

Does the attire of a primary care physician affect patients' perceptions and their levels of trust in the doctor?

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Authors:

Haymond Prasad Narayanan

(Corresponding author)
M.D, MAFP/FRACGP
Primary Care Department, MAHSA
University, Jalan University Campus
Jalan Ilmu, Off Jalan Universiti
59100 Kuala Lumpur
Malaysia
Email: haymondprasad@hotmail.com

Zahrina Azian binti Zohadie

MBBS, DFM
Klinik Kesihatan Presint 18
Putrajaya, Malaysia

Rosanna Patricia Chryshanthi Gregory

MB, Bch, BAO, Advance Training in
Family Medicine (ATFM)
certified by Academy of Family
Physicians Malaysia (AFPM)
Klinik Kesihatan Tanglin,
Kuala Lumpur, Malaysia

Rosalind Ho Wan Ying

Doctor of Medicine, MAFP/FRACGP
Klinik Thurai, Kuala Lumpur
Malaysia

Abstract

Introduction: With increasing evidence of disease transmission through doctors' white coats, many countries have discouraged doctors from wearing their white coats during consultations. However, there have been limited studies about patients' preferences concerning doctors' attire in Malaysia. This study, therefore, aimed to investigate patients' perceptions of doctors' attire before and after the disclosure of information about the infection risk associated with white coats.

Method: This cross-sectional study was conducted from 1st June 2015 to 31st July 2015 at three different primary care settings (government, private, and university primary care clinics) using a self-administered questionnaire. A 1:5 systematic random sampling method was employed to select the participants. The respondents were shown photographs of male and female doctors in four different types of attire and asked to rate their level of confidence and trust in and ease with doctors in each type of attire. Subsequently, the respondents were informed of the risk of white coat-carried infections, and their responses were reevaluated. Data analysis was completed using SPSS Version 24.0. Associations of categorical data were assessed using the Chi-Square test, while the overall change in perceptions after the disclosure of additional information was examined using the McNemar test. Results with p-values < 0.05 were considered statistically significant.

Results: A total of 299 respondents completed the questionnaire. Most of the respondents had more confidence and trust in the male (62.5%) and female (59.2%) doctors wearing white coats. A high proportion of the respondents from the government clinic (70.5%) felt more confidence in male doctors dressed in white coats (p-value = 0.018). In terms of ethnicity, male doctors in white coats were highly favored by Malays (61.0%), followed by the Chinese (41.2%) and Indians (38%) (p = 0.005). A similar preference was observed for the female doctors, whereby the highest number of Malays (60.3%), followed by the Chinese (41.2%) and Indians (40.0%) (p = 0.006), had a preference for female doctors wearing white coats. Only 21.9% of the initial 71.9% of patients who preferred white coats maintained their preference (p < 0.001) after learning of the risk of microbial contamination associated with white coats.

Conclusion: Most patients preferred that primary care doctors wear white coats. Nevertheless, that perception changed after they were informed about the infection risk associated with white coats.

Introduction

It has long been tradition for doctors to dress professionally in white coats, a universal symbol of physicians. This tradition can be traced back to Hippocrates, who stated that physicians should "be clean in person, well-dressed, and anointed with sweet-smelling unguents."¹ The white coats worn by physicians today were originally used by laboratory workers to provide a barrier against the hazardous contaminants they might have encountered at work.² While the white coats confer responsibility to and instill a sense of

professionalism in physicians, perceptions of these coats have varied among patients, whereby younger patients prefer doctors without white coats, and older patients prefer the attire. Such differences have led to numerous international studies on patients' levels of confidence in and comfort with their attending doctors based on their attire.³⁻⁶

Over the past two decades, the white coat has, however, lost its popularity among physicians due to the increasing awareness that white coats harbor microorganisms and are potential sources of infection. From 1969 to

Rajini Ann S. Ratnasingam

MD, MAFP/FRACGP
Pusat Perubatan Universiti Malaya,
Lembah Pantai, Malaysia

Low Boon Teck

MBBS, DFM
Klinik Low, Pahang, Malaysia.

