

Use of dietary supplement among the elderly in Yangon, Myanmar

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ABSTRACT

The use of dietary supplement (DS) among the elderly has increased worldwide including Myanmar. This survey research aimed to explore the prevalence of DS use and factors associated with DS use among the elderly in Yangon, Myanmar. Two hundred elderly were systematically sampled from four wards in South Okkalapa Township, Yangon. Face-to-face interviews with a structured questionnaire were conducted in February 2020. Descriptive statistics, chi square test and a binary logistic regression were used for data analysis. Findings showed that DS use was highly prevalent among the elderly (71%; 95% CI 64.7-77.3). The top three DS frequently used were multivitamins and minerals, vitamin B complex, and a combination of ginseng and multivitamins/minerals (43.6%, 12.8%, 11.3% respectively). The majority used only one DS, once daily, and between one and five years. Nearly half of them took DS to promote their health. They received DS from purchasing at pharmacies (45.1%), obtaining from family/relatives and friends (33.2%), and hospitals (18.5%). Nearly 75% reported that they consulted with their healthcare providers when taking DS. There were no any associations among independent variables (demographic factors, health behaviors, as well as health status) and DS use of the elderly. Some interventions by health care organizations might be created to raise awareness of appropriate use of DS, especially for the elderly who are at high risk group of negative consequences from drug-dietary interaction.

Keywords: *Dietary supplement, elderly, prevalence and Myanmar*

INTRODUCTION

Insufficient Globally, the use of dietary supplement (DS) has been increasing steadily among many countries. Since 2005, the prevalence of DS use among the elderly has increased from 16% to 80% in western countries (Aryeetey & Tamakloe 2015; Brownie, 2005; Gahche et al., 2017; Kishiyama et al., 2005; Nathan et al., 2019; Olafsdottir et al., 2017; Rozga et al., 2017). In Asian countries, the prevalence of DS usage among the elderly ranged from 19 to 79% between 1999 and 2019 (Chen et al., 2011; Hirayama et al., 2008; Liang et al., 2009; Park et al., 2016; Putthapiban et al., 2017; Tangkiatcumjai et al., 2013 and Wahab, 2021. Peltzer et al. (2016) indicated that the use of traditional and complementary and alternative medicine

among chronic disease patients in Myanmar was 65% in past 12 months (Peltzer et al., 2016). It is not surprising that the high prevalence of DS use among the elderly is due to wide availability of DS over-the-counter at pharmacies as well as high interest in DS usage. Although DS use was common, most of DS users might not receive information from reliable sources and used it for their own decisions (Alomar et al., 2019; Fadzil et al., 2018; Nathan et al., 2019; Park et al., 2016). The majority of DS users have confidence in safety, efficacy, quality and price of DS (Alkhamaiseh & Aljofan, 2020; Nathan et al., 2019). They generally viewed DS as a natural substance and concurrently use with medications without concerning side effects. An excessive usage can lead to neurological disturbances, hepatotoxicity, stroke, sudden death, and gastrointestinal problems (Axon et al., 2017). Evidence suggested that older people were more susceptible to potential drug-dietary supplement interactions. These interactions changed bioavailability of drugs, which leads to increasing toxicity of drugs or decreasing efficacy of prescription medications (Aznar-Lou et al., 2019). Previous study indicated that rate of hospitalization due to adverse events was two-fold higher in older adults than young adults (Geller et al., 2015). It is also vital to notice that the low disclosure rate of DS use between healthcare providers and patients can lead to excessive usage of supplement and increase risks of adverse drug reactions between prescribed medications and DS.

