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Comparing and determining factors associated with hypertension self-care profiles of patients in two multi-ethnic Asian countries: cross-sectional studies between two study populations

Sabrina Yi-Mei Wee,[1,2] Hani Salim ,[3] Maliza Mawardi,[3] Yi Ling Eileen Koh,[1] Hanifatiyah Ali,[3] Sazlina Shariff Ghazali ,[3,4] Ping Yein Lee,[5] Siew Mooi Ching ,[3] Nurainul Hana Shamsuddin,[3] Ngiap Chuan Tan [1,2]

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SY-MW and HS contributed equally.

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For numbered affiliations see end of article.

Correspondence to
Dr Hani Salim;
hanisyahida@upm.edu.my

ABSTRACT

Objectives To compare the sociodemography, disease characteristics and hypertension self-care profiles and to determine the factors influencing Hypertension Self-Care Profiles (HTN-SCP) in two populations in primary care settings from Singapore and Malaysia.

Design Cross-sectional, cross national.

Setting Multi-centre, primary care clinics Malaysia and Singapore.

Participants 1123 adults with hypertension enrolled and analysed.

Primary and secondary outcome measures Comparison between sociodemography, disease characteristics and the mean scores of HTN-SCP domains (behaviour, motivation and self-efficacy) and the factors influencing hypertension self-care.

Results 1123 adults with hypertension attending primary care clinics in Malaysia and Singapore were involved. The participants' mean age was 63.6 years (SD 9.7) in Singapore and 60.4 (SD 9.1) in Malaysia. Most of the participants in Singapore had tertiary education (22.3%) compared with Malaysia (13.0%), p<0.001. A higher proportion of participants from Singapore had controlled blood pressure (74.6%) compared with Malaysia (33.8%), p<0.001. The mean total score of HTN-SCP was significantly higher among Singapore participants compared with Malaysia participants 190 (SD 28) versus 184 (SD 23) (p<0.001). Similarly, the mean score for motivation domain 67 (SD 10) versus 65 (SD 9), followed by self-efficacy score 65 (SD 11) versus 62 (SD 9) and behaviour score (58 SD 9 vs 56 SD 9) were higher among Singapore participants. In both countries, the factors which influenced higher HTN-SCP mean scores across all domains were being Indian and had tertiary education.

Conclusions The study population in Singapore had a higher HTN-SCP mean score compared with Malaysia. The common factors influencing higher HTN-SCP mean scores at both study sites were ethnicity and level of education. Future intervention to improve self-care among people with hypertension may need to be tailored to their behaviour, motivation and self-efficacy levels.

Strengths and limitations of this study

- ► The unprecedented cross-national comparison of patients with hypertension sharing similar sociocultural background but different economic and health financing environment contributes to this study's strength.
- ► The study examined the sociodemography and disease characteristics factors which influenced Hypertension Self-Care Profiles (HTN-SCP) domain scores in Malaysia and Singapore among people aged 40 years and above.
- ► Large overall sample size has enabled in-depth analyses of the individual domain of the HTN-SCP.
- ► Cross-sectional study design implies associations but not causation and does not allow conclusions about changes in behaviour during the course of illness.
- ► The sample size and recruitment methods differ between the countries; suggesting that the results may not be generalisable to the national population and the HTN-SCP domains mean scores comparison between the two countries must be interpreted with caution.

BACKGROUND

Both Malaysia and Singapore inherited the British-style National Health Service and continued to finance its healthcare system from its revenue.[1] Over the years, the dissimilarity in the rate of socioeconomic development has significantly impacted the way resources being channelled to public services, particularly the health service. The Malaysian government funded medical and public health services through revenues derived from taxes, government revenues and income earned from government corporatised enterprises.[2] While in Singapore, it adopts a hybrid system to finance the health system whereby,

the cost of care is funded jointly by the government and the individual through insurance, revenue from taxes and personal medical saving accounts.[3] The intent to cultivate personal responsibility towards taking charge of an individual's health underpins the shared healthcare financing concept. Such an approach is postulated to shape an individual's overall perceptions and attitudes towards self-efficacy and self-care,[4] which is pivotal for the successful management of long term, non-communicable diseases such as hypertension.

