



# Health supplement products use among patients with chronic illnesses: A multicenter study in rural areas of Sarawak, Malaysia

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## ABSTRACT

Health supplement products (HSPs) are gaining public acceptance in Malaysia. However, little is known about the practices and perceptions of HSPs among patients in rural areas. This study aims to explore the prevalence of concomitant use of HSPs with prescribed medicine, practices, perceptions, and factors influencing the consumption of HSPs among patients with chronic illnesses in rural areas of Sarawak, Malaysia. A multicenter cross-sectional study was conducted in the outpatient pharmacy department of seven districts' hospitals from June to August 2018. A data collection form and questionnaire were developed and pilot tested prior to the data collection. Bivariate logistic regression was used to assess the association between patients' sociodemographic characteristics and the use of HSPs. A total of 350 patients participated in the study. Only 84 (24.0%) patients were active HSP users and 54 (64.3%) of them always used HSPs concomitantly with prescribed medicines. Approximately half (52.0%) of the patients never consult healthcare providers about the use of HSPs. However, the majority of them expressed agreement upon the necessity to consult healthcare providers prior to HSP use (82.0%) or during the concomitant use of HSPs with prescribed medicines (80.3%). Patients with monthly household incomes of more than RM 2000 (USD 480.59) ( $n = 84$ ) were 4.23 times significantly ( $p < 0.001$ ) more likely to consume HSPs than those with an income of RM 830 (USD 199.44) or less ( $n = 173$ ). In conclusion, the concomitantly used HSPs with prescribed medicines is prevalent among patients and educational interventions are needed to enhance the safe use of such products.

## INTRODUCTION

Notwithstanding the advancement in modern medicines and health technologies, the use of traditional health supplement products (HSPs) still prevails particularly among patients with chronic diseases. HSP is defined as any manufactured dietary supplement product, including supplement to the diet, and contains one or more dietary ingredients, such as vitamins, minerals, herbs or other botanicals, amino acids, and other substances or their constituents, consumed for general well-being (Abdulla *et al.*, 2019; Gardiner *et al.*, 2008). HSPs must be marketed in various dosage forms, such as tablet, capsule,

powder, and liquid formulation (Zubrova *et al.*, 2020). A recent study revealed that 42% of preoperative patients in the Czech Republic were consuming dietary supplements (Zubrova *et al.*, 2020). Meanwhile, approximately 43% of Australian adults were found to have consumed at least one dietary supplement product in the past 14 days (O'Brien *et al.*, 2017).

In 2017, the sales of HSPs achieved USD 128 billion globally (Baltazar-Martins *et al.*, 2019). The sales of HSPs in Malaysia was rapidly growing from USD 488 million in 2014 to USD 730 million in 2019 (Lim, 2020). Meanwhile, the expenditure recorded on HSP use in the United States was USD 36.7 billion in 2014, and USD 2 billion and USD 2.6 billion were specifically on supplements for weight loss and muscle building, respectively, in 2015 (Austin *et al.*, 2017). Indeed, the use of HSPs was found among elderly people who consumed various prescription medications for multiple comorbid conditions (Bailey *et al.*, 2010), as well as in children and adolescents (Liu *et al.*, 2019; Mohammadbeigi *et*

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*al.*, 2020; Namazi *et al.*, 2019). The monthly prevalence of HSP utilization was recorded as 65.3% among Iranian female high school students (Mohammadbeigi *et al.*, 2020), whereas 20.4% of primary school students in Hunan, China, were found to have used dietary supplements (Liu *et al.*, 2019).

Zooming to Malaysia, HSPs are gaining a high level of public acceptance. According to the national health and morbidity survey conducted in 2003 and 2014 throughout Malaysia, there was an increase in the use of HSPs among adults (Institute for Public Health, 2014). The prevalence of vitamins and mineral supplements usage had increased from 23.94% in 2003 to 28.05% in 2014. Besides, a more drastic increment was found in the prevalence of food supplement utilization between 2003 (24.79%) and 2014 (34.02%) (Institute for Public Health, 2014). Vitamin C, multivitamins, calcium, and vitamin B complex were the most commonly used vitamin and mineral supplements in Malaysia. Conversely, the most popular food supplements among Malaysian were fish oil, royal jelly, spirulina, and collagen (Institute for Public Health, 2014).

