1
Private clinic	59 (68.6)	0.69 (0.36, 1.32)	57 (66.3)	0.43 (0.22, 0.85) *	84 (97.7)	0.42 (0.04, 4.76)	79 (91.9)	0.98 (0.34, 2.83)
Private hospital	45 (68.2)	0.68 (0.34, 1.35)	52 (78.8)	0.82 (0.37, 1.78)	64 (97.0)	0.32 (0.03, 3.64)	52 (78.8)	0.32 (0.13, 0.82) *
Public hospital	111 (77.6)	1.10 (0.60, 2.01)	117 (81.8)	0.99 (0.51, 1.92)	141 (98.6)	0.71 (0.06, 7.96)	128 (89.5)	0.74 (0.30, 1.82)
Location of workplace								
District (*R*)	94 (75.8)	1	96 (77.4)	1	124 (100.0)	1	116 (93.5)	1
Regency	112 (74.7)	0.94 (0.54, 1.63)	126 (84.0)	1.53 (0.84, 2.81)	147 (98.0)	0.00 (0.00, 0.00)	133 (88.7)	0.54 (0.23, 1.30)
Province	85 (70.2)	0.75 (0.43, 1.33)	86 (71.1)	0.72 (0.40, 1.28)	117 (96.7)	0.00 (0.00, 0.00)	102 (84.3)	0.37 (0.16, 0.88) *
Attended province-level conference								
No (*R*)	98 (72.6)	1	98 (72.6)	1	132 (97.8)	1	118 (87.4)	1
Yes	193 (74.2)	1.09 (0.68, 1.74)	210 (80.8)	1.59 (0.97, 2.58)	256 (98.5)	1.46 (0.32, 6.60)	233 (89.6)	1.24 (0.65, 2.37)
Attended national-level conference								
No (*R*)	187 (73.9)	1	195 (77.1)	1	248 (98.0)	1	224 (88.5)	1
Yes	104 (73.2)	0.97 (0.61, 1.54)	113 (79.6)	1.16 (0.70, 1.92)	140 (98.6)	1.41 (0.27, 7.37)	127 (89.4)	1.10 (0.57, 2.12)
Attended international-level conference								
No (*R*)	277 (73.3)	1	293 (77.5)	1	373 (98.7)	1	336 (88.9)	1
Yes	1 4 (82.4)	1.70 (0.48, 6.04)	15 (88.2)	2.18 (0.49, 9.70)	15 (88.2)	0.10 (0.02, 0.56) *	15 (88.2)	0.94 (0.21, 4.24)
Medical practice experience (years)								
Internship (*R*)	56 (73.7)	1	59 (77.6)	1	76 (100.0)	1	63 (82.9)	1
1, 2 year	119 (74.8)	1.06 (0.57, 1.98)	127 (79.9)	1.14 (0.59, 2.22)	157 (98.7)	0.00 (0.00, 0.00)	145 (91.2)	2.14 (0.95, 4.81)
3, 4 year	36 (65.5)	0.68 (0.32, 1.44)	43 (78.2)	1.03 (0.45, 2.38)	53 (96.4)	0.00 (0.00, 0.00)	45 (81.8)	0.93 (0.37, 2.30)
5, 10 year	64 (77.1)	1.20 (0.58, 2.48)	65 (78.3)	1.04 (0.49, 2.20)	81 (97.6)	0.00 (0.00, 0.00)	78 (94.0)	3.22 (1.09, 9.51)
>10 year	16 (72.7)	0.95 (0.32, 2.77)	14 (63.6)	0.50 (0.18, 1.40)	21 (95.5)	0.00 (0.00, 0.00)	20 (90.9)	2.06 (0.43, 9.93)
Had you ever received information of human monkeypox during medical education								
Never (*R*)	237 (72.3)	1	253 (77.1)	1	321 (97.9)	1	290 (88.4)	1
Yes	54 (80.6)	1.60 (0.83, 3.06)	55 (82.1)	1.36 (0.69, 2.67)	67 (100.0)	4×10^7 (0.00,)	61 (91.0)	1.33 (0.54, 3.29)
Had you ever heard about human monkeypox before								
Never (*R*)	24 (75.0)	1	27 (84.4)	1	30 (93.8)	1	28 (87.5)	1
Yes	267 (73.6)	0.93 (0.40, 2.13)	281 (77.4)	0.64 (0.24, 1.70)	358 (98.6)	4.77 (0.89, 25.65)	323 (89.0)	1.15 (0.39, 3.46)
Knowledge on monkeypox								
Poor (*R*)	267 (74.6)	1	278 (77.7)	1	353 (98.6)	1	319 (89.1)	1
Good	24 (64.9)	0.63 (0.31, 1.29)	30 (81.1)	1.23 (0.52, 2.91)	35 (94.6)	0.25 (0.05, 1.33)	32 (86.5)	0.78 (0.29, 2.13)