Hypertension is a significant cause of morbidity and mortality arising from cardiovascular and kidney disease.[5] The prevalence of adults with hypertension as 30% in Malaysia and 21.5% in Singapore.[6 7] However, a significant proportion of the affected population has yet to attain treatment goal. In Singapore, 49.7% of patients treated for hypertension in primary care were reported with good blood pressure (BP) control.[7] While in Malaysia, the proportion of patients with good hypertension control is lower at 37.4%.[8] The differences in the proportion of good BP control warrants a comparison of their health behaviour profiles in the two countries as they have similar multi-ethnic background and culture.

The management of hypertension does not only encompass pharmacological treatment prescribed from the attending physician, but patients themselves are required to perform self-care measures to improve their BP control.[9] Self-care includes maintaining a healthy diet, performing regular physical activities, achieving ideal body weight and avoiding unhealthy lifestyle such as smoking.[10] The success of these activities requires behaviour change, motivation and self-efficacy. Hypertension self-care profile among adult with hypertension aged 18 years and above were found to be moderate.[11] To date, such data in Singapore are relatively lacking. This study aimed to compare the sociodemography, disease characteristics and HTN-SCP between Malaysia and Singapore and to determine the factors influencing hypertension self-care among study populations in Malaysia and Singapore among people aged 40 years and above.

METHODOLOGY

The studies were cross-national surveys of self-care profiles of patients with hypertension conducted among two study populations in two countries between October 2016 and June 2017. In Malaysia, the study was conducted in three urban primary care clinics in Selangor, Malaysia and a polyclinic in Bukit Merah, Singapore.

The studies' inclusion criteria were adults aged 40 years and above, with underlying hypertension diagnosed by a physician. Pregnant women and those with underlying psychiatric illness or cognitive impairment were excluded from this study. The estimated sample size in Malaysia was 720 based on the mean score of self-care management among hypertensive aged <60 years and ≥60 years[12] using Lemeshow *et al* formula[13] with 95% confidence level, 90% of power and 20% of non-response rate. However, in comparison with our previous reporting, in this study, we only include people aged 40 years and above, which gave us a total of 702 participants in Malaysia.

As the Singapore study had no prior literature on the percentage of patients with high self-care, 50% was adopted to obtain the maximum sample size. With a 95% CI estimate and 5% precision, the sample size required was 385. The sample size was increased to 450 to account for 15% incomplete data and non-response rate.

Study instrument

In this study, the Hypertension Self-Care Profiles (HTN-SCP) was used to assess the hypertension self-care profile. In this tool's development, two underpinning theories were Orem's self-care model and motivational interviewing (MI).[14 15] Orem's model described how people enabled self-care by performing specific actions to manage their illness.[14] Understanding the reason behind these actions were crucial to self-care. MI facilitates the self-care process by promoting commitment and developing confidence for a behaviour change.[15] Thus, using HTN-SCP tool uses the domains of behaviour, motivation and self-efficacy to assess self-care among patients with hypertension.[16]

The HTN-SCP tool is a reliable tool with good internal consistency.[16] It consists of 60-items and three domains which are behaviour, motivation and self-efficacy. It has been validated in Singapore,[17–19] and the Cronbach's alpha for the subdomain's ranges from 0.857 to 0.948. For the Malay version, the Cronbach's alpha for the subdomains ranges from 0.851 to 0.945 whereas, for the Mandarin version, the Cronbach's alpha ranges from 0.838 to 0.929.[18 19] There were 20-items in each domain, and the score of each domain ranges from 0 to 80 as each question using a 4-point Likert scale. Higher scores indicate a higher level of self-care behaviour, motivations and self-efficacy. A pretest of the questionnaire involving 30 participants was conducted in Malaysia to determine the questionnaire's feasibility. Following the pretest, minor changes were made to the questionnaire.

The questionnaire was available in three languages which are English, Malay and Mandarin for participants to select their preferred version.[17–19] It consists of three sections: sociodemographic characteristics, medical profiles on hypertension and the HTN-SCP tool. BP reading was taken from the patient's medical records.

