CrossMark
click for updates

Exploring the factors associated with the intention to assess customers' herbal and dietary supplement use by community pharmacists in Kuala Lumpur, Malaysia

Mohd Shahezwan Abd Wahab[1*], Nurul Aina Abd Malik[1], Shariza Sahudin[2], Meor Mohd Redzuan Meor Mohd Affandi[2], Noordin Othman[3,4], Aida Azlina Ali[5]

[1]Department of Pharmacy Practice, Faculty of Pharmacy, Universiti Teknologi MARA Cawangan Selangor, Kampus Puncak Alam, Malaysia.
[2]Department of Pharmaceutics, Faculty of Pharmacy, Universiti Teknologi MARA Cawangan Selangor, Kampus Puncak Alam, Malaysia.
[3]Department of Clinical and Hospital Pharmacy, College of Pharmacy, Taibah University, Medina, Saudi Arabia.
[4]School of Pharmacy, PICOMS International University College, Batu Caves, Kuala Lumpur, Malaysia.
[5]Department of Pharmacology and Pharmaceutical Chemistry, Faculty of Pharmacy, Universiti Teknologi MARA Cawangan Selangor, Kampus Puncak Alam, Malaysia.

ARTICLE INFO

ABSTRACT

Community pharmacists (CPs) often stock herbal and dietary supplements (HDS) at their community pharmacies. Therefore, CPs should be held responsible for ensuring safe and appropriate use of HDS. The present study aims to investigate the factors associated with the intention (INT) of CPs to assess their customers' HDS use. A cross-sectional study using a self-completed questionnaire was employed. A questionnaire along with a cover letter and stamped envelope was sent to CPs at community pharmacies located in Kuala Lumpur, Malaysia. Only 70 out of 533 CPs responded to the survey (response rate = 13.13%). The results showed that 11.4% (8/70) of CPs always assess customers' HDS use. The CPs, however, had positive and moderately high INT to assess customers' HDS use (mean = 3.84 ± 0.70). Positive and significant correlations were noted between INT and belief about consequences, moral norms, belief of capabilities, and role and identity. The relationship between INT and social influences was statistically insignificant. Efforts to enhance the INT of CPs to assess customers' HDS use should be warranted. This could be achieved by enhancing beliefs that are positively associated with the CPs' INT to assess customers' HDS use.

INTRODUCTION

Consumers of herbal and dietary supplements (HDS) generally assume that these products are "natural" and therefore are safe (Boullata and Nace, 2000). However, HDS may produce untoward effects similar to conventional medicines due to the chemical moieties they contained. In fact, previous studies have reported mortality (Maddukuri and Bonkovsky, 2014) and hospitalizations resulting from HDS use (Geller *et al.*, 2015).

Other related studies have also revealed that HDS are commonly used by older people (Reinhard *et al.*, 2014; Schnabel *et al.*, 2014) and pregnant women (Strouss *et al.*, 2014), who are prone to an increased risk of HDS adverse effects due to the physiological and pharmacokinetic changes in their body. In addition, HDS may interact with modern medicines, and therefore, can either enhance toxicity or render conventional medicines to become less effective. In a study conducted in Hungary, out of 1,563 prescribed medicines and 490 types of HDS used by 197 patients, the researchers found 365 and 718 HDS-drug interactions based on the Lexi-Interact and Medscape databases, respectively (Végh *et al.*, 2014).

In a Malaysian study by Wong *et al.* (2018), almost all community pharmacists (CPs) surveyed, stocked HDS. Since HDS are widely available in community pharmacies, CPs should have the responsibility to ensure that HDS are used safely and

*Corresponding Author
Mohd Shahezwan Abd Wahab, Department of Pharmacy Practice, Faculty of Pharmacy, Universiti Teknologi MARA Cawangan Selangor,Kampus Puncak Alam, Malaysia.
E-mail: ewan.pharmcare @ gmail.com

appropriately. This can be achieved through a thorough assessment of customers' HDS use by CPs (Gabay *et al.*, 2017). In this regard, CPs should determine the appropriateness of HDS use by using all information obtained from patients or consumers and ensure the safety of users by identifying problems associated with HDS use such as HDS-drug interactions and adverse effects.