* Significant at 0.05. Q1: Human monkeypox is an important infectious problem in Indonesia. Q2: Human monkeypox could bring detrimental impact to Indonesian national economic. Q3: The government should provide the trainings to healthcare workers related to human monkeypox. Q4: Human monkeypox lessons should be incorporated in the National Medical Curriculum of Indonesia

medical experience. Medical experience was defined as distance in years between the first time the participant received the first medical license and the time of survey. They were also asked whether they have attended local, national or international conference in the last five months.

d Exposure to HMPX information and knowledge on HMPX

To measure exposure to HMPX information, participants were asked whether they had ever received information about HMPX during their medical education, and whether they had heard HMPX prior to the survey. For those who had heard before, they were asked the time: within several days or weeks ago or within last month or later. To measure participants' knowledge on HMPX, a questionnaire consisting of 21 questions, was used. The questionnaire measured the knowledge on causative agent, transmission, epidemiology, signs and symptoms, and management of HMPX. All questions consisted of two possible responses in which a correct response was given a score of one while zero for an incorrect response. The score of each response were then summed into an additive scale ranging from 0 to 21, in which higher scores indicate better knowledge on HMPX. Finally, the knowledge of each individual was dichotomized as good and poor based on a 80% cut-off: good indicated a participant answered correctly >80% of questions (i.e. at least 17 out of the total 21 questions).

2.4. Statistical analysis

The level of GPs' confidence was dichotomized into good confidence and poor confidence based on two cut-off points; 80% and 70% of the total score (i.e. answered three and two questions correctly, respectively). We have used a similar cut-off point to dichotomize variables in previous studies (Harapan et al., 2017a; Harapan et al., 2018a; Harapan et al., 2017b; Harapan et al., 2016; Harapan et al., 2019). A two-step logistic regression analysis was used to explore the potential explanatory variables associated with confidence. Using a dichotomous outcome allowed for an easier interpretation of good *vs.* poor confidence among GPs. In the unadjusted logistic regression, all socio-demographic, workplace characteristics, professional characteristics, HMPX-related information exposure and knowledge of HMPX were included. Variables with $p \leq 0.25$ in this step were entered into the multivariable analysis. Estimated unadjusted odds ratio (OR) and adjusted OR (aOR) were interpreted in relation to a reference category.

To assess the possible variables associated with each question within perspective domain, a one-step logistic regression analysis was employed. All estimated ORs in this domain were also interpreted in relation to the same reference category as confidence domain. For all analyses, significance was assessed at $\alpha = 0.05$. Analyses were performed using SPSS for Windows (Version 15, Chicago, IL, USA).

2.5. Ethical clearance

In compliance with national legislation and the code of ethical principles, the protocol of this study was approved by Institutional Review Board of the Faculty of Medicine and Health Sciences, Maulana Malik Ibrahim State Islamic University Malang, Indonesia (055/EC/KEPK-FKIK/2019).