As DS are available over-the-counter and highly prevalent among elderly (Aryeetey & Tamakloe, 2015; Chen et al., 2011; Gahche et al., 2017; Masumoto et al., 2018; Olafsdottir et al., 2017; Park et al., 2016), it is important to explore characteristics of DS users, pattern of use, awareness of side effects and factors that influenced their use of DS. Prior studies highlighted that use of DS was highly associated with increasing in age, women, high socio-economic status, with one or more medical conditions and positive health behaviors such as having frequent physical exercise, non-smoking (Brownie, 2005; Chen et al., 2005; Dickinson & Mackay, 2014; Gahche et al., 2017). However, only one study has been conducted on the use of traditional, complementary, and alternative medicine among the elderly in Myanmar (Peltzer et al., 2016). This study aimed to explore the prevalence of DS use and factors associated with DS use among the elderly in Yangon, Myanmar.

METHODOLOGY

This study was a cross-sectional survey. South Okkalapa Township in Yangon city was purposive selected. The sample were elderly aged over 60 years old, both male and female, who could listen to and speak the local Burmese language. The required sample size was calculated by using formula for prevalence study:

$$(Z^2 P (1-P)/d^2)$$

where Z is the critical value (1.96 for an alpha of 0.05),

P is expected prevalence of DS users, and

d is precision

(Pourhoseingholi & Rahimzadeh, 2013)

As there was a lack of previous studies in Yangon, the sample size became 196 with 50% of expected prevalence and 7% precision (Naing et al., 2006). Finally, 200 elderly were included in this study. Five out of 13 wards in South Okkalapa were simple randomly selected, then 40 households were systematically selected in each ward. One elderly in each household was invited to face-to-face interviews in February 2020. Prior to the interview, the researcher described the research, including its objective and data collection method. If elderly were willing to participate in interviews, they provided written informed consent. A questionnaire was assessed content validity by three experts. After doing a try out among 30 elderly in different area of Yangon, the questionnaire was revised.

In this study, DS is defined as product that was in oral form, such as capsule, soft gel and tablet, which the elderly consider to have beneficial effects on their health (e.g. vitamins, minerals, and herbal products) except for daily foods such as milk, fruit, and vegetables. The questionnaire consists of three parts; Part A: Personal information (6 items) included age, gender, education, monthly household income, chronic diseases and perceived health status. In term of perceived health status, the elderly was asked to rate his/her health status (bad, fair, good and excellent); Part B: Health behaviors (2 items) included smoking and doing physical exercise. Part C: The use of DS (8 items) included type of DS, duration of use, frequency of use, purpose of use, source of purchase, source of information, consultation with healthcare providers and experience of side effects after using DS. Descriptive statistics were used to describe elderly's characteristics, prevalence and pattern of DS use. Percentage of categorical variables were compared using Chi-square test. Binary logistic regression was performed to assess factors associated with DS use. P-value less than 0.05 was set as statistically significant.

RESULTS

Demographic characteristics of the respondents

Two hundred elderly participated in this study. 53% of respondents were aged between 60 and 69 years, and the average age was 70.80 ± 8.07 years. Two-thirds of them were female. Most (62%) of them had below high

school level of education. Nearly 40% had monthly household income between 150,001 and 300,000 kyats, and the average income was $387,000 \pm 322,503$ kyats (208.6 ± 173.83 USD) Almost half of them perceived their health status as "fair". In terms of chronic diseases, 70% of elderly had chronic diseases and 41.6% had one chronic disease. (Table 1) The most common chronic diseases were hypertension (43.7%), followed by diabetes mellitus (13.2%) and arthritis (12.1%) (Table 2). In term of health behaviors, 72.0% of elderly had never smoked. Regarding to physical exercise, 36.5% had no physical exercise.

Out of 200, 142 elderly (71%), known as DS user, were currently using or had used within the past three months. There was no significant different in demographic characteristics between DS users and non-users ($p \geq 0.05$).