Ping Yein Lee

MBBS, MMED
Family Medicine Department
Faculty of Medicine and Health
Sciences, Universiti Putra Malaysia
Malaysia

as recently as 2014, there were approximately 30 studies that documented how such apparel can be contaminated and linked to infections.² These findings have led to various national guideline changes. For example, the National Health Service (NHS) in England, United Kingdom implemented their “bare below the elbows” policy in September 2007 for all workers in NHS medical facilities.⁷ In January 2014, new guidelines on healthcare personnel attire were also issued by the Society for Healthcare Epidemiology of America (SHEA). The guidelines called for the removal of white coats by the care providers during consultations and promoted the “bare below the elbows” approach in order to prevent pathogen transmission from white coats to patients.² In line with other international studies, one of the most important and early studies in Malaysia revealed a high prevalence of methicillin-resistant *Staphylococcus aureus* (MRSA) on doctors’ neckties.⁸

Furthermore, studies have shown that perceptions concerning white coats among patients often shift to favoring doctors without white coats after the patients have been informed of the possibility of microbial contamination on the coats.⁸⁻⁹ An editorial published in *The Medical Journal of Malaysia* on doctors’ attire and patient safety in 2009 highlighted concerns regarding bacterial contamination on doctors’ neckties and white coats. It further recommended that researchers examine doctors and patients’ perceptions of physicians’ attire and whether patient education could change their perceptions.¹⁰

Malaysia has a dual-sector (public and private) healthcare system. It is compulsory for primary care doctors in the public sector to wear formal attire with a white coat.¹¹ However, doctors in the private primary care setting are not bound by these compulsory rulings. Based on a literature search, there has been no published evidence concerning the current practice in Malaysia in terms of attire. Nevertheless, it has been the norm for doctors working in the government sector to wear formal attire with white coats, while the private doctors practice with or without white coats.

There have been limited studies that assess the preferences concerning doctors’ attire and the perceptions of white coats among the multi-

ethnic population of Malaysia.¹² Hence, this study aimed to determine patients’ levels of confidence, trust, and ease towards doctors based on various attire and evaluate their changes in perception, if any, after being informed about potential disease transmission through white coats.

Methods

This cross-sectional study was conducted from 1st June 2015 to 31st July 2015 in three primary care settings: (1) a university-based primary care clinic, (2) three government primary care clinics in the Klang Valley, and (3) two private primary care clinics (Kepong, Kuala Lumpur and Raub, Pahang). Patients attending these clinics who met the inclusion criteria were recruited for this study. The inclusion criteria for the study included being of age 18 or above and proficiency in reading or speaking Malay, English, or Chinese. Patients who required urgent care were excluded from this study.

A 1:5 systematic random sampling method was employed to select the participants. A trained staff person at each clinic recruited participants from their clinic’s waiting room after patient registration. The first participant at each clinic was randomly selected from the list of patients registered on the first day of data collection. The trained staff person then approached the subsequent fifth patient on the registration list after the first participant who met the inclusion criteria and asked them participate in the study. The patient was briefed and provided with an information sheet regarding the nature of the study and their right to refuse to participate. If the patient agreed to participate, they were asked to sign a consent form and complete the self-administered questionnaire. If the patient refused to consent, the next fifth patient on the day’s registration list was approached. The items on the questionnaire were explained at the request of the participants. The research centers had different registries (daily registry vs continuous registry), types of sessions (geriatric clinic, antenatal clinic, and so forth), and health record systems (electronic vs paper-based health records). To minimize sampling bias due to these differences, each center maintained or utilized a single, continuous registry of every patient attending the center during the data collection period.

A monitored trial run involving 30 volunteers

from the three types of clinics was conducted for one and a half months (from 1st June to 14th July 2015) prior to the commencement of the study. This pilot study aimed to train the staff in the recruitment process and assess the ease of use of the questionnaire. The volunteer participants had no difficulties in answering the questionnaire, and no ambiguity of the questionnaire was observed. Furthermore, the staff were demonstrably competent in following the procedure.