The definition of body mass index (BMI) was based on the WHO recommendation for Asian population.[20] Underweight is defined if BMI <18.5 kg/m^2, normal weight is defined if BMI is 18.5–22.9 kg/m^2, overweight is defined with BMI 23–27.4 kg/m^2 and obese is defined if BMI >27.5 kg/m^2. The definition of controlled BP was based on the Joint National Committee Eighth (JNC 8) guidelines.[21] The BP of patients with underlying hypertension without diabetes was considered controlled if their BP <140/90 mm Hg, regardless of age.

Data collection

Malaysia

In Malaysia, participants were recruited using a systematic random sampling method. A sampling interval of two was used as a constant difference between participants. The first patient (the reference point) was chosen using a draw lot method. Subsequently, every alternate patient was approached for study participation.

Singapore

In Singapore, potential participants were screened for eligibility at the waiting area outside the clinic consultation rooms and were invited to participate in the study.

Patients gave written informed consent to join the study. We obtained their sociodemographic data via self-administered proforma. The HTN-SCP questionnaire was administered through a face-to-face interview. We verified the patients' clinical information through their latest medical records.

Data analysis

We used SPSS V.22.0 in the data analysis. We used descriptive statistics to describe the demographic and disease profiles of the patients. We used percentages and frequencies for the categorical variables; mean and SD were used for the continuous variables if they were normally distributed. The normality of the continuous data was based on z-score of skewness and kurtosis, Kolmogorov-Smirnov, histogram and Q–Q plot. We used independent t-test or one-way ANOVA (analysis of variance) to determine the association for numerical data. We performed a χ^2 or Fisher's exact test for the categorical data. The significant level was set at p<0.05. multiple linear regression (MLR) model was performed to determine the predictors for hypertension self-care. Variables with p<0.25 from the univariate analysis were included in the MLR model. Level of significance was set at p<0.005. The MLR results were reported as beta coefficient, SE and 95% CI.

Patient and public involvement

This research was done with the involvement of the patients as research participants. They were not involved in the study design, recruitment, interpretation of the report's results and writing.

RESULTS

A total of 1123 adults with hypertension participated in this study, of which 702 and 421 were Malaysians and Singaporeans, respectively. The response rate in Malaysia was 93.8% (761/811). Non-participations were due to language barrier and time. The response rate was not reported in Singapore. The proportion of participants aged 60 years and above was higher in Singapore (63.4%) than Malaysia (54.6%). More female participants were recruited among the Singaporeans (50.6%) and Malaysians (49.4%). More Malays (42.9%) in the latter, whereas in the former, Chinese ethnicity constituted the highest proportion (69.6%). More participants were married in Malaysia (81.6%) than those in Singapore (67%). More patients had tertiary education in Singapore (22.3%), versus those in Malaysia (13.0%). Table 1 summarises the characteristics of the study participants.

A higher proportion of the participants from Malaysia were on three or more than four antihypertensive medications (20.9%) compared with Singapore (14.3%) (p=0.023). Regarding BP control to target, Malaysia (33.8%) had a significantly lower proportion of the treatment goal compared with Singapore (74.6%). Significantly more Malaysia participants had diabetes mellitus (65.8%) compared with Singapore participants (46.8%) (p<0.001) (table 2).

Table 3 illustrates the score of the HTN-SCP of the participants. The mean total score of HTN-SCP was significantly higher among Singapore participants (mean 189.9, SD 27.6) compared with Malaysia participants (mean 184.1, SD 22.8) (p<0.001). Similarly, for all the subdomains mean scores: motivation domain (p<0.001), self-efficacy domain (p<0.001) and behaviour score (p<0.001) were significantly higher among the Singapore participants compared with Malaysia participants.

