

Healthier SG awareness and enrolment among persons with chronic disease

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Dear Editor,

Singapore introduced Healthier SG (HSG) in July 2023, shifting healthcare from curative to preventive care by preventing chronic diseases in healthy individuals and slowing deterioration in those with existing conditions.¹ It encourages residents to enrol with a clinic, consult a family doctor and develop a personalised health plan.^{2,3} Pre-enrolment was open to individuals aged ≥ 40 years with chronic conditions in May 2023.⁴ Later, enrolment was open to individuals aged ≥ 60 years in July 2023 and expanded to individuals aged 40–59 years from November 2023.⁵

A household survey was conducted among community dwellers with chronic disease to explore patient characteristics associated with HSG awareness and enrolment.

Data collection occurred between September and November 2023 (National University of Singapore Institutional Review Board 2023-190). This study used a sampling frame of 3000 addresses of Singapore citizens or permanent residents (PRs) aged ≥ 45 years, acquired from the Singapore Department of Statistics using a proportionate stratified design by dwelling type. Study invitation letters in English, Mandarin and Malay were mailed at least 2 weeks before the addresses were visited by interviewers. The eligibility criteria included: (1) community-dwelling Singapore citizens or PRs; (2) aged ≥ 45 years; (3) diagnosed with ≥ 1 of these chronic conditions: diabetes, hypertension, hyperlipidaemia, musculoskeletal conditions, respiratory conditions, heart failure or other heart conditions, chronic kidney disease, depression or anxiety, stroke, fatty liver or hepatitis B cirrhosis, Parkinson's disease or epilepsy; (4) speaks English, Mandarin or Malay; and (5) agreed to be re-contacted for future related studies. In addition, individuals aged ≥ 65 years were screened for cognitive impairment using the Abbreviated Mental Test.

The questionnaire, initially developed in English, was translated into Mandarin and Malay, covering 6 self-reported sections: (1) demographics, (2) disease management and patient-reported experience, (3) healthcare utilisation, (4) patient-reported outcomes, (5) health characteristics and (6) HSG-related questions. As HSG enrolment was not open for some individuals aged < 60 years at the time of the survey, tailored questions were used to assess HSG awareness and enrolment status. Those aged ≥ 60 years were asked if they had enrolled, while those aged < 60 years were asked if they would enrol when the enrolment is open for them. Enrolment status was categorised as (1) already enrolled, (2) planning to enrol, (3) unsure about enrolment and (4) planning not to enrol. Participants who responded "I don't know what Healthier SG is" were categorised as being unaware of HSG while all others were categorised as aware.

Separate logistic regression models were employed to identify characteristics associated with HSG awareness and enrolment status, using stepwise backward elimination method. HSG awareness was used as the dependent variable (0=aware; 1=unaware) to assess the participant characteristics associated with HSG unawareness. Patient characteristics associated with enrolment status (0=enrolled or planned to enrol; 1=uncertain about enrolment or planned not to enrol) were examined among those who were aware. Characteristics investigated included variables related to demographics, chronic disease management, health characteristics, 1-year health services utilisation and lifestyle.

A total of 1503 participants were surveyed. Most participants were ≥ 60 years old (70.3%) and Chinese (67.8%), followed by Malays (15.0%), Indians (13.6%) and Others (3.6%). More than half (55.7%) had > 1 chronic condition, with hypertension (60.4%), hyperlipidaemia (58.8%) and diabetes (34.6%) being

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most prevalent. Of the 1503 participants, 985 (65.5%) were aware of HSG. Of these, 44.3% had enrolled in HSG, while 39.8% planned to enrol; the remaining were either unsure about enrolment (10.5%) or planned not to enrol (5.5%).