The majority of Malaysian consumers were single supplement users and most of them were living in urban areas. The main reasons for HSP use were to improve the general well-being and to act as an energy booster (Institute for Public Health, 2014). The consumption of HSPs among adolescences was higher than that among adults in Malaysia (Sien *et al.*, 2014). The usage of vitamin and mineral supplements among adolescences was 54.1%, while the food supplement intake was 40.2% (Sien *et al.*, 2014). Considering the use of herbal remedies for health maintenance among the population in Malaysia, a previous study revealed that the prevalence was as high as 29.6% (Siti *et al.*, 2009). Besides, the prevalence of Malaysian most commonly used herb-based application, beauty, and hygiene products for health problems was 23.6% (Siti *et al.*, 2009). Besides, a recent survey among Malay women in Malaysia found that 55.5% of them used herbs for general health and specific women problems (Tengku Mohamad *et al.*, 2019).

All the HSPs marketed in Malaysia need to be registered with the National Pharmaceutical Regulatory Agency with a compulsory security label and registration number on the outer packaging (National Pharmaceutical Regulatory Division, 2020). Nevertheless, previous studies revealed that substandard and falsified unregistered HSPs were found in the market (National Pharmaceutical Regulatory Division, 2020; Ting *et al.*, 2018b). These products are possibly adulterated with pharmaceutical substances which could produce the desired pharmacological action and outcome (Ting *et al.*, 2018b). According to the adulterated product samples analyzed by the Sarawak Pharmacy Enforcement Branch from 2015 to 2017, adulterated traditional products were found to be the highest (58.7%), followed by food products (33.3%) and supplements (8.0%) (Sarawak Pharmacy Enforcement Branch, 2018). Steroids remain the highest adulterants found in all the samples, with a percentage of 32.2%, followed by sex stimulants, non-steroidal anti-inflammatory drugs (NSAIDs), and others. Furthermore, most (66.2%) of the adulterated samples were originated from Malaysia (Sarawak Pharmacy Enforcement Branch, 2018). Inappropriate and long-term use of such pharmaceutical substances could lead to catastrophic and unwanted side effects and interactions. Therefore, it is essential for consumers to ensure the product safety by checking the product registration status before use.

Many studies have been conducted to explore factors influencing the use of HSPs, but there were variations in the study findings. Generally, factors influencing the use of HSPs were found to be and are not limited to gender, age, ethnic, marital status, education level, body mass index, physical activity, smoking, medical history, and income (Aziz and Tey, 2009; Mohammadbeigi *et al.*, 2020; O'Brien *et al.*, 2017). These variations are specifically based on the study population, as different populations would have different cultures, lifestyle, and beliefs. Hence, there is a need to explore factors that would influence the use of HSPs particularly among patients in rural areas of Sarawak, East Malaysia. The population in Sarawak is unique because of its diverse native ethnic groups, for instance, the Bidayuh, Iban, and Melanau. In the urban areas of Sarawak, the prevalence of herbal medicine use was 25% based on a previous study (Lee *et al.*, 2007). Nevertheless, there is limited newer research on the prevalence of HSP utilization among the Malaysian population. Additionally, previous studies in Malaysia did not properly address the prevalence of concomitant use of prescribed medicines and HSPs, as well as the practices, perceptions, and factors which lead to the use of HSPs among the rural population. Therefore, the primary objective of this study is to assess the prevalence of HSP use among patients with chronic illnesses from the rural areas of Sarawak. Additionally, the commonly used HSPs among these populations were assessed. This study also explores the practices and perceptions of the patients toward HSP. The association between socio-demographic characteristics of patients and the use of HSPs was assessed as well. Currently there are no established Malaysian guidelines on the concomitant use of HSPs and prescribed medicines, however, this study's findings will help in the development of such guidelines.

## METHODS

This was a multicenter cross-sectional study conducted from June to August 2018 in the outpatient pharmacy of seven districts' nonspecialist government hospitals in Sarawak, namely Hospital Saratok, Hospital Bau, Hospital Kanowit, Hospital Marudi, Hospital Dalat, Hospital Betong, and Hospital Daro. This study was approved by the Medical Research and Ethics Committee, Ministry of Health Malaysia (approval number NMRR-17-943-35773). The sample size was calculated based on the primary objective of the study by using a sample size formula from the prevalence study. Based on the previous prevalence of HSPs used among the Malaysian population of around 30% (Institute for Public Health, 2014), a total number of 323 patients would provide a representative sample size with 95% confidence interval and 5% margin of error.