Table 1: Demographic characteristics differences between DS users and non-users

Demographic characteristics	Total	DS users (n=142) n (%)	DS non-users (n=58) n (%)	p- value#
Age groups (years old) (n=200)				
Young-old (60-69)	106(53.0%)	73(51.4%)	33(56.9%)	0.378
Old-old (70-79)	62(31.0%)	43(30.3%)	19(32.8%)	
Oldest-old (≥ 80)	32(16.0%)	26(18.3%)	6(10.3%)	
Gender (n=200)				
Female	132(66.0%)	90(63.4%)	42(72.4%)	0.252
Male	68(34.0%)	52(36.6%)	16(27.6%)	
Level of highest education (n=200)				
Below high school	124(62.0%)	86(60.6%)	38(65.5%)	0.630
High school or above	76(38.0%)	56(39.4%)	20(34.5%)	
Monthly household income (kyats/USD) (n=200)				
$\leq 150,000$ (≤ 80.86 USD)	45(22.5%)	33(23.2%)	12(20.7%)	0.928
150,001-300,000 (80.86-161.72 USD)	79(39.5%)	54(38.0%)	25(43.1%)	
300,001-450,000 (161.72-242.59USD)	18(9.0%)	13(9.2%)	5(8.6%)	
$>450,000$ (≥ 242.59 USD)	58(29.0%)	42(29.6%)	16(27.6%)	
Perceived Health Status (n=200)				
Bad	36(18.0%)	29(20.4%)	7(12.1%)	0.362
Fair	97(48.5%)	66(46.5%)	31(53.4%)	
Good/ Excellent	67(33.5%)	47(33.1%)	20(34.5%)	
Presence of chronic diseases(n=190)				
Yes	133(70.0%)	96(71.1%)	37(67.3%)	0.605
No	57(30.0%)	39(28.9%)	18(32.7%)	
Number of chronic diseases (n=190)				
None	73(38.4%)	51(37.8%)	22(40.0%)	0.726
1	79(41.6%)	55(40.7%)	24(43.6%)	
≥ 2	38(20.0%)	29(21.5%)	9(16.4%)	
Smoking				
Current smokers	22(11.0%)	16(11.3%)	6(10.3%)	0.982
Former smokers	34(17.0%)	24(16.9%)	10(17.2%)	
Never smokers	144(72.0%)	102(71.8%)	42(72.4%)	
Physical Exercise				
No exercise	73(36.5%)	49(34.5%)	24(41.4%)	0.652
Light (1 time/week)	35(17.5%)	27(19.0%)	8(13.8%)	
Moderate (2 time/week)	44(22.0%)	33(23.2%)	11(19.0%)	
Heavy (>2 times/week)	48(24.0%)	33(23.2%)	15(25.9%)	

#chi-square test, $p > 0.05$. (n=200)

The use of DS

Of the 200 respondents, 71.0% (95%CI 64.7-77.3) used DS in the last three months. The top three commonly used DS were multivitamins and minerals (59.9%), vitamin B complex (17.6%), and ginseng with multivitamin and mineral (15.5%). About 70% used DS once daily, and 67.6% of respondents took only one DS. 48% of them reported that they had used DS between 1 and 5 years. The most common reasons for DS used included "to promote health" (48.1%), "to boost the energy" (23.1%), and "to balance the diet" (18.6%). Approximately 75% consulted with their doctors or healthcare providers when taking DS. A main reason for not consulting with doctors or healthcare providers was "The doctor doesn't need to know." The most common sources where they got DS were purchasing at pharmacies (45.1%), obtaining from family/relatives and friends (33.2%), and

hospitals (18.5%). When asking about source of information, 65.1% received information from their health care professionals, followed by relatives/friends/ neighbors (17.9%). Only one elderly experienced side effect, which was headache, after taking a combination of multivitamin and amino acids (Table 3).