The questionnaire was developed initially in English and based on previous studies. It was modified further following a discussion with two researchers who were familiar with instrument development and clinical research for content validity. Subsequently, it was forward and backward translated into Malay and Mandarin by two different professional translators in each case.

The first part of the questionnaire included socio-demographic data, such as age, sex, race, educational level, occupation, and monthly income. As illustrated in Figure 1, the second part of the questionnaire contained images of male and female doctors in four different ensembles: formal attire with a white coat,

formal attire without a white coat, smart casual, and casual. For all photographs, the model, stance, position of the stethoscope, and background remained constant. Based on the images, the patients were asked to select a male and a female doctor whom they had the most confidence in, trusted the most, and felt most at ease with.

Permission was obtained from Hartmans, Lagrain, and Asch³ to adopt two questions from their questionnaire:

1. In which doctor do you have the most confidence and trust? The confidence and trust refer to the patients feeling confident and trusting the doctor who provides care to them.
2. Which doctor makes you feel most at ease? The feeling of easiness refers to the patients being comfortable instead of feeling threatened or intimidated by the doctor.

For the final part of the questionnaire, patients who chose the doctors with white coats for any of the initial two questions were asked whether their preference would change if the white coats were potential sources of infection.

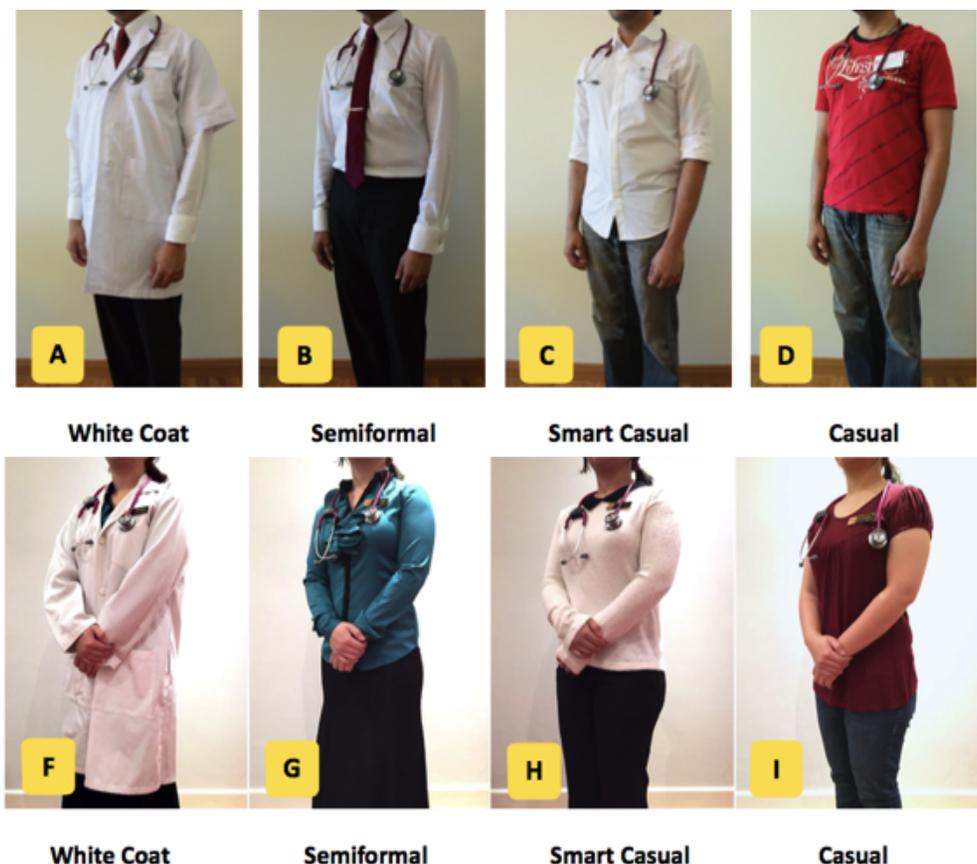


Figure 1. Pictures of male and female doctors in four different ensembles

Statistical analysis

The primary care settings and demographic characteristics were compared using the Chi-Square test via SPSS Version 24.0, where p -values <0.05 were considered statistically significant. Additionally, the respondents were grouped into two categories: those who chose the white coats versus those who chose the other options, to compare their preferences before and after the disclosure of information regarding the infection risk associated with white coats. The changes in preference among the respondents who initially favored the white coats were further analyzed using the McNemar test, with p -values <0.05 indicating a significant change.