Detail results of associations between HTN-SCP behaviour, motivation and self-efficacy scores and sociodemographic factors and disease characteristic in participants are in online supplemental files 1–3. As shown in table 4, in both countries, the factors that were significantly associated with HTN-SCP behaviour mean scores were participants aged 60 years and above (Malaysia: adjusted beta=2.047, 95% CI 0.728 to 3.365, p=0.002) (Singapore: adjusted beta=2.473, 95% CI 0.671 to 4.275, p=0.007), of Indian ethnicity (Malaysia: adjusted beta=4.389, 95% CI 2.614 to 6.164, p<0.001) (Singapore: adjusted beta=3.271, 95% CI 1.09 to 5.452, p=0.003) and those with tertiary education (Malaysia: adjusted beta=4.274, 95% CI 2.175 to 6.373, p<0.001) (Singapore: adjusted beta=4.243, 95% CI 1.857 to 6.629, p<0.001). For Malaysia, Malay ethnicity (adjusted beta=3.192, 95% CI 1.719 to 4.665, p<0.001) also was associated with higher HTN-SCP behaviour mean scores. For Singapore, other factors associated with HTN-SCP behaviour were women participants (adjusted beta=1.864, 95% CI 0.133 to 3.595, p<0.035), of other ethnicities (adjusted beta=9.25, 95% CI 2.714 to 15.786, p=0.006), and those with secondary education (adjusted beta=3.184, 95% CI 1.28 to 5.09, p=0.001).

Table 4 summarises the association between HTN-SCP motivation mean scores and sociodemographic and disease characteristics among Malaysia and Singapore participants. In both countries, the HTN-SCP motivation mean scores were significantly associated with Indian ethnicity (Malaysia: adjusted beta=5.099, 95% CI 3.359 to 6.838, p<0.001) (Singapore: adjusted beta=3.374, 95% CI 1.254 to 6.215, p=0.003), secondary education level (Malaysia: adjusted beta=3.125, 95% CI 1.693 to 4.557, p<0.001) (Singapore: adjusted beta=5.067, 95% CI 2.903 to 7.232, p<0.001), and tertiary education levels (Malaysia: adjusted beta=7.136, 95% CI 5.045 to 9.227,

Table 1 Sociodemographic characteristics of the study participants by country (N=1123)

	Malaysia participants (n=702)	Singapore participants (n=421)	P value
	N (%)	N (%)	
Total	702 (62.5)	421 (37.5)	
Age, years (mean+SD)	60.4 (9.1)	63.6 (9.7)	<0.001*
≥60	383 (54.6)	267 (63.4)	0.004*
Gender			0.106
Women	208 (49.4)	213 (50.6)	
Ethnicity			<0.001*
Chinese	251 (35.8)	293 (69.6)	
Malay	301 (42.9)	40 (9.5)	
Indian	150 (21.4)	81 (19.2)	
Others	0 (0)	7 (1.7)	
Education level			<0.001*
Primary and below	252 (35.9)	157 (37.3)	
Secondary	359 (51.1)	170 (40.4)	
Tertiary	91 (13.0)	94 (22.3)	
Marital status			<0.001*
Married	572 (81.6)	282 (67)	
Single/separated/widowed	129 (18.4)	139 (33)	
Declined to answer	1 (0.1)	0	

Univariate analysis (χ^2 test or Fisher's exact test).
*P value <0.05.

Table 2 Clinical characteristics of the study participants by country (N=1123)

Variable	Malaysia participants (n=702)	Singapore participants (n=421)	P value
	N (%)	N (%)	
Antihypertensive medications (n)			0.023*
0	7 (1)	7 (1.7)	
1	301 (42.9)	208 (49.6)	
2	247 (35.2)	144 (34.4)	
3	113 (16.1)	51 (12.2)	
>4	34 (4.8)	9 (2.1)	
Blood pressure well-controlled			<0.001*
Yes	237 (33.8)	314 (74.6)	
Body mass index, kg/m^2			0.191
Underweight (<18.5)	8 (1.2)	7 (1.7)	
Normal weight (18.5–22.9)	115 (16.7)	88 (21.3)	
Overweight (23–27.4)	236 (34.3)	140 (33.9)	
Obese (>27.5)	329 (47.8)	178 (43.1)	
Missing data	8 (1.1)	8 (1.9)	
Presence of diabetes mellitus			<0.001*
Yes	462 (65.8)	197 (46.8)	

Univariate analysis (χ^2 test or Fisher's exact test).
*P value <0.05.