Table 2: Frequency and percentage of respondents with chronic diseases

Diseases	Total n (%)	DS users (n=135) n (%)	DS non-users (n=55) n (%)
Hypertension	83(43.7%)	59(31.1%)	24(12.6%)
Diabetes Mellitus	25(13.2%)	21(11.1%)	4(2.1%)
Arthritis	23(12.1%)	16(8.4%)	7(3.7%)
Heart disease	20(10.5%)	13(6.8%)	7(3.7%)
Chronic respiratory disease	15(7.9%)	12(6.3%)	3(1.6%)
Hyperlipidemia	11(5.8%)	10(5.3%)	1(0.5%)
Chronic liver disease	5(2.6%)	5(2.6%)	0(0.0%)
Chronic kidney disease	4(2.1%)	3(1.6%)	1(0.5%)

Table 3: The use of DS

DS use in past three months	Number	Percentage
Yes	142	71.0
No	58	29.0
Type of DS used		
Multivitamins and minerals	85	59.9
Vitamin B complex	25	17.6
Ginseng with multivitamin and mineral	22	15.5
Essential amino acid	10	7.0
Vitamin C	10	7.0
Fish oil	9	6.3
Blue-green algae	8	5.6
Vitamin A	3	2.1
Vitamin D with calcium	3	2.1
Iron	3	2.1
Glucosamine	3	2.1
Garlic	2	1.4
Royal Jelly	2	1.4
Calcium	2	1.4
Vitamin E	2	1.0
Vitamin B1	2	1.0
Gingko biloba	1	0.7
Coenzyme Q10	1	0.7
Milk thistle (Silymarin Extract)	1	0.7
Vitamin B9(folic acid)	1	0.7
Number of DS use		
1	96	67.6
2	39	27.5
3	6	4.2
4	1	0.7
Frequency of DS use		
Less than a month	3	2.1
Less than a year	34	23.9
1-5years	68	47.9
More than 5 years	37	26.1
Duration of DS use		
Once daily	99	69.7
Twice daily	16	11.3
1-3 times a week	22	15.5
Monthly	5	3.5
Reasons for DS use		
To promote the health	75	48.1

To boost energy	36	23.1
To balance the diet	29	18.6
To prevent disease (cancer, anemia)	4	2.6
To decrease pain, joint, back	3	1.6
To improve memory	2	1.3
To prevent stress	1	0.6
To control blood sugar	3	1.9
To control blood pressure	1	0.6
For eye problem	2	1.3
To boost immune	2	1.3
Consultation with healthcare providers		
Yes	106	74.6
No	36	25.4
Reasons for not consulting with healthcare providers (n=36)		
The doctor doesn't need to know	19	52.7
Don't have enough time to consult	10	27.8
The doctor never asks	5	13.9
Do not believe in doctors	1	2.8
Afraid to have medical check-up	1	2.8
Source of purchase		
Purchase from pharmacy	83	45.1
Obtain from family, relatives, friends	61	33.2
Obtain from hospital	34	18.5
Obtain from clinic	4	2.2
Purchase from supermarket	2	1.1
Source of information		
Health care professionals	96	65.1
Relatives/ friends/ neighbors	24	17.9
Radio/TV	8	6.0
Books/ Magazines	7	5.2
Journals	3	2.2
Product labels/ Packaging inserts	3	2.2
Internet	1	0.7
Others	6	4.0

*Respondents can report more than one reason, so these more than 142 (n=142)

Factors associated with DS use

A binary logistic regression showed that there were no significant factors associated with DS use. Although there was no significant association, having chronic diseases, former smokers, and those who did not have physical exercise were more likely to use DS (Table 4).

DISCUSSION

The prevalence of DS used among the elderly in South Okkalapa Township, Yangon was 71% (95% CI 64.7-77.3). This result was contrast with a study in Kyauktan Township by (Peltzer et al., 2016) which showed that 402 of 1,261 (25%) of the participants (average age 55.7 ±15.1 years) used dietary supplement (Peltzer et al., 2016). While the prevalence of this study was comparable to a Malaysian study (Fadzil et al., 2018), it was higher than other Asian countries (Chen et al., 2011; Fadzil et al., 2018; Masumoto et al., 2018; Park et al., 2016; Putthapiban et al., 2017; Tangkiatkumjai et al., 2013; Wahab, 2021). Previous studies indicated that the elderly used a higher proportion of DS than young adults because they have more health problems or underlying diseases and they are more inclined to use DS to treat or prevent diseases (Brownie, 2005).