In the recently published White Paper on Natural Products by the American College of Clinical Pharmacy in 2016, pharmacists are recommended to include HDS in their patient assessment (Gabay *et al.*, 2017). There is limited information about the extent to which pharmacists assess HDS use in the literature. However, existing information showed that this activity was not routinely performed. In a study in Australia, Braun and Cohen (2007) found that only 24% of the pharmacists surveyed, always checked for adverse effects and HDS-drug interactions. In a similar study in Iran, the authors found that the rate to which CPs checked HDS-drug interactions was moderate (Mehralian *et al.*, 2014).

Previous studies have revealed that several factors such as practice settings (Abahussain *et al.*, 2007; Dolder *et al.*, 2003), age (Braun and Cohen, 2007; Chen *et al.*, 2016), personal use of HDS (Dolder *et al.*, 2003), and qualifications (Chen *et al.*, 2016) were associated with higher involvement of pharmacists in patient-care activities related to HDS. However, such contextual factors may not be suitable to be targeted in promoting CPs to become more proactive in assessing HDS use. Social pharmacy researchers often study pharmacists' behavioral intention to engage in a certain activity as it is the most proximate predictor of behavior (Ajzen, 1991). This was shown in a study in the United States, where pharmacists' behavioral intention was a significant predictor of the actual implementation of general pharmaceutical care (Odedina *et al.*, 1997). Therefore, to promote pharmacists' behavior performance, pharmacists' behavioral intention should be enhanced. The formation of pharmacists' behavioral intentions, however, can be influenced by several psychosocial factors such as attitude, subjective norm, perceived behavioral control, and moral norm (Farris and Schopflocher, 1999; Gavaza *et al.*, 2014; Herbert *et al.*, 2006; Odedina *et al.*, 1997; Puspitasari *et al.*, 2016), warranting the investigation of these contributing factors.

In a systematic review that compiled theory-based studies that predicted intention and behavior of healthcare professionals in various clinical-related activities (Godin *et al.*, 2008), the authors illustrated several variables that are important in the prediction of intention and behavior of healthcare professionals. The authors proposed that beliefs about consequences (BAC), social influences (SI), moral norms (MN), role and identity (RAI), belief of capabilities (BOC), and habit/past behavior (HPB) have a positive relationship with intention (INT). Additionally, INT, HPB, and BOC are expected to have a direct link with behavior [assessment of HDS use (AHU)]. Therefore, the main objective of this present study was to determine BAC, SI, MN, RAI, BOC, HPB, INT, and AHU among a sample of CPs in Kuala Lumpur, Malaysia. The study also aims to explore the inter-relationship of the variables proposed by Godin *et al.* (2008) in the context of HDS use assessment by CPs.

METHODS

This study was approved by the Research Ethics Committee of *Universiti Teknologi* MARA (UiTM) (REC/464/18).

The study respondents consisted of CPs employed as full- or part-time pharmacists in community pharmacies in Kuala Lumpur, Malaysia. Only CPs who had direct contact with customers or patients at their workplaces were included in the study. Data were collected using postal survey. A cover letter along with the questionnaire and stamped envelope were mailed to all community pharmacies in Kuala Lumpur in the first week of April 2018. The sampling frame was a list of community pharmacy addresses in Kuala Lumpur, obtained from the official website of Pharmaceutical Services Divisions of the Ministry of Health, Malaysia (Pharmaceutical Services Division MOH, 2018). A reminder postcard was sent to all addresses approximately a week after the first mailing to promote CPs to respond to the survey. Total anonymity and confidentiality were maintained throughout the study which was informed to all CPs. Data collection was finalized in the third week of May 2018. In this study, HDS refer to products containing plant-derived materials or dietary ingredients, e.g., vitamins, minerals, amino acids, and substances such as enzymes, organ tissues, glands, metabolites, extracts, and concentrates in the form of pills, capsules, tablets, powder, or liquids that are taken to treat and/or prevent diseases or maintain health (The World Health Organization, 2000; U.S. Food & Drug Administration, 2015).