Ethical approval

This study received ethical approval from the Medical Research and Ethics Committee of the Ministry of Health, Malaysia (approval no. NMRR-15- 219-24301). In addition, written informed consent for the research was obtained from each participant prior to conducting the study.

Results

A total of 300 questionnaires were completed by respondents from the six different sites, with one questionnaire being excluded due to its incompleteness.

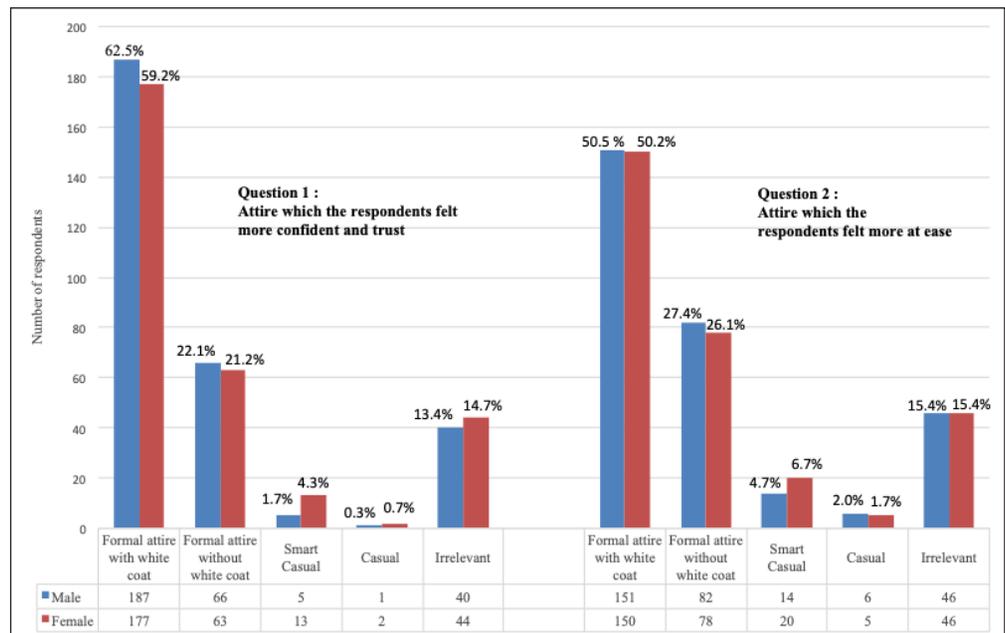
The demographic characteristics of the participants are shown in Table 1. Most of the participants were from the government primary care clinics ($n = 149$, 49.8%), followed by the private primary care clinics ($n = 100$, 33.4%) and the university-based primary care clinic ($n = 50$, 16.7%). Of the total participants, 55.9% ($n = 167$) were female and 44.1% ($n = 132$) were male. The mean age was 40.91 years \pm 15.7 (SD), and more than two-thirds of the respondents were below 50 years of age. In terms of social background, most of the respondents had an income level below RM5000 (58.3%, $n = 174$), while more than half of the respondents (55.2%, $n = 165$) had received a secondary and higher secondary education.