Multivitamins and minerals were the most frequently used, which is consistent with previous studies (Chen et al., 2011; Gahche et al., 2017; Putthapiban et al., 2017). Use of multivitamins and minerals among older adults could increase total nutrient intake and prevent nutrient deficiencies as well as chronic diseases (Dickinson & Mackay, 2014; Vatanparast et al., 2010; Wallace et al., 2019). However, one study pointed out that intake of multivitamins and minerals did not have significant clinical outcomes, and it is only users' positive expectation to have a better well-being (Paranjpe, 2020). Moreover, previous studies stated that composition of nutrients in

multivitamins and minerals were above the upper limits of recommended dietary intake levels; therefore, combined use of proper diet with multivitamins and minerals could lead to adverse effects (Ford et al., 2019; Ronis et al., 2018).

Table 4: Factors associated with DS use

Variables	Crude OR	95%CI		p-value#	Adjusted OR	95% CI		p-value#
		Lower	Upper			Lower	Upper	
Age (years old)								
Young-old (60-69)	1				1			
Old-old (70-79)	0.977	0.496	1.927	0.947	.810	.389	1.684	.572
Oldest-old (≥80)	0.510	0.192	1.358	0.178	.371	.127	1.085	.070
Gender								
Male	1.517	0.777	2.962	0.223	1.387	0.617	3.119	.429
Female	1				1			
Level of highest education								
Below high school	0.808	0.427	1.529	0.513	1.294	0.621	2.697	.492
High school and above	1				1			
Monthly household income (kyats)								
≤ 150,000 (≤80.86USD)	1				1			
150,001-300,000(80.86-161.72 USD)	1.273	0.565	2.871	0.561	1.377	.574	3.302	.474
300,001-450,000(161.72-242.59USD)	1.058	0.311	3.600	0.928	1.122	.308	4.083	.862
>450,000 (≥242.59 USD)	1.048	0.436	2.517	0.917	1.143	.450	2.908	.779
Perceived health status								
Bad	0.567	0.213	1.507	0.256	.513	.172	1.534	.232
Fair	1.104	0.562	2.168	0.774	1.174	.559	2.467	.672
Good/Excellent	1				1			
Chronic diseases								
Yes	1.198	0.610	2.352	0.601	1.210	.607	2.411	.588
No	1				1			
Smoking								
Current smokers	0.911	0.333	2.487	0.855	.973	.329	2.882	.961
Former smokers	1.012	0.445	2.299	0.977	1.282	.515	3.190	.594
Never smokers	1				1			
Physical exercise								
No exercise	1.078	0.493	2.355	0.851	1.207	.486	2.999	.685
Light exercise	0.652	0.240	1.767	0.400	.622	.222	1.740	.366
Moderate exercise	0.733	0.294	1.832	0.507	.649	.243	1.733	.388
Heavy exercise	1				1			

*level of significance was set at $p < 0.05$.

The pattern of DS used also concurred with previous studies (Chen et al., 2011; Gahche et al., 2017; Putthapiban et al., 2017), which found that the elderly purchased DS from pharmacies and mostly receive information from health care professionals. In Myanmar, pharmacies are very accessible and most of DS are available as OTC drugs. They might use DS together with modern medicine in order to promote health or boost the energy. The most common reason for use was “to promote the health”, which was consistent with previous study (Gahche et al., 2017). In addition, 74.6% of older people consulted DS use with healthcare providers, which was consistent with previous studies (Samuels et al., 2012) and one-quarter of participants did not disclose about use of DS. The most common reason for not consulting with healthcare providers was “they did not need to know”, which was similar to previous studies (Putthapiban et al., 2017; Yong et al., 2014). Most of elderly might perceive that DS did not have harmful effects to their health and they were worried about being judged by the health care providers. In this study, only one elderly reported side effects after taking DS. This might be due to the fact that the elderly was unaware of or did not know about side effects. Currently, in Myanmar, reporting of ADR has not been established yet. Therefore, health policy makers should make a consideration for implementation of adverse event monitoring system for health products. Furthermore, it is important to educate consumers and health professionals in order to raise the awareness of reporting adverse events to the responsible authority. A dietary supplement practical guideline including clinical evidence on efficacy and safety should be designed for health care professionals, in particular community pharmacists. It would help them to provide essential information for their patients especially for the elderly who are at high risk group of negative consequences from drug-dietary interaction.