Survey instrument

The survey instrument was developed based on the proposed framework of constructs by Godin *et al.* (2008) that may influence healthcare professionals' intention and behavior in various clinical-related activities including the provision of care to patients. Generation of items was done by adapting similar items from previous studies (Gavaza *et al.*, 2011; 2014; Herbert *et al.*, 2006; Puspitasari *et al.*, 2016; Wahab *et al.*, 2019). The questionnaire contains eight scales representing BAC, SI, MN, BOC, RAI, INT, HPB, and AHU. The definition and number of items for each construct are outlined in Table 1. The domains HPB and AHU used a 5-point Likert-type scale ranging from 1 (never) to 5 (always), whereas the other six domains (BAC, SI, MN, BOC, RAI, and INT) used a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire included a socio-demographic section to collect demographic data such as gender, position at work, and history of HDS use that have been identified as factors that may influence CPs to engage in pharmacist-related activities related to HDS (Barnes and Abbot, 2007; Dolder *et al.*, 2003; Welna and Hadsall, 2003). The survey instrument was reviewed by five pharmacy practice researchers to assess the relevance of each survey item. Additionally, the questionnaire was administered to a convenient sample of CPs to obtain feedback about the clarity and comprehensibility of survey items. Minor changes were made to the items by rephrasing them based on the feedback obtained from the experts and CPs.

Data analysis

The frequencies, means, and standard deviations were computed for all item scores. The internal consistency reliability of scales comprising of at least three items (BAC, SI, MN, BOC, INT, and AHU) were assessed using Cronbach's α. One construct has only two items. Therefore, the Spearman correlation (rho) was used to measure the correlation of the two items. All the item

Table 1. Definition, number of items, reliability and descriptive statistics for the study scales.

Scale	Definition	No. of items	Mean ± SD	Minimum	Maximum	Cronbach's α
BAC: Belief about Consequences	Belief that assessing HDS use is associated with certain attributes	5	4.11 ± 0.43	2.80	5.00	0.78
SI: Social Influences	Belief that referent individuals or groups expect them to assess HDS use	3	3.66 ± 0.54	2.00	4.67	0.60
MN: Moral Norms	Belief that assessing HDS use is morally right	3	4.12 ± 0.70	2.67	5.00	0.87
BOC: Belief of Capabilities	Belief in the ability to assess HDS use	3	3.62 ± 0.66	2.00	5.00	0.78
RAI: Role and Identity	The role CPs devise for themselves as pharmacists	2	4.21 ± 0.76	2.00	5.00	0.80[a]
INT: Intention	Readiness to assess HDS use	3	3.84 ± 0.70	2.00	5.00	0.90
HPB: Habit / Past Behavior	Self-reported involvement in the assessment of HDS use for the past 2 weeks	1	3.61 ± 0.77	2.00	5.00	-
AHU: Assessment of HDS Use	Beliefs in the extent to which they perform specific assessment activities of customers' HDS use	4	4.03 ± 0.76	1.75	5.00	0.88

[a]Spearman's rho for the two items was calculated instead of Cronbach's α.
CPs, Community pharmacists.

scores were averaged to obtain the mean score for each scale. The independent samples *t*-test was carried out on dichotomous socio-demographic variables to find significant differences in the mean scores of the scales. The Pearson correlation test (*r*) was performed to assess the correlation among constructs. The interpretation of the correlation coefficients followed the convention by Guilford as the following: ≤ 0.19 = slight or almost no relationship; 0.20–0.39 = low correlation or definite but small relationship; 0.40–0.69 = moderate correlation or substantial relationship; 0.70–0.89 = high correlation or strong relationship; and 0.90–1.00 = very high correlation or very dependable relationship (Durrheim and Tredoux, 2004). Additionally, a correlation coefficient of ≥ 0.30 implies a practically significant relationship (Steyn, 2002). All data analysis were done using SPSS version 23.