Among individuals who were aware of HSG, Malays (odds ratio [OR] 1.56), those without a regular doctor (OR 1.71), those hospitalised for a total of more than 7 days in the past year (OR 1.82), those who did not visit a primary care provider in the past year (OR 2.61) and individuals reporting anxiety or depression (OR 1.46) were more likely to be unsure about or planning not to enrol in HSG (Table 1). Among them, not having a regular doctor and 1-year primary care visit were identified as the most significant factors in the multivariable regression analysis. Participants cited the following reasons for enrolment hesitancy: preference to retain doctor selection flexibility, lack of interest or motivation, uncertainty about enrolment process or clinic choice, preferred physician or clinic is not an HSG clinic, difficulty in using the enrolment app, insufficient information, discouragement from family or existing doctors, reliance on specialist clinics and perceived low need for primary care, busy with other commitments, physical limitations, negative perceptions of HSG, already have a regular doctor and perceived low needs to enrol. Individuals who were unaware of HSG were more likely to be Malays (OR 1.98) or Indians (OR 1.63), PRs (OR 1.79); those without formal education (OR 3.44); housewives (OR 1.40) or widow/widowers (OR 1.86); occupants of 1- to 4-room public housing flat (OR 1.75); individuals of lower socioeconomic status (card holders of Community Health Assist Scheme [CHAS] Blue or Orange) (OR 1.55); current or ex-smokers (OR 1.83); those who were hospitalised at least once in the past year (OR 1.38); or had a total length of inpatient stay of 7 days or more in the past year (OR 2.13); those who never visited a primary care provider (OR 1.65); and those who reported problems in mobility (OR 1.77), self-care (OR 2.13) or usual activities (OR 1.93) (Table 2). Among these, ethnicity, citizenship status, education, widowhood, socioeconomic status, smoking status, length of inpatient stays in the past year, and problems with usual activities were identified as the most significant factors in the multivariable regression analysis.

The study suggests that individuals who are more vulnerable or less health-conscious were unaware of HSG, probably due to slower penetration of HSG promotion into this group. Hopefully, the multi-method HSG campaigns in the past years have significantly improved its awareness, which is key to HSG enrolment.

The combined HSG enrolment and planning-to-enrol rate among individuals who were aware of HSG

Table 1. Characteristics of individuals who were aware of HSG but were unsure about enrolling or planned not to enrol in Healthier SG.

Participant characteristics	Univariate analysis		Multivariate analysis	
	OR	P value	OR	P value
(A) Demographics				
Age				
Below 60 years old	1.00		-	
60 years old and above	0.78	0.175	-	-
Sex				
Male	1.00		-	
Female	0.77	0.136	-	-
Ethnicity				
Chinese	1.00		-	
Malay	1.56	0.071	-	-
Indian	1.15	0.602	-	-
Others	0.92	0.861	-	-
Citizenship status				
Singapore citizens	1.00		-	
Singapore permanent resident	1.11	0.782	-	-
Lived in Singapore most of the time in the past 5 years				
Yes	1.00		-	
No	0.81	0.782	-	-
Education				
Has formal education	1.00		-	
No formal education	0.91	0.699	-	-
Work status				
Employed, unemployed, retired or full-time student	1.00		-	
Housewife	1.24	0.397	-	-
Marital status				
Single, married, divorced or separated	1.00		-	
Widowed	1.01	0.977	-	-
Children				
No children	1.00		-	
Have children	0.85	0.478	-	-

Table 1. Characteristics of individuals who were aware of HSG but were unsure about enrolling or planned not to enrol in Healthier SG. (Cont'd)

Participant characteristics	Univariate analysis		Multivariate analysis	
	OR	P value	OR	P value
Housing				
5-room public housing flat, private condominium or flat, or bungalow or semi-detached house	1.00		-	
1-, 2-, 3-, 4-room public housing flat	1.03	0.889	-	-
Socioeconomic status				
Higher socioeconomic status	1.00		-	
Lower socioeconomic status	1.00	0.980	-	-
(B) Disease management				
Regular doctor				
Have a regular doctor	1.00		1.00	
No regular doctor	1.71	0.005	1.55	0.023
Health plan				
No health plan	1.00		-	
Have a health plan	1.01	0.966	-	-
(C) Healthcare utilisation				
One-year hospitalisation				
Never hospitalised in the past year	1.00		-	
Hospitalised at least once in the past year	0.95	0.829	-	-
Total no. of nights spent in the hospital in the past year				
0–7 days	1.00		-	
More than 7 days	1.82	0.097	-	-
1-year emergency visit				
Never visited the emergency department in the past year	1.00		-	
Visited the emergency department at least once in the past year	0.74	0.333	-	-
Total no. of emergency visit in the past year	1.03	0.847	-	-