Table 3 Scores of Hypertension Self-Care Profiles (HTN-SCP)

Domain	Range of scores		Mean (SD)		†P value	Adjusted beta	SE	95% CI	‡P value
	Malaysia	Singapore	Malaysia	Singapore					
Behaviour	31–79	27–80	56.5 (8.9)	58.4 (9.1)	0.001*	2.2	0.6	1 to 3.4.0	<0.001*
Motivation	23–80	27–80	65.2 (9.0)	67.1 (10.4)	0.001*	3.1	0.6	1.8 to 4.3	<0.001*
Self-efficacy	31–80	29–80	62.4 (8.8)	64.5 (10.6)	<0.001*	2.9	0.6	1.7 to 4.2	<0.001*
Total HTN-SCP score	102–238	92–240	184.1 (22.8)	189.9 (27.6)	<0.001*	8.2	1.6	5.0 to 11.4	<0.001*

*P value <0.05.
†Univariate analysis (independent t-test).
‡Multivariate analysis assessing the difference between scores among two countries (controlling for age, gender, ethnicity, education, marital status, number of antihypertensive medications, well-controlled blood pressure, body mass index, presence of diabetes).

p<0.001) (Singapore: adjusted beta=5.528, 95% CI 2.863 to 8.193, p<0.001). For Malaysia, Malay ethnicity (adjusted beta=4.339, 95% CI 2.857 to 5.82, p<0.001) also was associated with higher HTN-SCP motivation mean scores.

Table 4 summarises the association between HTN-SCP self-efficacy mean scores and our participants' sociodemographic factors and disease characteristics. In both countries, the factors that were significantly associated with HTN-SCP self-efficacy mean scores were participants of Indian ethnicity (Malaysia: adjusted beta=6.174, 95% CI 4.433 to 7.914, p<0.001),(Singapore: adjusted beta=3.706, 95% CI 1.163 to 6.25, p=0.004) and those with tertiary education (Malaysia: adjusted beta=4.752, 95% CI 2.687 to 6.818, p<0.001) (Singapore: adjusted beta=4.179, 95% CI 1.51 to 6.847, p<0.001). For Malaysia, Malay ethnicity (adjusted beta=4.003, 95% CI 2.537 to 5.468, p<0.001) and women (adjusted beta=1.747, 95% CI 0.475 to 3.02, p=0.007) were associated with higher HTN-SCP self-efficacy mean scores. For Singapore, other factors associated with HTN-SCP self-efficacy were of other ethnicities (adjusted beta=8.4, 95% CI 0.696 to 16.104, p=0.033) and those with secondary education (adjusted beta=3.921, 95% CI 1.698 to 6.145, p=0.001).

DISCUSSION

Summary of findings

Compatible with the national population composition, more Malays and Chinese are present in the respective Malaysia and Singapore study populations. Demographically, the Singapore study population comprised higher proportions of those who are age 60 years (63.4% vs 54.6%) and older who were educated up to secondary level (87.0% vs 77.7%). Nearly half of the participants from both countries were treated with at least one antihypertensive medication, with a significantly higher proportion of those from Malaysia's study population on three or more such medications (p=0.023). In terms of control, more than half of Singaporean participants attained BP control goals based on JNC 8 guidelines, with fewer in Malaysia, attaining the mark.[21]

Singapore's participants in this study had significantly higher mean total HTN-SCP scores. In both countries, HTN-SCP behaviour, motivation and self-efficacy were associated with Indian ethnicity and tertiary education. The HTN-SCP behaviour score was associated aged 60 years and above in both countries. The HTN-SCP motivation mean scores were associated with secondary education level in both countries. For Malaysia, Malay ethnicity was associated with higher HTN-SCP behaviour, motivation and self-efficacy scores. Other factors associated with HTN-SCP behaviour and mean self-efficacy scores were of other ethnicity and those with secondary education for Singapore. Women were associated with higher HTN-SCP behaviour mean scores in Singapore and HTN-SCP self-efficacy scores in Malaysia.