RESULTS

Socio-demographic characteristics of community pharmacists

The socio-demographic characteristics of the CPs are outlined in Table 2. Overall, only 70 out of 533 CPs responded to the survey, accumulating a response rate of 13.13%. The majority of the respondents were female CPs (43/70, 61.4%). Approximately, 44% (31/70) of the CPs were registered as pharmacists for more than 10 years while the rest were registered for 10 years or less. A small proportion of the CPs (17/70, 24.3%) had a postgraduate qualification. About 64% (45/70) of them worked in independent pharmacies while the others (25/70, 35.7%) were CPs at chain or franchise pharmacies. Full-time CPs made up of 45.7% (32/70) of the total respondents while slightly more than 50% (38/70) of the CPs were part-timers.

Approximately 40% (27/70) of the CPs were the owner or manager of community pharmacies. More than half of the CPs had at least another CPs working with them (55.7%, 39/70) and the majority had at least one pharmacy assistants at their pharmacies (65.7%, 46/70). All CPs had at least one customer purchasing HDS from their pharmacies daily, with a median of 10 customers purchasing HDS per day. The majority of CPs (60%, 42/70) claimed that they received 10 or fewer customers purchasing HDS every day. Out of all CPs, 72.9% (51/70) of them had been using at least one type of HDS in the past 6 months.

BAC, MN, BOC, INT, and AHU constructs had good internal consistency reliability with Cronbach's α values greater than 0.7 (Taber, 2018). INT had the highest internal consistency reliability with Cronbach's α of 0.90 (Table 1). SI had a lower but satisfactory/acceptable internal consistency reliability of Cronbach's α of 0.60 (Taber, 2018). The two items of the RAI construct had positive and significant correlation (Table 1).

Community pharmacists' beliefs about and practices in assessing HDS use among customers

Belief about consequences

Many of the CPs agreed with each BAC item. Most respondents (94.3%, 66/70) were noted to strongly agree and agree that by assessing HDS use among their customers, they will feel satisfied (Table 3). CPs generally showed strong and positive beliefs about the consequences of assessing HDS use (mean = 4.11 ± 0.43) (Table 1).

Social influences

For SI, the majority of CPs strongly agreed and agreed that the HDS customers (72.9%, 51/70) and their colleagues (67.1%, 47/70) would encourage them to assess HDS use. However, only 42.9% (30/70) of CPs strongly agreed and agreed that they were influenced by the Malaysian Pharmaceutical Society to assess HDS use, with almost half of the CPs were neutral (48.6%, 34/70) about this statement (Table 3). The mean score for this item was moderate (mean = 3.37 ± 0.75) (Table 3).

Moral norms

Based on the CPs' responses for MN items, it can be observed that most CPs held strong beliefs that they had a moral obligation to assess HDS use (mean = 4.12 ± 0.70) (Table 1). More than half of the respondents strongly agreed and agreed with each MN item (Table 3).

Beliefs of capabilities

The CPs' responses for the BOC items showed that although 75.7% (53/70) and 51.4% (36/70) of the CPs strongly agreed and agreed that they were confident and had the knowledge to assess

Table 2. Socio-demographic details of community pharmacists (*n* = 70).

Demographic details	Frequency (Percentage)[a]
Gender	
Male	27 (38.6)
Female	43 (61.4)
Number of years as registered pharmacists	
≤10 years	39 (55.7)
>10 years	31 (44.3)
Possess postgraduate qualification (e.g., Masters or PhD)	
Yes	17 (24.3)
No	53 (75.7)
Type of community pharmacy	
Chain / Franchise	25 (35.7)
Independent	45 (64.3)
Position at community pharmacy	
Full-time staff	32 (45.7)
Part-time staff	38 (54.3)
Owner or manager of community pharmacy	
Yes	27 (38.6)
No	43 (61.4)
Number of pharmacist co-workers	
None	31 (44.3)
≥1	39 (55.7)
Number of pharmacy assistants	
None	24 (34.3)
≥1	46 (65.7)
Has used HDS[b]	
Yes	51 (72.9)
No	19 (27.1)
Number of customers that purchase HDS daily	
≤10	42 (60)
>10	28 (40)
Median number of customers that purchase HDS daily (IQR)	10 (5–20)

HDS = herbal and dietary supplements, SD = standard deviation.
[a]Unless stated otherwise.
[b]In the past 6 months.