Convenience sampling was used in the recruitment of patients. Patients with chronic diseases who consumed three or more prescribed medicines were included. Patients who actively consumed HSPs were assessed on their practices and perceptions of HSP use. The inclusion criteria for HSPs were those which demonstrated pharmacologic action used to produce a therapeutic effect or those that do not have a documented pharmacologic action which can affect the absorption, metabolism, and disposition of other drugs (Gardiner *et al.*, 2006). Any patient who declined the consent was excluded.

A data collection form was developed based on the objectives of the study using information from a literature review. The data collection form consisted of four parts. The first part

was the patient demographic data. Part two was a questionnaire to assess the prevalence of use, practices, and perceptions of patients toward HSPs. Meanwhile, parts three and four assessed the patient's current use of prescribed medicines and HSPs, respectively. The data collection form had gone through face and content validation by two experts (academicians from the School of Pharmaceutical Sciences, Universiti Sains Malaysia) and three practicing senior clinical pharmacists with at least 5 years of working experience in the government hospital. Briefing, training sessions, and pretesting were conducted with all the data collectors prior to the data collection. The data collectors in this study were the pharmacists from the respective hospitals involved in this study. Subsequently, a pilot study was conducted with 32 patients, with eight patients each from Hospital Marudi, Hospital Betong, Hospital Daro, and Hospital Dalat. With the collected data, the internal consistency of the questionnaire in the data collection form was tested with Cronbach's alpha, and the results were 0.825 for questions that explored the practices of HSPs and 0.780 for questions that focused on patient's perception of HSPs.

The patients who collected medications from the outpatient pharmacy department of the selected hospitals were screened by the data collectors. Those who fulfilled the inclusion criteria were selected and called to the counseling room. The objectives of the study were explained and the patients were asked for consent to participate in the study. Subsequently, the data collection form was distributed through face-to-face interviews with the patients. In order to reduce recall bias, this study only included the HSPs mentioned by the patients which they were actively using. Explanations were given by the data collectors by using layman's term so that the patients would understand the definition of HSPs in this study. Actively used HSP was defined as HSPs that were currently consumed by the patients. The patients were requested to bring along their HSPs for identification if they cannot recall the products' names. The data collection form was filled in by the data collectors. Additionally, patients' cell phone numbers were recorded. Hence, information that was missed out during the interview was obtained later through telephone calls or during the next medication collection date.

The data were entered into the Statistical Package for the Social Sciences SPSS® version 21.0 for analysis. Descriptive statistics were used to report the demographic data, prevalence, practices, and perceptions of the patients toward HSPs. The common HSPs used and their indications were tabulated. Bivariate logistic regression was used to explore the association of all the socio-demographic data with the use of HSPs.

## RESULTS

### Patients' demographic

A total of 364 patients were approached to participate in the present study. Nine patients who refused to participate and another five patients with missing data were excluded. The remaining 350 patients participated in this study. The mean age and body mass index of the respondents were  $55.6 \pm 11.7$  years and  $25.60 \pm 4.95$  kg/m<sup>2</sup>, respectively. Slightly more than half (56.0%) of the respondents were female. The ethnicity of the majority (32.3%) of the respondents was Iban, and most (54.6%) of the respondents' education levels were lower than secondary school. The respondents were mostly nonsmokers (73.1%) and nonalcohol drinkers (72.0%). The majority of them (41.1%) were physically active with more

than three times of physical activity per week. Considering the socio-demographics, about half (49.4%) of them have a monthly household income of less than RM 830 (USD 199.44). Most of the respondents were diagnosed with hypertension (86.9%), diabetes mellitus (52.9%), and dyslipidemia (34.3%) (see Table 1).