Table 1: Demographic Characteristics of the Study Population ($n=299$)

	N	%
Type of clinic		
Government	149	49.8
Private GP	100	33.4
University PC	50	16.7
Gender		
Male	132	44.1
Female	167	55.9
Age group (years)		
18-30	102	34.1
31-50	104	34.8
51-65	70	23.4
≥ 66	23	7.7
Race		
Malay	154	51.5
Chinese	80	26.8
Indians	50	16.7
Others	12	4.0
Income (RM)		
No income or refuse to reveal	56	18.7
5,000 and below	174	58.3
5,001 and above	69	23.1
Education level		
No formal education	2	0.7
Primary education	25	8.4
Secondary and higher secondary	165	55.2
Tertiary education	104	34.8

Figure 2 shows the respondents' preferences in terms of physician attire based on their level of confidence, trust, and ease. Overall, most of the respondents had more confidence and trust in the male ($n=187$, 62.5%) and female ($n=177$, 59.2%) doctors dressed formally with white coats. Similarly, about half of the respondents felt more at ease with both male ($n=151$, 50.5%) and female primary care physicians wearing formal attire with a white coat.

Figure 2: Attire preferences based on respondents' confidence, trust, and ease.



To explore further the perceptions of doctors' attire among patients, the respondents' choices were categorized into two major groups: the white-coat group and the non-white-coat group. The associations between the demographics of the respondents and their confidence and trust in and ease with the doctors are presented in Tables 2 and 3. The clinical setting was significantly associated with the patients' confidence and trust in the male doctors' attire. Specifically, a total of 70.5% ($n=105$) of the respondents from the government clinics, 57% ($n=57$) of the respondents from the private clinics, and 50% ($n=25$) of the respondents from the university primary care clinic felt more confident in

male doctors dressed in white coats (p -value = 0.013).

In addition, there was a significant association between ethnicity and the respondent's feelings of ease with both male and female doctors wearing white coats, as seen in Table 3. It was found that a higher number of Malays (61.0%), followed by Chinese (41.2%) and Indians (38%), felt at ease with male doctors wearing white coats (p -value = 0.005). Similarly, a higher number of Malays (60.3%), followed by Chinese (41.2%) and Indians (40%), felt at ease with female doctors dressed in white coats (p -value = 0.006).

Table 2: Associations between respondents' characteristics and feelings of confidence and trust.

		Question 1: Patient feels more confident and trusting					
		Male Doctor			Female Doctor		
		White-Coat (n)	Non-White-Coat (n)	p - value *	White-Coat (n)	Non-White-Coat (n)	p - value *
Clinic Type	Government	105(70.5%)	44(29.5%)	0.013	86(57.7%)	63(42.3%)	0.736
	Private GP	57(57.0%)	43(43.0%)		59(59.0%)	41(41.0%)	
	University PC	25(50.0%)	25(50.0%)		32(64.0%)	18(36.0%)	
Age Group	18-30	63(61.8%)	39(38.2%)	0.904	62(60.8%)	40(39.2%)	0.785
	31-50	63(60.6%)	41(39.4%)		58(55.8%)	46(44.2%)	
	51-65	46(65.7%)	24(34.3%)		44(62.9%)	26(37.1%)	
	≥66	15(65.2%)	8(34.8%)		13(56.5%)	10(43.5%)	
Gender	Male	82(62.1%)	50(37.9%)	0.894	80(60.6%)	52(39.4%)	0.659
	Female	105(62.9%)	62(37.1%)		97(58.1%)	70(41.9%)	
Race	Malay	104(64.9%)	50(35.1%)	0.287	101(65.6%)	53(34.4%)	0.073
	Chinese	47(58.9%)	33 (41.3%)		42(52.5%)	38(47.5%)	
	Indian	27(54.0%)	23(46.0%)		24(48.0%)	26(52.0%)	
	Others	7(58.3%)	5(41.7%)		8(66.7%)	4(33.3%)	
Education Level	No Formal/ Primary Education	15(55.6%)	12(44.4%)	0.755	17(63.0%)	10(37.0%)	0.675
	Secondary and Higher secondary	108(65.5%)	57(34.5%)		96(58.2%)	69(41.8%)	
	Tertiary Education	64(61.5%)	40(38.5%)		63(60.6%)	41(39.4%)	

* Data analyzed with X² test, p-value < 0.05 set as significant

Table 3: Associations between respondents' characteristics and feelings of ease.