HDS use, respectively, only less than 50% (33/70) of the respondents believed that the activity is easy. About one-fifth of the CPs (21.4%, 15/70) disagreed that assessing HDS use is easy. The mean score for BOC was generally moderate (mean = 3.62 ± 0.66) (Table 1).

Roles and identity

For RAI, it can be seen that CPs had a strong perception that assessing HDS use is part of their professional responsibility (mean = 4.21 ± 0.76) (Table 1). Only a small proportion of the CPs disagreed that they have a professional obligation to perform this activity (Table 3).

Intention

Many CPs in the survey had the intention to assess HDS use among the customers in the next 2 weeks (Table 3). However, although the CPs' intention was positive, it was moderately high (mean = 3.84 ± 0.70) (Table 1).

Habit/past behavior

Only 11.4% (8/70) of the CPs claimed that they always assess HDS use for the past 2 weeks. Approximately 44% (31/70) and 39% (27/70) of CPs "often" and "sometimes", respectively, performed the activity (Table 3).

Assessment of HDS use among customers

Assessment of CPs' responses for AHU items showed that most CPs "often to always" engaged in AHU activities (Table 3). Among the AHU items, it was evident that the CPs were more active in the assessment of HDS indications (mean = 4.14 ± 0.86), and in utilizing relevant information obtained from the customers to make professional decisions about HDS use (mean = 4.14 ± 0.82). The involvement of CPs in identifying HDS-related problems was moderate (mean = 3.81 ± 0.92). Only 25.7% (18/70) claimed that they always identify problems related to HDS use (Table 3).

Comparison of scales' mean based on community pharmacists' socio-demographic characteristics

The comparison of the scales' mean based on CPs' socio-demographic characteristics is outlined in Table 4. The mean score of INT was significantly higher in male CPs. CPs who had been registered for > 10 years had significantly higher mean scores of SI, MN, BOC, and HPB compared to those who had been registered for ≤ 10 years. CPs with a postgraduate qualification had significantly higher mean scores in all domains, compared to those having only a bachelor degree. The mean score of MN was also noted to be significantly higher in CPs who were working in an independent community pharmacy compared to those employed in chain/franchise pharmacies.

CPs who were part-timers had significantly higher mean scores of BOC and AHU than those who were working full-time. Additionally, CPs who identified themselves as an owner or manager of a community pharmacy had a significantly higher mean score of BOC. It was also observed that CPs who had no assistant had significantly higher HPB mean score than those who had at least one assistant at their pharmacies. Finally, CPs who claimed that they had used HDS in the past 6 months had significantly higher mean scores of SI, BOC, HPB, and AHU.

Correlations between the constructs

Correlation analysis among the scales' mean is outlined in Table 5. The results showed that there were positive and significant correlations between BAC and INT ($r = 0.43$, $p < 0.001$), MN and INT ($r = 0.43$, $p < 0.001$), BOC and INT ($r = 0.46$, $p < 0.001$), RAI and INT ($r = 0.33$, $p = 0.005$), and HPB and INT ($r = 0.38$, $p = 0.001$). Additionally, it was observed that there were positive and significant correlations between INT and AHU ($r = 0.38$, $p = 0.001$), HPB and AHU ($r = 0.61$, $p < 0.001$), and BAC and AHU ($r = 0.37$, $p = 0.002$). Based on Guilford's interpretation of the magnitude of significant correlations, these correlations were small to moderate but imply practically significant relationships. SI had a positive correlation with INT but this relationship was not significant ($r = 0.19$, $p = 0.112$).

Table 3. Community pharmacists' beliefs about and practices regarding assessing HDS use among customers.