**Table 1.** Demographic characteristics of patients.

Demographic characteristic	n (%)
Age, years	
18–35 (young adults)	16 (4.6)
36–55 (middle age adults)	151 (43.1)
> 55 (older adults)	183 (52.3)
Body mass index, kg/m <sup>2</sup>	
< 18.5 (underweight)	19 (5.4)
18.5–24.9 (normal)	150 (42.9)
25.0–29.9 (overweight)	124 (35.4)
> 29.9 (obese)	57 (16.3)
Gender	
Female	196 (56.0)
Male	154 (44.0)
Ethnicity	
Natives ethnic groups	244 (69.7)
Iban	113 (32.3)
Melanau	82 (23.4)
Bidayuh	36 (10.3)
Kenyah	4 (1.1)
Kayan	3 (0.9)
Penan	2 (0.6)
Kelabit	2 (0.6)
Kiput	1 (0.3)
Dayak	1 (0.3)
Malay	57 (16.3)
Chinese	49 (14.0)
Education level	
No formal education	69 (19.7)
Primary school	122 (34.9)
Secondary school	126 (36.0)
Diploma/degree	33 (9.4)
Cigarette smoking status	
Smoker	37 (10.6)
Ex-smoker	57 (16.3)
Non-smoker	256 (73.1)
Alcohol consumption status	
Drinker	61 (17.4)
Ex-drinker	37 (10.6)
Non-drinker	252 (72.0)
Physical activity (including labor work/farming)	
< 1 time a week	109 (31.1)
1–3 times a week	97 (27.7)
> 3 times a week	144 (41.1)
Monthly household income	
≤ RM 830.00 (USD 199.44)	173 (49.4)
> RM 830.00–RM 2,000.00 (USD 199.44 – USD 480.59)	93 (26.6)
> RM 2000.00 (USD 480.59)	84 (24.0)
Type of chronic diseases	
Hypertension	304 (86.9)
Diabetes mellitus	185 (52.9)
Dyslipidemia	120 (34.3)
Chronic kidney disease/end stage kidney disease	13 (3.7)
Atrial fibrillation	10 (2.9)
Others	73 (20.9)

### Patients' practices of HSP

A total of 150 respondents (42.9%) have experience in consuming HSPs. However, the prevalence of active HSP users was 24.0% ( $n = 84$ ). Among the active users, the majority (41.7%;  $n = 35$ ) were from the high household income group, while 28.6% ( $n = 24$ ) and 29.8% ( $n = 25$ ), respectively, were from moderate- and low-income groups. The 150 respondents were investigated on their practices of HSP. Around half (51.4%) of the respondents have experience in consuming prescribed medicines together with HSPs immediately prior to or after their prescribed medicines consumption without any intentional time spacing. When specifically assessing the current active HSP users, 64.3% ( $n = 54$ ) of them have always used HSPs concomitantly with prescribed medicines. Nevertheless, approximately half (52.0%) of the respondents indicated that they never consult doctors or pharmacists before consuming any HSP. Besides, 54.0% of the respondents never informed doctors or pharmacists about their use of HSPs. The majority of respondents (72.0%) never check the product registration status before using HSPs. Most of the respondents claimed that they never (75.3%) change the regime of the prescribed medicines because of HSP use, and 56.7% followed the dosage regime instruction of the HSP use (see Table 2).

### Patients' perceptions of HSP

All the respondents ( $n = 350$ ) were assessed on their perceptions of HSP. Only 24.3% of the respondents perceived all HSPs marketed in Sarawak as safe to be consumed. Similarly, only 27.5% of respondents believed that all HSPs sold in Sarawak have approval from the Ministry of Health Malaysia. The majority of respondents expressed agreement that it is necessary to consult doctors or pharmacists before using any HSP (82.0%) and be informed about the concomitant use of HSPs and prescribed medicines (80.3%). In addition, the respondents also mostly

agreed (83.7%) upon the importance of following the instruction of doctors or pharmacists on the use of HSPs (see Table 3).

### Factors influencing HSP consumption

When assessing the contributing factors to HSP consumption, the patient's gender, age, body mass index, ethnicity, education level, smoking status, alcohol consumption status, physical activity, household income, and number of comorbidity diseases were initially tested by single logistic regression. The results showed that education level, smoking status, and monthly household income were statistically significantly associated with the use of HSPs. These three factors were subsequently tested in multivariate analyses and only income of the family significantly influenced the use of HSPs. Higher household income significantly led to a greater usage of HSPs. Patients with a monthly household income of more than RM 2000.00 (USD 480.59) were significantly more likely to consume HSPs as compared to the low-income group with a monthly income of RM 830.00 (USD 199.44) or less (adjusted odds ratio: 4.23; 95% CI: 2.31–7.76;  $p < 0.001$ ). Those with a monthly income ranging from more than RM 830.00 (USD 199.44) to RM 2000.00 (USD 480.59) were also significantly more prone to use HSPs than the low-income group (adjusted odds ratio: 2.06; 95% CI: 1.10–3.86;  $p < 0.001$ ).