3. Results

3.1. Participants' characteristics

Out of 510 responses received, a total of 395 (77.4%) were included in the analysis; data from 115 (22.5%) participants were excluded due to incomplete data; mostly because respondent exited the survey before completing the survey. A vast majority of the participants (86.1%) graduated from universities located in Sumatra and other islands (Table 1). Almost 70% of them were working in the western part of Indonesia. A majority (68.4%) of the participants were female and more than third (69.9%) were 30 years old or younger. Less than 5% of the participants had an additional master's or doctorate degree and less than 5% had attended an international conference within last five months. Most could be classified in their early career in that 73.4% had ≤5 years of experience, and 51.9% earned less than IDR 5 million each month. In term of HMPX information exposure, only 17.0% of surveyed GPs had heard about HMPX during their medical school and 8.1% of the participants never heard about HMPX prior to the survey. This study found that 9.4% of the participants had good knowledge of HMPX.

3.2. General practitioners' confidence and associated factors

In this study, using 80% cut-off, only 40 (10.1%) participants had good confidence in facing HMPX (i.e. confident to diagnose and treat of HMPX cases in their clinical setting based on their current knowledge, skills and their workplace facilities). However, using the lower cut-off to define good confident (i.e. 70% of total scores), 34.9% had good confidence.

Using a 80% cut-off to define good confidence, none of the explanatory variables were associated with GPs' confidence. When using a 70% cut-off to define a good confidence, in unadjusted analyses, attendance at national conferences, length of medical practice, and receipt of HMPX information during medical education were associated with good confidence (Table 1). Those who attended at least one national conference within the last five months and those who had been working more than ten years had 1.6 times (95% confidence interval [CI]: 1.07–2.52) and 2.8 times (95%CI: 0.05–7.46) higher odds of being confident compared to those who did not attend a conference and those who had medical experience of less than one year, respectively. Those who had received education about HMPX during their medical education were more likely to have good confidence compared to those who never received (OR: 2.99; 95%CI: 1.75–5.11, $p < 0.001$).

In the multivariable analysis, receiving information of HMPX during medical education was the only variable associated with GPs' confidence in which it increased the odds of had good confidence by approximately 3 times (aOR: 2.74; 95%CI: 1.57–4.78; $p < 0.001$).

3.3. General practitioners' perspective and associated factors

Our study found that 73.6% of respondents believed that HMPX is an important infectious problem in Indonesia (Q1 in Table 2) and 77.9% of them believed that it could bring detrimental impact to Indonesian economy (Q2). The data also showed that 98.2% of surveyed GPs agreed that the government should provide HMPX trainings to HCWs (Q3) and 88.8% suggested that HMPX should be included in the National Medical Curriculum of Indonesia (Q4).

Compared to GPs in Java, those who lived mainly in western part of Indonesia (Sumatra Island) were more likely to agree that: (a) HMPX is an important infectious disease and could have detrimental impacts on the Indonesian economy; and (b) that the government should provide trainings about HMPX to HCWs (Table 2). More women than men agreed that HMPX is an important problem in Indonesia and therefore think that government needs to provide adequate trainings. GPs who were working in the community health services or who lived in rural districts had higher odds of suggesting that the HMPX information should be incorporated into the National Medical Curriculum compared to those who were working in the private clinics or in the capital of provinces (urban areas).

4. Discussion

Our study found that majority of study participants were female, younger GPs which were in early career which is similar with previous studies (Harapan et al., 2017a; Harapan et al., 2018a; Harapan et al., 2019); suggesting the results might reflect the contemporary condition