Table 1. Characteristics of individuals who were aware of HSG but were unsure about enrolling or planned not to enrol in Healthier SG. (Cont'd)

Participant characteristics	Univariate analysis		Multivariate analysis	
	OR	P value	OR	P value
1-year primary care visit				
Visited a primary care provider at least once in the past year	1.00		1.00	
Have not visited a primary care provider in the past year	2.61	<0.001	2.38	0.001
(D) Health characteristics				
EQ-5D mobility dimension				
No problem	1.00		-	
Have problem	0.99	0.947	-	-
EQ-5D self-care dimension				
No problem	1.00		-	
Have problem	1.08	0.827	-	-
EQ-5D usual activities dimension				
No problem	1.00		-	
Have problem	0.89	0.673	-	-
EQ-5D pain/discomfort dimension				
No problem	1.00		-	
Have problem	0.88	0.459	-	-
EQ-5D anxiety/depression dimension				
No problem	1.00		-	
Have problem	1.46	0.085	-	-
EQ VAS score	1.00	0.937	-	-
BMI category				
Underweight (<18.5 kg/m ²)	1.00		-	
Low cardiovascular disease risk (18.5–22.9 kg/m ²)	2.27	0.186	-	-
Moderate cardiovascular disease risk (23.0–27.4 kg/m ²)	2.21	0.200	-	-
High or very high cardiovascular disease risk (≥27.5 kg/m ²)	2.16	0.221	-	-

Table 1. Characteristics of individuals who were aware of HSG but were unsure about enrolling or planned not to enrol in Healthier SG. (Cont'd)

Participant characteristics	Univariate analysis		Multivariate analysis	
	OR	P value	OR	P value
(E) Lifestyle				
Smoking status				
Never smoker	1.00		-	
Current or ex-smoker	1.36	0.175	-	-
Alcohol consumption behaviour in the past month				
Non-drinker	1.00		-	
Drinker who did not engage in binge drinking	1.20	0.488	-	-
Binge drinker	1.25	0.731	-	-

BMI: body mass index; EQ VAS: EQ visual analogue scale;
OR: odds ratio

Table 2. Characteristics of individuals who were unaware of Healthier SG. (Cont'd)

Participant characteristics	Univariate analysis		Multivariate analysis	
	OR	P value	OR	P value
Lived in Singapore most of the time in the past 5 years				
Yes	1.00		-	
No	0.50	0.225	-	-
Education				
Has formal education	1.00		1.00	
No formal education	3.44	<0.001	3.38	<0.001
Work status				
Employed, unemployed, retired or full-time student	1.00		-	
Housewife	1.40	0.026	-	-
Marital status				
Single, married, divorced or separated	1.00		1.00	
Widowed	1.86	<0.001	1.56	0.017
Children				
No children	1.00		-	
Have children	1.16	0.345	-	-
Housing				
5-room public housing flat, private condominium or flat, or bungalow or semi-detached house	1.00		-	
1-, 2-, 3-, 4-room public housing flat	1.75	<0.001	-	-
Socioeconomic status				
Higher socioeconomic status	1.00		1.00	
Lower socioeconomic status	1.55	<0.001	1.40	0.008
(B) Disease management				
Regular doctor				
Have a regular doctor	1.00		-	
No regular doctor	1.06	0.649	-	-
Health plan				
Have a health plan	1.00		-	
No health plan	1.10	0.400	-	-

Table 2. Characteristics of individuals who were unaware of Healthier SG.