### HSPs consumed by the patients

The products commonly consumed by a total of 84 active HSP users are listed in Table 4. The majority (83.3%,  $n = 70$ ) of them were single HSP users, while nine (10.7%) of the users consumed two products. There were only four (4.8%) HSP users who consumed three products and only one (1.2%) user who consumed four products. The mean number of HSPs used by active users was found to be  $1.25 \pm 0.59$ . The most commonly used HSP was fish oil (with vitamin E), vitamin C (with bioflavonoids), and glucosamine (with a combination of other active ingredients).

Table 2. Practices of the use of HSPs.

Question <sup>a</sup>	Never <i>n</i> (%)	Sometimes <i>n</i> (%)	Frequently <i>n</i> (%)	Always <i>n</i> (%)
1. Do you ever take your prescribed medicines together with HSP?	73 (48.7)	42 (28.0)	16 (10.7)	19 (12.7)
2. Do you ever consult your doctors or pharmacists before consuming any HSP?	78 (52.0)	25 (16.7)	20 (13.3)	27 (18.0)
3. Do you ever inform your doctors or pharmacists about the use of HSP?	81 (54.0)	28 (18.7)	18 (12.0)	23 (15.3)
4. Do you ever self-decide the dosage regime of the HSP use?	85 (56.7)	32 (21.3)	14 (9.3)	19 (12.7)
5. Do you ever change the regime (dose, frequency, duration) of prescribed medicines yourselves because of HSP use?	113 (75.3)	23 (15.3)	12 (8.0)	2 (1.3)
6. Do you ever check registration status of the HSP before using it?	108 (72.0)	20 (13.3)	4 (2.7)	18 (12.0)

<sup>a</sup>This section involved patients who have experiences in using HSP ( $n = 150$ ).

Table 3. Perceptions of HSPs.

Item	Strongly disagree <i>n</i> (%)	Disagree <i>n</i> (%)	Neutral <i>n</i> (%)	Agree <i>n</i> (%)	Strongly agree <i>n</i> (%)
1. All HSP in Sarawak are safe to be consumed.	22 (6.3)	142 (40.6)	101 (28.9)	84 (24.0)	1 (0.3)
2. All HSP sold in Sarawak have approval from Ministry of Health Malaysia.	22 (6.3)	130 (37.1)	102 (29.1)	94 (26.9)	2 (0.6)
3. It is important to consult my doctors or pharmacists before consuming any HSP.	3 (0.9)	27 (7.7)	33 (9.4)	224 (64.0)	63 (18.0)
4. It is important to follow the instruction from my doctors or pharmacists on the regime of HSP use.	3 (0.9)	21 (6.0)	33 (9.4)	237 (67.7)	56 (16.0)
5. It is important to inform my doctors or pharmacists about the concomitant use of HSP and prescribed medicines.	3 (0.9)	23 (6.6)	43 (12.3)	230 (65.7)	51 (14.6)