Construct	Survey item	Mean ± SD	N	Frequency (Percentage)				
				Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
BAC	If I assess the use of HDS among the customers:	3.93 ± 0.67	70	11 (15.7)	45 (64.3)	12 (17.1)	2 (2.9)	0 (0)
	I can ensure their safety by avoiding side effects, and disease- or drug-HDS interactions.							
	I can ensure they are using the most suitable product.	4.01 ± 0.63	70	12 (17.1)	49 (70)	7 (10)	2 (2.9)	0 (0)
	They will trust me as a community pharmacist.	4.19 ± 0.55	70	18 (25.7)	47 (67.1)	5 (7.1)	0 (0)	0 (0)
	They will come back to my community pharmacy to consult me.	4.16 ± 0.53	70	16 (22.9)	49 (70)	5 (7.1)	0 (0)	0 (0)
	I will feel satisfied.	4.29 ± 0.57	70	24 (34.3)	42 (60)	4 (5.7)	0 (0)	0 (0)
SI	The customers want me to assess their use of HDS.	3.83 ± 0.64	70	8 (11.4)	43 (61.4)	18 (25.7)	1 (1.4)	0 (0)
	Those who work with me (e.g. other pharmacists, pharmacy assistants, healthcare consultants, etc.) think that I should assess the use of HDS among customers.	3.77 ± 0.78	70	11 (15.7)	36 (51.4)	19 (27.1)	4 (5.7)	0 (0)
	The Malaysian Pharmaceutical Society would like me to assess the use of HDS among customers.	3.37 ± 0.75	70	3 (4.3)	27 (38.6)	34 (48.6)	5 (7.1)	1 (1.4)
MN	I think assessing the use of HDS among customers is a good thing to do.	4.43 ± 0.65	70	36 (51.4)	28 (40)	6 (8.6)	0 (0)	0 (0)
	I have a moral obligation to assess the use of HDS among customers.	4.10 ± 0.84	70	24 (34.3)	33 (47.1)	9 (12.9)	4 (5.7)	0 (0)
	I would feel guilty if I do not assess the use of HDS among customers.	3.84 ± 0.85	70	14 (20)	37 (52.9)	13 (18.6)	6 (8.6)	0 (0)
BOC	I am confident that I can assess the use of HDS among customers.	3.91 ± 0.68	70	12 (17.1)	41 (58.6)	16 (22.9)	1 (1.4)	0 (0)
	Assessing the use of HDS among customers is easy.	3.33 ± 0.90	70	5 (7.1)	28 (40)	22 (31.4)	15 (21.4)	0 (0)
	I think my knowledge to assess the use of HDS among customers is good.	3.61 ± 0.79	70	10 (14.3)	26 (37.1)	31 (44.3)	3 (4.3)	0 (0)
RAI	As a pharmacist, I believe that assessing the use of HDS among customers is something I should do.	4.21 ± 0.80	70	27 (38.6)	35 (50)	4 (5.7)	4 (5.7)	0 (0)
	It is my professional responsibility as a community pharmacist to assess the use of HDS among customers.	4.20 ± 0.79	70	27 (38.6)	33 (47.1)	7 (10)	3 (4.3)	0 (0)
INT	I am ready to assess the use of HDS among customers on a regular basis in the next 2 weeks.	3.77 ± 0.80	70	11 (15.7)	37 (52.9)	17 (24.3)	5 (7.1)	0 (0)
	I will try to assess the use of HDS among customers on a regular basis in the next 2 weeks.	3.86 ± 0.73	70	13 (18.6)	35 (50)	21 (30)	1 (1.4)	0 (0)
	I have intention to assess the use of HDS among customers on a regular basis in the next 2 weeks.	3.90 ± 0.76	70	14 (2)	38 (54.3)	15 (21.4)	3 (4.3)	0 (0)
				Always	Often	Sometimes	Seldom	Never
HPB	For the past 2 weeks, I always assess the use of HDS among customers.	3.61 ± 0.77	70	8 (11.4)	31 (44.3)	27 (38.6)	4 (5.7)	0 (0)
AHU	I assess whether the HDS has any indication for customers.	4.14 ± 0.86	70	28 (40)	27 (38.6)	12 (17.1)	3 (4.3)	0 (0)
	I identify any HDS-related problems associated with the use of the HDS.	3.81 ± 0.92	70	18 (25.7)	26 (37.1)	22 (31.4)	3 (4.3)	1 (1.4)
	I ask customers if they have skipped their medications.	4.01 ± 0.94	70	28 (40)	18 (25.7)	21 (30)	3 (4.3)	0 (0)
	I utilize all relevant information obtained from customers to make professional decisions about HDS use.	4.14 ± 0.82	70	27 (38.6)	28 (40)	13 (18.6)	2 (2.9)	0 (0)