of GPs in Indonesia. There is only a small percentage of GPs in Indonesia who have good confidence in diagnosing and treating HMPX cases in clinical settings. One factor associated with confidence was the length of experience in medical practice. Previous studies found that the length of learning experience (Chen et al., 2019; Hsieh and Nolan, 2015) and prolonged attachment and training in healthcare centers increased self-confidence in medical practices (Lonnbro et al., 2019; McNair et al., 2016). However, a systematic review of 12 studies between 1966 and 2004, found that longer experience in medical practice was associated with less knowledge (Choudhry et al., 2005). A majority (63%) of studies showed that more experienced GPs, i.e., those with more years of experience, were actually more apt to not adhere to standards of practice for diagnosis, screening, and prevention (Choudhry et al., 2005). It could be that GPs with longer experience in our study were more confident but less knowledgeable. Therefore, it is important to ensure that the more-experienced GPs receive adequate training and continuing medical education activities (CME) (Choudhry et al., 2005).

In addition, this study found that good knowledge of HMPX is not associated with higher confidence in managing HMPX cases. This result is plausible since knowledge is not the only aspect of effective patient management. Clinical diagnostic skills and appropriate experience are other factors that produce effective patient care. Miller's pyramid of competence suggests that despite good knowledge being foundational to achieving proficient clinical skills, clinical skills are at a higher level compared to knowledge (Shumway et al., 2003). The phenomenon is also relevant to the theory of competency development and internalization, the Johari's Window (Ramani et al., 2017). Individuals with good knowledge might understand their limitations so that they are 'conscious incompetent'. Hence, there would be hesitance in managing this particular case. Nevertheless, this less-confident attitude is a good entry point for implementing a reflective learning practice (Ramani et al., 2017), to advance from being an 'unconscious incompetent' to a 'conscious competent' through an experiential learning journey (Yardley et al., 2012).

As expected, our data indicate that GPs are likely to be more confident if they had received education about HMPX during their education in medical school. This is the only factor associated with GPs' confidence in multivariable model, indicating that incorporating material into medical education could have a large impact on confidence compared to information received from other sources. Learning in a formal curriculum during medical education would provide a better learning experience since an informal information may result in inconsistent outcomes (Baker et al., 2011). Learners might face conflicts when they are learning from informal resources due to lack of guidance (White et al., 2009). Unfortunately, the Indonesian Standard of Medical Doctor Competency do not include HMPX as one of the compulsory diseases to be mastered by Indonesian medical graduates (Indonesian Medical Council, 2012). Incorporating HMPX into Indonesian Standard of Medical Doctor Competency would force Indonesian medical schools to teach HMPX to medical students. One of the important findings of this study is that GPs who were working in community health centers were more likely to agree that HMPX should be involved in the National Medical Curriculum. This indicates, in part, that those working in frontline health central facilities felt a need to have more information about HMPX.

Studies have found geographical differences in health care knowledge across Indonesia. A previous study have found that GPs in Java Island have better knowledge of HMPX (Harapan et al., 2020). Yet we found that more GPs from Sumatra Island believe that HMPX is an important issue that could be associate with negative economic effects and therefore agree that government should provide trainings to the HCWs. This is probably can be explained because the first HMPX case in Asia, May 2019, was reported in Singapore (Ng et al., 2019) which is geographically close to the smaller Indonesian island of Batam and the larger island of Sumatra. Afterward, the Indonesian government strengthened the surveillance system in Batam and the main island of Sumatra by installing thermal scanning system in five ports and preparing hospitals to care for HMPX patients (Fadli and Arbi, 2019). Batam is also a freeport in Indonesia and an economic center for western Indonesia.

There are some limitations of this study. The results of the present study should be interpreted with caution. Although a minimal sample size was calculated, the number of samples in the present study was far less compared to a comparable nationally representative survey conducted in high income country (Sellers et al., 2015). The complete response rate (i.e. the rate of completed response out of received responses) in this survey is relatively low (77.4%) and there is potential for selection bias for geographical as some regions in Indonesia are likely to have better internet access than others. Finally, this study assessed a subjective measure, self-confidence, which may not be based on actual knowledge of HMPX.