		Question 2: Patient would feel more at ease					
		Male Doctor			Female Doctor		
		White-Coat (n)	Non-White-Coat (n)	p - value *	White-Coat (n)	Non-White-Coat (n)	p - value *
Clinic Type	Government	83(55.7%)	66(44.3%)	0.089	81(54.4%)	68(45.6%)	0.331
	Private GP	49(49.0%)	51(51.0%)		45(45.0%)	55(55.0%)	
	University PC	19(38.0%)	31(62.0%)		24(48.0%)	26(52.0%)	
Age Group	18-30	52(51.0%)	50(49.0%)	0.813	54(52.9%)	48(47.1%)	0.600
	31-50	51(49.0%)	53(51.0%)		47(45.2%)	57(54.8%)	
	51-65	38(54.3%)	32(45.7%)		38(54.3%)	32(45.7%)	
	≥66	10(43.5%)	13(56.5%)		11(47.8%)	12(52.2%)	
Gender	Male	66(50.0%)	66(50.0%)	0.877	68(51.5%)	64(48.5%)	0.679
	Female	85(50.9%)	82(49.1%)		82(49.1%)	85(50.9%)	
Race	Malay	94 (61.0%)	60 (38.9%)	0.005	93(60.3%)	61(39.6%)	0.006
	Chinese	33(41.2%)	47(58.8%)		33(41.2%)	47(58.8%)	
	Indian	19(38.0%)	31(62.0%)		20(40.0%)	30(60.0%)	
	Others	5(41.7%)	7(58.3%)		4(33.3%)	8(66.7%)	
Education Level	No Formal/ Primary Education	12(44.4%)	15(55.6%)	0.302	12(44.4%)	15(55.6%)	0.380
	Secondary and Higher secondary	88(53.3%)	77(46.7%)		84(50.9%)	81(49.1%)	
	Tertiary Education	51(49.0%)	53(51.0%)		53(51.0%)	51(49.0%)	

* Data analyzed with X² test, p-value < 0.05 set as significant

Finally, the overall change in patients' preferences after being informed of potential disease transmission via white coats was evaluated and analyzed. There was a significant change in the respondents' choices after the disclosure of the additional information, whereby only 21.9% of the initial 71.9% patients who preferred white coats maintained their initial preferences (p -value < 0.001).

Discussion

In this study, it was observed that the patients preferred both male and female primary care doctors wearing white coats. Such preferences are consistent with the findings reported by previous studies conducted in other settings.^{4,5,13,14,15} This phenomenon could be due to the common perception that doctors wearing white coats are more competent and official, therefore resulting in more confidence and trust from the patients during consultations.^{16,17} Furthermore, the white coat facilitates the identification of authority, and it is part of the societal expectations, culture, traditional values, and beliefs of some patients.¹⁸

In addition, the study showed that white coats were highly favored by the respondents from the government clinics, with the male doctors being particularly expected to wear white coats. A plausible explanation for this observation could be that patients are more accustomed to images of male doctors wearing white coats in government clinics. Moreover, most patients in Malaysia attend government clinics, where the doctors are predominantly male.^{19,20} This finding can be compounded by the fact that it is mandatory for doctors in Malaysian government service to wear white coats.¹¹

Further, a higher proportion of Malay patients felt more at ease with doctors wearing white coats, followed by the Chinese and Indian respondents. Based on studies conducted in the United States, the influence of ethnicity on the patients' perceptions and attire preferences was similarly observed among Caucasians and African-Americans.¹⁵ Each ethnicity is heavily influenced by their own unique cultural and social factors. Such diversity may have caused differences in the reasons for consultation, the types of primary care centers visited, and the types of medical care received (acute vs. chronic) among

the different races in Malaysia.²⁰ Ethnicity could, therefore, be a contributing factor that influences the perception of doctors' attire among the various races.

Meanwhile, the attire of female doctors showed no significant influence on the patients' levels of confidence and trust in the various settings in this study. These findings contradict most previous studies.^{3,4,15} A relatively similar study conducted in Japan reported that factors such as speech and reputation play an important role in inspiring the confidence of patients, while the titles, age, and gender of a doctor were found to be less crucial.¹³ As such, it can be inferred from the findings of this study that the confidence patients had in their doctors was not solely influenced by attire, but also by many other factors which were not investigated in the present study.