**Table 4.** HSP use and its expected medicine purpose.

Health supplement product <sup>a</sup>	Expected medicinal purpose	n (%) <sup>b</sup>
1. Fish oil omega 3 fatty acid [eicosapentaenoic acid and docosahexaenoic acid]/Fish oil omega 3 fatty acid with vitamin E	Enhance the immune system, for general health well-being, reduced blood cholesterol, reduce knee pain, cardio and brain health protective effects, improve memory	14 (16.7)
2. Vitamin C/Vitamin C with bioflavonoids	For general health well-being, skin care (for healthier skin), reduce fatigue/lethargy (improve energy level), antioxidant	10 (11.9)
3. Glucosamine/Glucosamine with chondroitin/Glucosamine with curamin complex plus vitamin C and minerals	Reduce knee pain, osteoarthritis, reduce joint pain	7 (8.3)
4. Multivitamin/Multivitamin with minerals/Multivitamin with panax ginseng	For general health well-being, increase alertness	6 (7.1)
5. Coenzyme Q10/Coenzyme Q10 with alpha lipoic acid/Coenzyme Q10 with L-carnitine fumarate/Coenzyme Q10 with alpha lipoic acid, olive extract plus multivitamin with antioxidant properties minerals/Coenzyme Q10 with beta glucan	Reduce fatigue/lethargy (improve energy level), reduced blood cholesterol	5 (6.0)
6. Spirulina	For general health well-being, reduce fatigue/lethargy (improve energy level)	5 (6.0)
7. Vitamin B complex	For general health well-being	5 (6.0)
8. Delima Pamoga® Liquid (pomegranate, stichopus variegatus & chlorella vulgaris extract)	For general health well-being, reduce blood pressure, reduced blood cholesterol	4 (4.8)
9. Collagen/Collagen with hyaluronic acid	Skin care (for skin fairness and healthier skin), reduce knee pain, joint support	3 (3.6)
10. Folic	For general health well-being	3 (3.6)
11. Ginkgo biloba	Reduce nerve pain or numbness, improve memory, increase blood circulation	3 (3.6)
12. Mecobalamine	Reduce muscle pain, reduce nerve pain	3 (3.6)
13. Ayam Selasih® Tablet (basil leaf extract, rafflesia hasseltii extract, pomegranate, parameria, sea cucumber extract and pineapple extract)	For general health well-being	2 (2.4)
14. Calcium carbonate	For healthy bone, reduce muscle cramp	2 (2.4)
15. Jus Hidayah Gold® Liquid (red dates, date palm, angelica sinesis, clove, turmeric, pomegranate, curcuma zanthorrhiza, cumin, black seeds, honey, nutmeg, god's crown & apricot)	Reduce fatigue/lethargy (improve energy level), for general health well-being.	2 (2.4)
16. Milk thistle/Milk thistle with dandelion	Liver protective	2 (2.4)
17. Moreenga® Elixer (moringa, acai berry and seabuckthorn)	Improve sexual performance, reduce blood pressure	2 (2.4)
Other 26 types of HSPs		26 (31.0)

<sup>a</sup>The total types of HSPs identified were 43.

<sup>b</sup>The percentage was calculated based on a total of 84 active HSP users.

## DISCUSSION

The response rate in this study was 96.2% and managed to achieve the targeted sample size. Most of the respondents (69.4%) were the non-Malay native population in Sarawak and the distribution was in accordance with the demographic characteristic of the Sarawak native population for which the majorities were Iban, Bidayuh, and Melanau (Nelson *et al.*, 2016). This was contrasted with similar studies conducted in West Malaysia which involved mainly the ethnic groups of Malay, Chinese, and Indian (Baharom *et al.*, 2016; Ching *et al.*, 2013). Besides, the respondents generally have lower education level and household income as compared to a previous study in Malaysia which involved urban (Lee *et al.*, 2007) and suburban areas (Ching *et al.*, 2013). Nearly 20% of the respondents in the present study did not receive formal education and approximately half of them have a household income lower than RM 830 per month and this was classified as a poor family according to the definition by the Malaysian government (Ministry of Health, Labor and Welfare, 2011).

Although this study specifically involved patients with chronic illnesses, the prevalence of HSP utilization was lower as compared to other studies which focused on specific disease

groups, such as type II diabetes mellitus (58.5%), hypertension (62.6%), and Parkinson's disease (83.4%) (Baharom *et al.*, 2016; Ching *et al.*, 2013; Ferguson *et al.*, 2019). The low prevalence in this study could be explained by the intension of the use of the products (Abdullah *et al.*, 2018). Approximately 40% of the HSPs were intended for general health maintenance or as energy booster rather than for disease adjunctive treatment. Additionally, the low household income among the respondents might be another reason for the low prevalence in this study. A study in Iran revealed a similar finding that dietary supplement consumption increases when there is an increment in the family income level (Mohammadbeigi *et al.*, 2020). In the present study, only 29.8% of active HSP users were patients from low-income group. This finding might reflect the fact that the high expenditure on HSPs was a burden to chronic disease patients with a low household income. A study by Austin *et al.* (2017) also found that the cost of HSPs might place the low household income families at a higher risk of financial burden. Interestingly, household income was the only determining factor for the use of HSPs in the present study. This finding is in contrast with other studies where income is not the sole determining factor but multiple factors such as gender, age, body mass index, and

education status were also influencing the use of HSPs (Aziz and Tey, 2009; O'Brien *et al.*, 2017).