5. Conclusion

GPs in Indonesia have low confidence to diagnose and treat of HMPX cases based on their current knowledge, skills and workplace facilities. Although HMPX cases have not been reported in Indonesia, increasing numbers of international air flights into the country every year necessitate a prepared workforce of frontline GPs in the country. Incorporating HMPX systematically into the National Medical Curriculum in Indonesia may be required, and is supported by most participants in this study.

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CRediT authorship contribution statement

Harapan Harapan: Conceptualization, Methodology, Software, Formal analysis, Resources, Writing - original draft, Writing - review & editing, Project administration, Funding acquisition. **Abdul M. Setiawan:** Methodology, Investigation, Writing - original draft, Project administration. **Amanda Yufika:** Methodology, Investigation, Writing - original draft, Writing - review & editing, Project administration. **Samsul Anwar:** Software, Formal analysis. **Sri Wahyuni:** Validation, Investigation, Data curation. **Febrivan W. Asrizal:** Validation, Investigation. **Muhammad R. Sufri:** Validation, Investigation, Data curation. **Reza P. Putra:** Validation, Investigation, Data curation. **Nanda P. Wijayanti:** Validation, Investigation, Data curation. **Salwiyadi Salwiyadi:** Validation, Investigation, Data curation. **Razi Maulana:** Validation, Investigation, Data curation. **Afriyani Khusna:** Validation, Investigation, Data curation. **Ina Nusrina:** Validation, Investigation, Data curation. **Muhammad Shidiq:** Validation, Investigation, Data curation. **Devi Fitriani:** Validation, Investigation, Data curation. **Muharrir Muharrir:** Validation, Investigation, Data curation. **Cut A. Husna:** Validation, Investigation, Data curation. **Fitria Yusri:** Validation, Investigation, Data curation. **Reza Maulana:** Validation, Investigation, Data curation. **Prattama S. Utomo:** Validation, Investigation, Data curation. **Mohd Andalas:** Validation, Writing - review & editing, Supervision. **Abram L. Wagner:** Validation, Resources, Writing - original draft, Writing - review & editing. **Mudatsir Mudatsir:** Resources, Writing - review & editing, Supervision.

Declaration of Competing Interest

The authors declare that they have no competing interests.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.actatropica.2020.105450.