Furthermore, it was showed that most respondents changed their preference from white coats to no white coats after being informed about the infection risk associated with white coats. This finding could have come about because most of the participants generally had good access to the latest information about global trends, as reflected by their younger age group (below 50 years), urban origins, and high educational attainment levels.²¹ Their change in preference for white coats could also imply their conscientiousness concerning hygienic practices.

The significant change in the perception of doctors' attire observed in this study could also be attributed to the outbreaks of contagious diseases that have occurred in the Asia-Pacific region, including Malaysia. For instance, there have been several public health emergencies arising from emerging and re-emerging diseases, such as Nipah Virus, SARS, and H1N1 in the recent years.²² The health perceptions and behaviors of the public evolved during and after these outbreaks.²³ Consequently, Malaysian society nowadays is more ready to accept and change their practices and beliefs once they have been educated adequately.

This study has many strengths. Firstly, it was conducted in three different clinical settings (government, private, and university-based primary care clinics), therefore encompassing a widespread population. Secondly, the respondents in the study constituted the three

main ethnic groups in Malaysia, with their responses being assessed using their respective languages. Such multi-ethnicity strongly represented the composition of the Malaysian population and thus increased the relevance of the research findings. Thirdly, this study was not biased against the age of the doctors or the effects of expression and countenance, as the pictures in the questionnaire did not display these aspects. Lastly, this study was the first in Malaysia to examine the patients' perceptions of doctors' attire before and after the disclosure of information about white coats potentially acting as modes of disease transmission.

However, the study has several limitations. The sample size was relatively small, with most of the respondents being patients from the government primary care clinics. Besides, the respondents were mostly in the age group of 18-50 years, implying that respondent age groups were not represented equally. Additionally, most of the respondents originated from the urban areas and were well-educated. These factors may reduce the generalizability of this study. Furthermore, the information regarding the risk of infection transmission via the white coats was not delivered in an impartial manner. The final section of the questionnaire, which asked the respondents if they would change their preferences after learning the new information, may have led the respondents to a biased answer. Therefore, changes in preference after being informed may have been pre-empted and not necessarily a result of the information provided per se. In view of the limitations, the findings of this study should be interpreted with caution.

To overcome the limitations of this study, future researchers should consider adding a cognitive debriefing following the administration of the questionnaire. Additionally, the questions should be properly worded to avoid response bias. The changes in perception regarding doctors' attire among the patients after being informed of possible contamination should be explored further in future studies. Also, more research should be conducted in other parts of Malaysia to expand the generalizability of the findings of this study to the national level. Further study would also be useful for policymakers in terms of deciding if the 'no white coat policy' should be implemented in the Malaysian healthcare system.

Conclusion

In general, the patients demonstrated a predominant preference for primary care physicians wearing white coats. The strong preference for white coats was particularly evident in the government clinical setting, with the male doctors being highly expected to dress formally and wear white coats. Furthermore, ethnicity appeared as a significant factor influencing the attire preferences of the patients, whereby most Malays regarded the white coats as the favorable attire for both male and female doctors. Nevertheless, the patients' perceptions and preferences for white coats changed significantly after the patients learned of the potential risk of white coat-carried infection. This study could serve as a starting point for more elaborate nation-based research capable of providing guidance on healthcare personnel attire and improving the guidelines for infection control in healthcare facilities.

Competing interests:

The authors declare that they have no competing interests or any possible conflicts of interest regarding the publication of this paper.

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How does this paper make a difference to general practice?

- This paper shows that patients still prefer to interact with primary care doctors wearing white coats.
- It also suggests that patients are willing to change their minds if they are educated about potential disease transmission via white coats.
- Any future policies regarding primary care doctor's attire should include patient education, which may disassociate the strong professional image of white coats and doctors.