DISCUSSION

The present study revealed that CPs generally do not routinely assess customers' HDS use. The CPs were also noted to be less proactive in identifying HDS-related problems. This should be a cause for concern since HDS can produce untoward effects (Geller *et al.*, 2015), interact with conventional medicines (Végh *et al.*, 2014), and may be used without clear indications (Wahab *et al.*, 2017). Previous studies conducted in Australia and Iran also showed similar findings where pharmacists did not always check for

adverse effects and HDS-drug interactions (Braun and Cohen, 2007; Mehralian *et al.*, 2014). In another study in Iran, almost 83% of CPs did not identify any interaction when a simulated patient requested for a vitamin A supplement together with the mentioning of regular isotretinoin use (Dabaghzadeh and Hajjari, 2018). Our results also showed that CPs had moderately positive INT to assess HDS use among customers. As hypothesized, CPs' INT to assess HDS use correlated positively and significantly with the performance of the activity. In this present study, BAC, MN, RAI, BOC, and HPB

Table 4. Comparison of scales' mean based on community pharmacists' socio-demographic characteristics.

Mean (SD)[a]	Belief about Consequences	Social Influences	Moral Norms	Belief of Capabilities	Role and Identity	Intention	Habit / Past Behavior	Assessment of HDS Use
Gender								
Male	4.22 ± 0.43	3.74 ± 0.57	4.25 ± 0.77	3.80 ± 0.69	4.26 ± 0.91	4.07 ± 0.72	3.78 ± 0.85	4.13 ± 0.66
Female	4.05 ± 0.42	3.60 ± 0.52	4.05 ± 0.64	3.50 ± 0.62	4.17 ± 0.65	3.70 ± 0.65	3.51 ± 0.70	3.97 ± 0.82
	$p = 0.096$	$p = 0.309$	$p = 0.243$	$p = 0.064$	$p = 0.677$	$p = 0.027$	$P = 0.159$	$P = 0.383$
Number of years as registered pharmacists								
≤ 10 years	4.12 ± 0.50	3.50 ± 0.58	3.92 ± 0.76	3.47 ± 0.69	4.06 ± 0.78	3.72 ± 0.72	3.39 ± 0.75	3.87 ± 0.79
> 10 years	4.11 ± 0.33	3.86 ± 0.42	4.39 ± 0.50	3.81 ± 0.58	4.39 ± 0.70	4.00 ± 0.66	3.90 ± 0.70	4.23 ± 0.68
	$p = 0.934$	$p = 0.003$	$p = 0.003$	$p = 0.033$	$p = 0.077$	$p = 0.094$	$p = 0.004$	$p = 0.053$
Possess postgraduate qualification (e.g., Masters or PhD)								
Yes	4.29 ± 0.39	3.92 ± 0.53	4.65 ± 0.40	4.04 ± 0.71	4.62 ± 0.55	4.37 ± 0.54	4.12 ± 0.70	4.38 ± 0.61