References

Baker, M., Wrubel, J., Rabow, M.W., 2011. Professional development and the informal curriculum in end-of-life care. J. Cancer Educ. 26, 444–450.
Beer, E.M., Rao, V.B., 2019. A systematic review of the epidemiology of human monkeypox outbreaks and implications for outbreak strategy. PLoS Negl. Trop. Dis. 13, e0007791.
Chen, Y., Zheng, K., Ye, S., Wang, J., Xu, L., Li, Z., Meng, Q., Yang, J., Feng, S.T., 2019. Constructing an experiential education model in undergraduate radiology education by the utilization of the picture archiving and communication system (PACS). BMC Med. Educ. 19, 383.
Choudhry, N.K., Fletcher, R.H., Soumerai, S.B., 2005. Systematic review: the relationship between clinical experience and quality of health care. Ann. Intern. Med. 142, 260–273.
Durski, K.N., McCollum, A.M., Nakazawa, Y., Petersen, B.W., Reynolds, M.G., Briand, S., Djingarey, M.H., Olson, V., Damon, I.K., Khalakdina, A., 2018. Emergence of Monkeypox - West and Central Africa, 1970–2017. MMWR Morb. Mortal. Wkly. Rep. 67, 306–310.
Erez, N., Achdout, H., Milrot, E., Schwartz, Y., Wiener-Well, Y., Paran, N., Politi, B., Tamir, H., Israely, T., Weiss, S., Beth-Din, A., Shifman, O., Israeli, O., Yitzhaki, S., Shapira, S.C., Melamed, S., Schwartz, E., 2019. Diagnosis of imported monkeypox, Israel, 2018. Emerg. Infect. Dis. 25, 980–983.
Fadli, Arbi I.A, 2019. Indonesia on Alert for Monkeypox. The Jakarta Post, Jakarta, Indonesia.
Harapan, H., Aletta, A., Anwar, S., Setiawan, A., Maulana, R., Wahyuniati, N., Ramadana, R., Haryanto, S., Rodríguez-Moralesh, A., Jamil, K., 2017a. Healthcare workers' knowledge towards Zika virus infection in Indonesia: a survey in Aceh Asian. Pac. J. Trop. Med. 10, 189–194.
Harapan, H., Alleta, A., Anwar, S., Setiawan, A.M., Maulana, R., Wahyuniati, N., Ramadana, M.R., Ikram, I., Haryanto, S., Jamil, K.F., Kuch, U., Rodriguez-Morales, A.J., 2018a. Attitudes towards Zika virus infection among medical doctors in Aceh province, Indonesia. J. Infect. Public Health 11, 99–104.
Harapan, H., Anwar, S., Bustamam, A., Radiansyah, A., Angraini, P., Fasli, R., Salwiyadi, S., Bastian, R.A., Oktiviyari, A., Akmal, I., Iqbalamin, M., Adil, J., Henrizal, F., Darmayanti, D., Mahmuda, M., Mudatsir, M., Imrie, A., Sasmono, R.T., Kuch, U., Shkedy, Z., Pramana, S., 2017b. Willingness to pay for a dengue vaccine and its associated determinants in Indonesia: a community-based, cross-sectional survey in Aceh. Acta Trop. 166, 249–256.
Harapan, H., Anwar, S., Setiawan, A.M., Sasmono, R.T., Study, A.D., 2016. Dengue vaccine acceptance and associated factors in Indonesia: a community-based cross-sectional survey in Aceh. Vaccine 34, 3670–3675.
Harapan, H., Rajamoorthy, Y., Anwar, S., Bustamam, A., Radiansyah, A., Angraini, P., Fasli, R., Salwiyadi, S., Bastian, R.A., Oktiviyari, A., Akmal, I., Iqbalamin, M., Adil, J., Henrizal, F., Darmayanti, D., Pratama, R., Setiawan, A.M., Mudatsir, M., Hadisoemarto, P.F., Dhimal, M.L., Kuch, U., Groneberg, D.A., Imrie, A., Dhimal, M., Muller, R., 2018b. Knowledge, attitude, and practice regarding dengue virus infection among inhabitants of Aceh, Indonesia: a cross-sectional study. BMC Infect. Dis. 18, 96.