References

- Hochberg MS. The doctor's white Coat : An historical perspective. *Virtual Mentor*. 2007;9(4):310-4.
- Nash DB. Keep the white coat. *Am J Med Qual*. 2014;29(6):465-6.
- Hartmans C, Heremans S, Lagrain M, Asch KV, Schoenmakers B. The doctor's new clothes: Professional or fashionable? *Primary Health Care: Open Access*. 2013;03(03):135.
- Yamada Y, Takahashi O, Ohde S, Deshpande GA, Fukui T. Patients' preferences for doctors' attire in Japan. *Intern Med*. 2010;49(15):1521-6.
- Landry M, Dornelles AC, Hayek G, Deichmann RE. Patient preferences for doctor attire: The white coat's place in the medical profession. *Ochsner J*. 2013;13(3):334-42.
- McKinstry B, Wang JX. Putting on the style: what patients think of the way their doctor dresses. *Br J Gen Pract*. 1991;41(348):270, 5-8.
- Jacob G. Uniforms and workwear: an evidence base for developing local policy. London, United Kingdom Department of Health 2007. Available from: <http://www.dh.gov.uk/publications>.
- Koh KC, Husni S, Tan JE, Tan CW, Kunaseelan S, Nuriyah S, et al. High prevalence of methicillin-resistant Staphylococcus aureus (MRSA) on doctors' neckties. *Med J Malaysia*. 2009;64(3):233-5.
- Hueston WJ, Carek SM. Patients' preference for physician attire: a survey of patients in family medicine training practices. *Fam Med*. 2011;43(9):643-7.
- Abu Bakar S. Doctor's attire and patient safety. *Med J Malaysia*. 2009;64(3):185-6.
- Malaysian Medical Council. A guidebook for house officers 2008. Available from: <http://www.mmc.gov.my/images/contents/ethical/A-Guidebook.pdf>.
- Tiang KW, Razack AH, Ng KL. The 'auxiliary' white coat effect in hospitals: Perceptions of patients and doctors. *Singapore Med J*. 2017;58(10):574-5.
- Kurihara H, Maeno T, Maeno T. Importance of physicians' attire: factors influencing the impression it makes on patients, a cross-sectional study. *Asia Pac Fam Med*. 2014;13(1):2.
- Douse J, Derrett-Smith E, Dheda K, Dilworth JP. Should doctors wear white coats? *Postgrad Med J*. 2004;80(943):284-6.
- Rehman SU, Nietert PJ, Cope DW, Kilpatrick AO. What to wear today? Effect of doctor's attire on the trust and confidence of patients. *Am J Med*. 2005;118(11):1279-86.
- Sebo P, Herrmann FR, Haller DM. White coat in primary care: What do patients think today? Cross-sectional study. *Swiss Med Wkly*. 2014;144:w14072.
- Furnham A, Chan PS, Wilson E. What to wear? The influence of attire on the perceived professionalism of dentists and lawyers. *J Appl Soc Psychol*. 2013;43(9):1838-50.
- So EC, Fung FH, Yeung JK, Chow LH, Kwok JS, Lam RL, et al. Patient perception of physician attire before and after disclosure of the risks of microbial contamination. *Int J Med Stud*. 2013;1(3):109-14.
- World Health Organization. Human resources for health country profiles: Malaysia. Manila: WHO Regional Office for the Western Pacific; 2014. 47 p.
- Sivasampu S, Wahab YFA, Miin OS, Ismail SA, Pin GP, Sinnadurai J. National medical care statistics 2014. Kuala Lumpur: National Clinical Research Centre; 2016. Report No.: NCRC/HSU/2016.1.
- Chung D, Chun SG. Social media use in health care : Will it be embraced by millennials? *Issues in Information Systems*. 2017;18(2):206-14.
- Ministry of Health Malaysia. Malaysia Strategic Workplan for Emerging Diseases (MySED Workplan 2012-2015) 2012. Available from: <http://www.moh.gov.my/english.php/pages/view/118>.
- Miao YY, Huang JH. Prevalence and associated psychosocial factors of increased hand hygiene practice during the Influenza A/ H1N1 pandemic: Findings and prevention implications from a national survey in Taiwan. *Trop Med Int Health*. 2012;17(5):604-12.