Table 4 Summary of factors influencing Hypertension Self-Care Profiles (HTN-SCP) behaviour, motivation and self-efficacy scores

HTN to SCP behaviour scores										
Countries	**Malaysia**					**Singapore**				
Variable	**Behaviour domain score**	**P value**	**Adjusted beta (95% CI)**	**SE**	**P value**	**Behaviour domain score**	**P value**	**Adjusted beta (95% CI)**	**SE**	**P value**
	Mean±SD					Mean±SD				
Age, years		0.052					0.068			
≥60	57.1 (9.1)		2.1 (0.7 to 3.4)	0.7	0.002*	59 (8.9)		2.5 (0.7 to 4.3)	0.9	0.007*
Gender		0.288					0.208			
Women	56.8 (8.8)		–		–	58.9 (9.0)		1.9 (0.1 to 3.6)	0.9	0.035*
Ethnicity		<0.001*					0.001*			
Chinese	55.6 (31.0)		Ref		–	57.9 (8.7)		Ref		–
Malay	58.3 (32.0)	0.751	3.2 (1.7 to 4.7)		<0.001*	55.8 (11.7)		to 0.9 (to 3.9 to 2.0)	1.5	0.534
Indian	59.7 (35.0)	0.906	4.4 (2.6 to 6.2)		<0.001*	60.7 (8.4)		3.3 (1.1 to 5.5)	1.1	0.003*
Others	0.0		–		–	68.0 (5.9)		9.3 (2.7 to 15.8)	3.3	0.006*
Education level		<0.001*					0.004*			
Primary and below	56.8 (34.0)		Ref		–	56.5 (8.7)		Ref		–
Secondary	57.1 (31.0)		0.1 (to 1.3 to 1.5)	0.7	0.925	59.5 (9.1)		3.2 (1.3 to 5.1)	0.972	0.001*
Tertiary	62.1 (39.0)		4.3 (2.2 to 6.4)	1.1	<0.001*	59.5 (9.3)		4.2 (1.9 to 6.6)	1.217	<0.001*
HTN to SCP motivation domain scores										
Countries	**Malaysia**					**Singapore**				
Variable	**Motivation domain score**	**P value**	**Adjusted beta (95% CI)**	**SE**	**P value**	**Motivation domain score**	**P value**	**Adjusted beta (95% CI)**	**SE**	**P value**
	Mean±SD					Mean±SD				
Gender		0.031*					0.208			
Women	65.8 (8.8)		2.1 (0.8 to 3.4)	0.7	0.002*	67.7 (10.5)		1.9 (to 0.1 to 3.8)	1.0	0.064
Ethnicity		<0.001*					0.013*			
Chinese	61.7 (9.6)		Ref		–	66.3 (10.2)		Ref		–
Malay	66.9 (7.9)		4.3 (2.9 to 5.8)	0.8	<0.001*	66 (13.7)	1.7	0.2 (to 3.1 to 3.5)		0.898
Indian	67.4 (8.5)		5.1 (3.4 to 6.8)	0.9	<0.001*	69.8 (8.7)	1.3	3.7 (1.3 to 6.2)		0.003*
Others	0.0					74 (7.6)	3.8	6.1 (to 1.4 to 13.6)		0.109
Education level		<0.001*					<0.001*			