Harapan, H., Rajamoorthy, Y., Utomo, P.S., Anwar, S., Setiawan, A.M., Alleta, A., Bambang, A., Ramadana, M.R., Ikram, I., Wahyuniati, N., Maulana, R., Ichsan, I., Indah, R., Wagner, A.L., Kuch, U., Groneberg, D.A., Rodriguez-Morales, A.J., Andalas, M., Muller, R., Mudatsir, M., Imrie, A., 2019. Knowledge and attitude towards pregnancy-related issues of Zika virus infection among general practitioners in Indonesia. BMC Infect. Dis. 19, 693.
Harapan, H., Setiawan, A., Yufika, A., Anwar, S., Wahyuni, S., Asrizal, F., Sufri, M., Putra, R., Wijayanti, N., Salwiyadi, S., Maulana, R., Khusna, A., Nusrina, I., Shidiq, M., Fitriani, D., Muharrir, M., Husna, C., Yusri, F., Maulana, R., Andalas, M., Wagner, A., Mudatsir, M., 2020. Knowledge of human monkeypox viral infection among general practitioners: a cross-sectional study in Indonesia. Pathog. Glob. Health. https://doi.org/10.1080/20477724.2020.1743037. (In press).
Hsieh, C.M., Nolan, N.J., 2015. Confidence, knowledge, and skills at the beginning of residency. A survey of pathology residents. Am. J. Clin. Pathol. 143, 11–17.
Hsu, C.C., Chen, T., Chang, M., Chang, Y.K., 2006. Confidence in controlling a SARS outbreak: experiences of public health nurses in managing home quarantine measures in Taiwan. Am. J. Infect. Control 34, 176–181.
Indonesian Medical Council, 2006. Standar Kompetensi Dokter Indonesia. Indonesian Medical Council, Jakarta.
Indonesian Medical Council, 2012. Standar Kompetensi Dokter Indonesia. Indonesian Medical Council, Jakarta.
Learned, L.A., Reynolds, M.G., Wassa, D.W., Li, Y., Olson, V.A., Karem, K., Stempora, L.L., Braden, Z.H., Kline, R., Likos, A., Libama, F., Moudzeo, H., Bolanda, J.D., Tarangonia, P., Boumandoki, P., Formenty, P., Harvey, J.M., Damon, I.K., 2005. Extended interhuman transmission of monkeypox in a hospital community in the Republic of the Congo, 2003. Am. J. Trop. Med. Hyg. 73, 428–434.
Lonnbro, J., Nylen, K., Wallerstedt, S.M., 2019. Developing professional confidence in the art of prescribing-a randomized controlled study on structured collegial discussions during internship. Eur. J. Clin. Pharmacol. 75, 687–696.
McNair, R., Griffiths, L., Reid, K., Sloan, H., 2016. Medical students developing confidence and patient centredness in diverse clinical settings: a longitudinal survey study. BMC Med. Educ. 16, 176.
Nakoune, E., Lampaert, E., Ndjapou, S.G., Janssens, C., Zuniga, I., Van Herp, M., Fongbia, J.P., Koyazegbe, T.D., Selekon, B., Komoyo, G.F., Garba-Ouangole, S.M., Manengu, C., Manuguerra, J.C., Kazanji, M., Gessain, A., Berthet, N., 2017. A Nosocomial Outbreak of Human Monkeypox in the Central African Republic. Open Forum Infect. Dis. 4 ofx168.
Ng, O.T., Lee, V., Marimuthu, K., Vasoo, S., Chan, G., Lin, R.T.P., Leo, Y.S., 2019. A case of imported Monkeypox in Singapore. Lancet Infect. Dis. 19, 1166.
Ogoina, D., Izibewule, J.H., Ogunleye, A., Ederiane, E., Anebonam, U., Neni, A., Oyeyemi, A., Etebu, E.N., Ihekweazu, C., 2019. The 2017 human monkeypox outbreak in Nigeria-Report of outbreak experience and response in the Niger Delta University Teaching Hospital, Bayelsa State. Nigeria. PLoS One 14, e0214229.
Petersen, B.W., Kabamba, J., McCollum, A.M., Lushima, R.S., Wemakoy, E.O., Muyembe Tamfum, J.-J., Nguete, B., Hughes, C.M., Monroe, B.P., Reynolds, M.G., 2019a. Vaccinating against monkeypox in the Democratic Republic of the Congo. Antivir. Res. 162, 171–177.
Petersen, E., Kantele, A., Koopmans, M., Asogun, D., Yinka-Ogunleye, A., Ihekweazu, C., Zumla, A., 2019b. Human Monkeypox: Epidemiologic and Clinical Characteristics, Diagnosis, and Prevention. Infect. Dis. Clin. North Am. 33, 1027–1043.