This study raised a concern on the concomitant use of supplement products with prescribed medicines. A high proportion of active HSP users were not consulting and disclosing such information to their healthcare providers. These findings are consistent with a recent meta-analysis which found that the patients' rate of disclosure of such information to their healthcare providers was low (Foley *et al.*, 2019). The major contributing factors to this problem might be that the patients were afraid of critics and lack of discussion between the healthcare providers and patients on the use of HSPs (Abdullah *et al.*, 2018; Foley *et al.*, 2019). This issue needs to be addressed as there are potential interactions between HSPs and prescribed medicines and which subsequently might cause unwanted effects or therapeutic failure (Tachjian *et al.*, 2010).

The Malaysian Medicines Policy was endorsed in 2006 for which the quality use of medicines is one of the essential components (Pharmaceutical Services Division, 2013). Subsequently, the national "Know Your Medicines" campaign which aimed to improve the quality use of medicines among Malaysians was launched (Ting *et al.*, 2019). Various activities were conducted through this campaign which involves workshop exhibition and talks, promoting rational use of medicines through the mass media, and reviewing consumer perception and knowledge toward medicines (Ting *et al.*, 2019). Besides, the Malaysian government requires compulsory labeling for registered HSPs with security label and registration number on the outer packaging (National Pharmaceutical Regulatory Division, 2020; Ting *et al.*, 2018b). The consumers could verify the products' authenticity by either vetting the security label Meditag™ Hologram (Pharmaceutical Services Division, 2015) or searching for the product registration number through the online product registration search database named "QUEST 3+ Product Search" (National Pharmaceutical Regulatory Agency, 2020). These steps are essential in avoiding consuming any unregistered or counterfeited products. However, a worrying practice was found in this study that more than 60% of the respondents did not check product registration status before consuming any HSP. This could be due to the lack of awareness about product registration (Ting *et al.*, 2019). Surprisingly, around 40% of the respondents perceived that not all the HSPs marketed in Sarawak are safe and registered. These findings reflected that the rural population might have a lack of accessibility to the government health promotion campaign. Information on the precaution of concomitant use of HSPs with prescribed medicines, potential drug-HSP interaction, and HSP registration status is lacking among the rural population. This warranted a review of the current health promotion material and the necessity in creating better understanding of these topics. Crucial steps are needed to create better health promotion strategies in creating awareness among the patients on the safe use of HSPs. More health promotion campaigns should be organized by the Ministry of Health to highlight the potential risk of HSP adulteration and interactions with prescribed

medicines and encourage patients to discuss the use of HSP with healthcare providers. This is an important step as this information is lacking in the currently available health promotion materials. Besides, more local representatives from the rural areas should be invited to be involved in the educational program, along with well-designed local native language health promotion materials to create awareness on the safe use of HSPs.

Adherence to prescribed medicines is crucial for chronic disease control (Ting *et al.*, 2018a). Nevertheless, approximately, quarter of the patients in this study have a tendency to change the regime of the prescribed medication after the use of HSPs. This finding indicates that some patients from rural areas have not complied with the instruction of healthcare providers. In order to address this problem, the healthcare provider could take the initiative to explore more by asking patients about their use of HSPs with open-ended questions. Patients would be willing to disclose more about their use of supplement products if the healthcare provider showed interest in knowing the information (Foley *et al.*, 2019). Additionally, all information about HSPs should be recorded in the patient record book and treated the same as other prescribed medicines. Documentation of patient's HSP usage could alert the healthcare provider on the potential adverse effects and interaction between supplements and prescribed medicines (Ben-Sasson *et al.*, 2020).

## LIMITATIONS

There might have been a selection bias in this study due to the convenience sampling. To overcome this problem, the data were collected from multicenter facilities and with a bigger sample size. Additionally, the results were solely based on the self-reporting of the patients' consumption of HSP, which might have introduced recall bias. However, efforts were made to avoid recall bias, whereby the patients were asked to bring along the HSPs for review in case they could not recall their HSP name. However, there was a possibility of response bias (socially desirable answers) as the interviewers were the pharmacist working in the district hospital.

## CONCLUSION

The concomitant use of HSPs with prescribed medicines was prevalent among patients with chronic diseases in rural areas of Sarawak. This practice was seldom being disclosed by the patients to the healthcare providers. Educational interventions and tenacious efforts are required to instill better practice on the safe use of HSPs among patients.

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**CONFLICT OF INTEREST**

The authors have no conflicts of interest in connection with this paper.

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