Continued

Table 4 Continued

HTN to SCP behaviour scores										
Countries	**Malaysia**					**Singapore**				
Variable	**Behaviour domain score**	**P value**	**Adjusted beta (95% CI)**	**SE**	**P value**	**Behaviour domain score**	**P value**	**Adjusted beta (95% CI)**	**SE**	**P value**
Primary and below	62.6 (8.9)		Ref		–	64 (10.4)		Ref		–
Secondary	65.9 (8.7)		3.1 (1.7 to 4.6)	0.7	<0.001*	69.1 (10.1)		5.1 (2.9 to 7.2)	1.1	<0.001*
Tertiary	69.5 (8.4)		7.1 (5.0 to 9.2)	1.1	<0.001*	68.6 (9.8)		5.5 (2.9 to 8.2)	1.4	<0.001*
HTN to SCP self to efficacy domain scores										
Countries	**Malaysia**				**Singapore**					
Variable	**Self to efficacy domain score**	**P value**	**Adjusted beta (95% CI)**	**SE**	**P value**	**Self to efficacy domain score**	**P value**	**Adjusted beta (95% CI)**	**SE**	**P value**
	Mean±SD					Mean±SD				
Gender		0.012*					0.360	–		–
Women	63.2 (8.6)		1.7 (0.5 to 3.0)	0.649	0.007*	64.9 (10.3)				
Ethnicity		<0.001*					0.007*			
Chinese	59.2 (9.1)		Ref		–	63.7 (10.1)		Ref		–
Malay	63.5 (7.9)		4.0 (2.5 to 5.5)	0.748	<0.001*	63.2 (13.4)		0.1 (to 3.3 to 3.5)	1.733	0.975
Indian	65.6 (8.3)		6.2 (4.4 to 7.9)	0.888	<0.001*	67.1 (10.2)		3.7 (1.2 to 6.3)	1.298	0.004*
Others	0.0		–	–	–	73.6 (7.9)		8.4 (0.7 to 16.1)	3.931	0.033*
Education level		<0.001*					<0.001*			
Primary and below	60.6 (8.3)		Ref		–	61.9 (10.4)		Ref		–
Secondary	63 (8.7)		2.0 (0.6 to 3.4)	0.714	0.004	66 (10.8)		3.9 (1.7 to 6.1)	1.134	0.001*
Tertiary	65.3 (9.7)		4.8 (2.7 to 6.8)	1.054	<0.001*	66 (9.6)		4.2 (1.5 to 6.8)	1.361	0.002*

Univariate analysis (t-test or ANOVA, analysis of variance).
*P value <0.05. Variables from univariate analysis with p values of less than 0.250 were included in the multivariate analysis, variables which were not included were represented in dashes (–).

Hypertension: the impact of self-care on health outcomes

In terms of control, three-quarter of the Singaporean participants in this study significantly attained BP control goals based on JNC 8 guidelines, with fewer in Malaysia reached the mark (73.6% vs 33.8%). The possible explanation could be due to the higher tertiary education background (22.3% vs 13% p=0.001) and lesser patients with diabetes (46.8% vs 65.8%, p<0.001) among study population from Singapore. In this study, Singapore participants attained significantly higher mean total HTN-SCP scores than their counterparts in Malaysia. These results apply to all the domains of the tool; behaviour, motivation and self-efficacy. Nearly two-thirds (62.2%) of Singaporean participants achieved BP goal versus one-third of those from Malaysia (34.5%). These findings were similar to the prevalence of BP controlled to target in population-based studies.[17] Those with higher HPT-SCP scores reflects their higher levels of self-efficacy and self-care. Self-efficacy empowers them to take on daily self-care measures to control their BP and reduces cardiovascular risks.[22]

The higher total HPT-SCP scores in Singapore patients may be partly due to its healthcare system and policy.[23] It is designed to enable the population to take on higher responsibility to manage their health through co-share healthcare financing, comprehensive individual and community empowerment and self-management programmes.[24–26] Nevertheless, the implementation of these programmes[27 28] remains challenging, with hindrance to reaching out to all patients, particularly those with lower health literacy and motivation.[29 30]

Comparing self-care profiles

In this study, being of Indian ethnicity is associated with better self-care scores in all HPT-SCP domains for both countries than Chinese and Malay ethnicities. Despite good progress in healthcare accessibility, ethnic health disparity is still a challenge in both countries. While good self-care will result in better health outcomes, studies have shown that the incidence of metabolic syndromes, including raised BP, is high among Indian ethnicity with significant mortality risk in both Indian and Malay ethnicities.[31–33] Although there may be a potential cultural influence of reporting desirable outcomes among patients of Indian ethnicity, further exploration may be of value to look at other factors, including the role of genetics on cardiovascular outcomes. We also found that Malay ethnicity in Malaysia's study population had better self-care scores in all HPT-SCP domains than Singapore's study population. These findings may be related to ethnicity and medium of language used by healthcare staffs in the primary care setting. The majority of Malaysian healthcare staff are of Malay ethnicity with Malay language as the primary medium of communication. The similar medium of language used may have eased the access and understanding of health education across all aspect of self-care provided by the system.[34]

Behaviour mean score was significantly associated with participants aged 60 years and above in both countries. Older patients with hypertension were reported to be more compliant in their BP monitoring and were more motivated to maintain weight.[35 36] The longer duration of diagnosis increased their engagement with the health system over time. Thus, this might improve their knowledge about hypertension, and improved their coping skills to manage a chronic condition.