Ramani, S., Konings, K., Mann, K.V., van der Vleuten, C., 2017. Uncovering the unknown: A grounded theory study exploring the impact of self-awareness on the culture of feedback in residency education. Med. Teach. 39, 1065–1073.
Reed, K.D., Melski, J.W., Graham, M.B., Regnery, R.L., Sotir, M.J., Wegner, M.V., Kazmierczak, J.J., Stratman, E.J., Li, Y., Fairley, J.A., Swain, G.R., Olson, V.A., Sargent, E.K., Kehl, S.C., Frace, M.A., Kline, R., Foldy, S.L., Davis, J.P., Damon, I.K., 2004. The detection of monkeypox in humans in the Western Hemisphere. N. Engl. J. Med. 350, 342–350.
Sejvar, J.J., Chowdary, Y., Schomogyi, M., Stevens, J., Patel, J., Karem, K., Fischer, M., Kuehnert, M.J., Zaki, S.R., Paddock, C.D., Guarner, J., Shieh, W.J., Patton, J.L., Bernard, N., Li, Y., Olson, V.A., Kline, R.L., Loparev, V.N., Schmid, D.S., Beard, B., Regnery, R.R., Damon, I.K., 2004. Human monkeypox infection: a family cluster in the midwestern United States. J. Infect. Dis. 190, 1833–1840.
Sellers, K., Leider, J.P., Harper, E., Castrucci, B.C., Bharthapudi, K., Liss-Levinson, R., Jarris, P.E., Hunter, E.L., 2015. The Public Health Workforce Interests and Needs Survey: The First National Survey of State Health Agency Employees. J. Public Health Manag. Pract. 21 6, S13–S27 Suppl.
Shumway, J.M., Harden, R.M., 2003. Association for medical education in, E. AMEE Guide No. 25 25, 569–584.
Vaughan, A., Aarons, E., Astbury, J., Balasegaram, S., Beadsworth, M., Beck, C.R., Chand, M., O'Connor, C., Dunning, J., Ghebrehewet, S., Harper, N., Howlett-Shipley, R., Ihekweazu, C., Jacobs, M., Kaindama, L., Katwa, P., Khoo, S., Lamb, L., Mawdsley, S., Morgan, D., Palmer, R., Phin, N., Russell, K., Said, B., Simpson, A., Vivancos, R., Wade, M., Walsh, A., Wilburn, J., 2018. Two cases of monkeypox imported to the United Kingdom. September 2018. Euro. Surveill. 23.
White, C.B., Kumagai, A.K., Ross, P.T., Fantone, J.C., 2009. A qualitative exploration of how the conflict between the formal and informal curriculum influences student values and behaviors. Acad. Med. 84, 597–603.
WHO, 2017. WHO Informal Consultation on Monkeypox 2017. Geneva, Switzerland.
WHO, 2018. Monkeypox, Fact Sheets. World Health Organization.
Yardley, S., Teunissen, P.W., Dornan, T., 2012. Experiential learning: AMEE guide no. 63. Med. Teach. 34, E102.
Yinka-Ogunleye, A., Aruna, O., Dalhat, M., Ogoina, D., McCollum, A., Disu, Y., Mamadu, I., Akinpelu, A., Ahmad, A., Burga, J., Ndoreraho, A., Nkunzimana, E., Manneh, L., Mohammed, A., Adeoye, O., Tom-Aba, D., Silenou, B., Ipadeola, O., Saleh, M., Adeyemo, A., Nwadiutor, I., Aworabhi, N., Uke, P., John, D., Wakama, P., Reynolds, M., Mauldin, M.R., Doty, J., Wilkins, K., Musa, J., Khalakdina, A., Adedeji, A., Mba, N., Ojo, O., Krause, G., Ihekweazu, C., Team, C.D.C.M.O., 2019. Outbreak of human monkeypox in Nigeria in 2017–18: a clinical and epidemiological report. Lancet Infect. Dis. 19, 872–879.
Yufika, A., Wagner, A.L., Nawawi, Y., Wahyuniati, N., Anwar, S., Yusri, F., Haryanti, N., Wijayanti, N.P., Rizal, R., Fitriani, D., Maulida, N.F., Syahriza, M., Ikram, I., Fandoko, T.P., Syahadah, M., Asrizal, F.W., Aletta, A., Haryanto, S., Jamil, K.F., Mudatsir, M., Harapan, H., 2020. Parents' hesitancy towards vaccination in Indonesia: a cross-sectional study in Indonesia. Vaccine 38, 2592–2599.