Participant characteristics	Univariate analysis		Multivariate analysis	
	OR	P value	OR	P value
(A) Demographics				
Age				
45–59 years old	1.00		-	
60 years old and above	0.93	0.557	-	-
Sex				
Male	1.00		-	
Female	1.04	0.744	-	-
Ethnicity				
Chinese	1.00		1.00	
Malay	1.98	<0.001	1.80	<0.001
Indian	1.63	0.002	1.48	0.022
Others	1.14	0.651	0.97	0.934
Citizenship status				
Singapore citizen	1.00		1.00	
Singapore permanent resident	1.79	0.005	3.39	<0.001

Table 2. Characteristics of individuals who were unaware of Healthier SG. (Cont'd)

Participant characteristics	Univariate analysis		Multivariate analysis	
	OR	P value	OR	P value
(C) Healthcare utilisation				
1-year hospitalisation				
Never hospitalised in the past year	1.00		-	
Hospitalised at least once in the past year	1.38	0.018	-	-
Total no. of nights spent in the hospital in the past year				
0–7 days	1.00		1.00	
More than 7 days	2.13	<0.001	1.70	0.030
One-year emergency visit				
Never visited the emergency department in the past year	1.00		-	
Visited the emergency department at least once in the past year	0.96	0.800	-	-
Total no. of emergency visit in the past year	0.98	0.877	-	-
1-year primary care visit				
Visited a primary care provider at least once in the past year	1.00		-	
Never visited a primary care provider in the past year	1.65	0.003	-	-
(D) Health characteristics				
EQ-5D mobility dimension				
No problem	1.00		-	
Have problem	1.77	<0.001	-	-
EQ-5D self-care dimension				
No problem	1.00		-	
Have problem	2.13	<0.001	-	-
EQ-5D usual activities dimension				
No problem	1.00		1.00	
Have problem	1.93	<0.001	1.46	0.018
EQ-5D pain/discomfort dimension				
No problem	1.00		-	
Have problem	1.16	0.176	-	-

Table 2. Characteristics of individuals who were unaware of Healthier SG. (Cont'd)

Participant characteristics	Univariate analysis		Multivariate analysis	
	OR	P value	OR	P value
EQ-5D anxiety/depression dimension				
No problem	1.00		-	
Have problem	1.13	0.377	-	-
EQ VAS score	0.99	0.015	-	-
BMI category				
Underweight (<18.5 kg/m ²)	1.00		-	
Low cardiovascular disease risk (18.5–22.9 kg/m ²)	0.84	0.564	-	-
Moderate cardiovascular disease risk (23.0–27.4 kg/m ²)	0.89	0.681	-	-
High or very high cardiovascular disease risk (≥27.5 kg/m ²)	1.04	0.884	-	-
(E) Lifestyle				
Smoking status				
Never smoker	1.00		1.00	
Current or ex-smoker	1.83	<0.001	1.88	<0.001
Alcohol consumption behaviour in the past month				
Non-drinker	1.00		-	
Drinker who did not engage in binge drinking	0.89	0.514	-	-
Binge drinker	1.18	0.689	-	-

BMI: body mass index; EQ VAS: EQ visual analogue scale;
OR: odds ratio

in the sample (84.1%) was similar to the high proportion (85.5%) of willingness to enrol in HSG among older adults observed in a Singapore study conducted a year before HSG's launch.⁶ However, 1 and a half years after the launch of HSG, only half of the eligible population had enrolled,⁷ which was only slightly higher than the enrolment rate of 44.3% among individuals who were aware of HSG in this study. The small increase in enrolment rate could be due to low willingness to enrol among eligible residents who were aware of or invited to HSG at a later time. For example, younger residents without chronic conditions, who were invited to enrol after the survey, may not feel the urgency to do so. Another possibility,

which is more worrying, is that some residents with chronic conditions did not enrol due to other undetected reasons, though they were aware of HSG and would express willingness when inquired.

Improving HSG uptake is key to HSG's success since it adopts an opt-in method. This study suggests that awareness per se is not sufficient, and targeted interventions are needed to improve for HSG enrolment.

Ethics statement

This study was approved by the National University of Singapore Institutional Review Board (2023-190).

Declaration

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