Studies have shown that higher education level is associated with adherence to self-care activities,[30 37 38] as reflected in this study's results. Being more educated allows people with hypertension to access and understand health information and resources to better manage their health better.[11 39] They may be mindful of higher healthcare expenditure if they are hospitalised for hypertension-related complications such as stroke and maybe more conscious of the cost of maintaining their health.[4] Thus, those with better education may be more likely to be motivated to adopt self-care practices to avoid such complications. In this study, women had a significantly higher mean score for behaviour domain scores in Singapore and Malaysia's self-efficacy. Studies have found that women are likely to adopt the behaviour, leading to favourable lifestyle change and the self-efficacy to monitor their BP.[38 40]

It has been shown that monitoring BP alone is not enough to improve cardiovascular outcomes.[9] Self-care is not just about an individual responsibility to care for their health.[41] Based on this study, self-care may be supported by the education policy and the healthcare system[23] through better access to education and reducing gaps in health inequalities, that is, ethnicity and gender. Holistic management of hypertension is multi-faceted, including behaviour change approach and raising the motivation level. Enhancing self-efficacy to actualise self-care is one prerequisite for cost-effective and optimal long-term control of an individual's BP.

Strengths and limitations

The unprecedented cross-national comparison of patients with hypertension that shares similar sociocultural background but different economic and health financing environment contributes to this study's strength. This is a study of comparison between two populations from two different countries, but not a comparison between two countries. It adds to the literature on the association between self-efficacy, self-care and BP treatment goal achievement. Large sample size has enabled in-depth analyses of the individual domain of the HTN-SCP. This study is not without limitations. The cross-sectional study design does not allow causal effect relationship to be determined. The difference in assumptions (ie, conservative) resulted in different ways the sample size were calculated in both countries. Non-response rates adopted by the countries affected the sample size in each study. The small sample size in one country may inadequately power the study. As for recruitment, selection bias is inherent for convenience sampling in one study centre, suggesting that the results may not be generalisable to the national

population. Due to these reasons, the HTN-SCP domains mean scores comparison between the two countries must be interpreted with caution. We excluded an essential social variable, household income, due to the differences in how socio-economic categories being determined in each country. Malaysia has a national standard to categorise actual household income into three different levels (ie, low-income, middle-income and upper-income levels) and Singapore uses tax payment or housing type to ascertain this.

CONCLUSION

Patients with hypertension in Singapore's study population have a better overall self-care profile across behaviour, motivation and self-efficacy. In both study populations, being of Indian ethnicity and having tertiary education were predictors of higher self-care scores. Self-efficacy and skills in self-care are potentially modifiable. Future intervention to improve self-care among people with hypertension may need to be tailored to their behaviour, motivation and self-efficacy levels. This study's findings may be of interest for public health measures to tackle health inequality in multi-ethnic settings globally.

Author affiliations
[1]SingHealth Polyclinics, Singapore
[2]Family Medicine Academic Clinical Programme, SingHealth Duke-NUS, Singapore
[3]Department of Family Medicine, Universiti Putra Malaysia, Serdang, Malaysia
[4]Malaysian Research Institute on Ageing, Universiti Putra Malaysia, Serdang, Malaysia
[5]UM eHealth Unit, University of Malaya, Kuala Lumpur, Malaysia

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ORCID iDs
Hani Salim http://orcid.org/0000-0002-7471-8678
Sazlina Shariff Ghazali http://orcid.org/0000-0002-5737-7226
Siew Mooi Ching http://orcid.org/0000-0003-0505-019X
Ngiap Chuan Tan http://orcid.org/0000-0002-5946-1149

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