Concurred with previous studies (Chen et al., 2011; Park et al., 2016; Putthapiban et al., 2017; Tangkiatkumjai et al., 2013), the results did not show significant factors associated with DS use. Evidence suggested that older

women, higher level of education, higher income group, having positive health behaviors were more likely to use DS (Brownie, 2005; Chen et al., 2005; Dickinson & Mackay, 2014; Kofoed et al., 2015).

In this study, no significant association was found between chronic diseases and DS use. However, those with chronic diseases were more likely to use DS, which is consistent with previous studies (Brownie, 2005; Liang et al., 2009; Putthapiban et al., 2017). This might be due to that those who had medical conditions might have more vitamin/mineral deficiencies than those without chronic diseases. Previous study highlighted that use of complementary medicine plays a vital role in providing healthcare needs, especially for people with chronic conditions among ASEAN countries (Peltzer et al., 2016). However, that healthcare professionals should be aware of drug-dietary supplement interactions and side effects, especially when prescribing for elderly patients with chronic diseases. Consistent with previous studies (Abdulla et al., 2019; Knudsen et al., 2002; Schwab et al., 2013), former smokers were more likely to use DS, although no significant association was found. It might be possible that former-smokers may change a healthier lifestyle. DS users might rely on DS to prevent themselves from those effects of previous poor health habits. Concurred with previous studies (El Khoury et al., 2016), this study found that those without physical exercise were more likely to use DS. This can be explained by the fact that older people in this study perceive benefits of DS consumption, such as promoting overall health, improving quality of life, and preventing or treating any diseases.

One strength of the study is that data were collected through face-to-face interview at the elderly's houses. They were asked to show bottle or strips of DS that they took. Researchers could record both brand names and active ingredients. Thus, names of DS were completely reported. However, some issues in the interviews needed to be considered. The elderly might have given answers in a socially desirable way rather than telling their views or feelings. In addition, some variables, such as pattern of use, perceived health status, physical exercise were self-reported which relied on a respondent's recall ability. This might lead to under or over-reporting. As it was conducted in one urban area in Yangon, this might not be representative to the whole elderly in the country. Generalization should be made cautiously. Further research might conduct in other areas, such as rural area and central city, in order to compare the difference among the groups.

CONCLUSION

The finding showed that DS usage was highly prevalent among the elderly. Health care professional appear to have a substantial role as the majority of them bought DS from the pharmacy as well as the main source of information were health care providers. Some interventions should be created by health care organizations, such as a literacy campaign for DS use for the elderly group to raise awareness of appropriate DS use. A dietary supplement practical guideline including clinical evidence on efficacy and safety should be designed for health care professionals, especially community pharmacists. It would help them to provide essential information for their patients.

AUTHOR CONTRIBUTIONS

Swe Swe San was in charge of formulating the research questions, study design, data collection, data analysis and writing-up manuscript. Luerat Anuratpanich, Montaya Sunantiwat and Somying Pumtong were involved in study design, data analysis, discussion and editing the manuscript. All authors have read and agreed to the published version of the manuscript.

ETHICS APPROVAL

This study was approved by the Institutional Review Board of Defense Services Medical Research Center Ethic Committee on December 19, 2019. Reference Number: IRB/2019/B6. All survey respondents completed a consent question.

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Not applicable.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest in this work.

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