No	4.06 ± 0.43	3.57 ± 0.52	3.96 ± 0.69	3.48 ± 0.59	4.08 ± 0.78	3.67 ± 0.66	3.45 ± 0.72	3.92 ± 0.78
	$p = 0.047$	$p = 0.019$	$p < 0.001$	$p = 0.002$	$p = 0.009$	$P < 0.001$	$p = 0.001$	$p = 0.027$
Type of community pharmacy								
Chain / Franchise	4.07 ± 0.44	3.55 ± 0.62	3.85 ± 0.72	3.49 ± 0.62	4.10 ± 0.85	3.71 ± 0.63	3.56 ± 0.77	3.96 ± 0.63
Independent	4.14 ± 0.43	3.72 ± 0.49	4.27 ± 0.64	3.69 ± 0.68	4.27 ± 0.70	3.92 ± 0.73	3.64 ± 0.77	4.07 ± 0.83
	$p = 0.544$	$p = 0.206$	$p = 0.014$	$p = 0.236$	$p = 0.383$	$p = 0.227$	$p = 0.662$	$p = 0.578$
Position at community pharmacy								
Full-time staff	4.10 ± 0.49	3.55 ± 0.55	4.05 ± 0.65	3.42 ± 0.62	4.11 ± 0.86	3.87 ± 0.61	3.44 ± 0.76	3.82 ± 0.69
Part-time staff	4.13 ± 0.38	3.75 ± 0.53	4.18 ± 0.74	3.79 ± 0.65	4.29 ± 0.66	3.83 ± 0.77	3.76 ± 0.75	4.20 ± 0.78
	$p = 0.801$	$p = 0.137$	$p = 0.432$	$p = 0.017$	$p = 0.326$	$p = 0.813$	$p = 0.077$	$p = 0.035$
Owner or manager of community pharmacy								
Yes	4.19 ± 0.34	3.78 ± 0.51	4.21 ± 0.81	3.83 ± 0.68	4.370 ± 0.728	3.85 ± 0.84	3.82 ± 0.83	4.25 ± 0.82
No	4.07 ± 0.48	3.58 ± 0.55	4.07 ± 0.62	3.49 ± 0.61	4.105 ± 0.768	3.84 ± 0.61	3.49 ± 0.70	3.89 ± 0.70
	$p = 0.278$	$p = 0.141$	$p = 0.416$	$p = 0.035$	$p = 0.155$	$p = 0.933$	$p = 0.083$	$p = 0.053$
Number of pharmacist co-worker								
None	4.06 ± 0.41	3.61 ± 0.51	4.14 ± 0.71	3.45 ± 0.64	4.258 ± 0.784	3.79 ± 0.75	3.71 ± 0.82	4.00 ± 0.88
≥ 1	4.16 ± 0.45	3.69 ± 0.57	4.11 ± 0.69	3.75 ± 0.65	4.167 ± 0.746	3.89 ± 0.66	3.54 ± 0.72	4.05 ± 0.66
	$p = 0.333$	$p = 0.546$	$p = 0.865$	$p = 0.057$	$p = 0.620$	$p = 0.540$	$p = 0.357$	$p = 0.782$
Number of pharmacy assistants								
None	4.05 ± 0.32	3.68 ± 0.55	4.22 ± 0.73	3.67 ± 0.58	4.208 ± 1.021	4.01 ± 0.63	3.92 ± 0.88	4.20 ± 0.70
≥ 1	4.15 ± 0.48	3.65 ± 0.54	4.07 ± 0.68	3.59 ± 0.70	4.207 ± 0.592	3.75 ± 0.73	3.46 ± 0.66	3.94 ± 0.78
	$p = 0.370$	$p = 0.796$	$p = 0.396$	$p = 0.665$	$p = 0.993$	$p = 0.140$	$p = 0.016$	$p = 0.181$
Has used HDS[a]								
Yes	4.17 ± 0.41	3.75 ± 0.53	4.19 ± 0.67	3.75 ± 0.62	4.245 ± 0.724	3.92 ± 0.71	3.77 ± 0.71	4.24 ± 0.60
No	3.98 ± 0.47	3.42 ± 0.51	3.95 ± 0.75	3.28 ± 0.66	4.105 ± 0.859	3.65 ± 0.66	3.21 ± 0.79	3.46 ± 0.86
	$p = 0.109$	$p = 0.025$	$p = 0.197$	$p = 0.008$	$p = 0.497$	$p = 0.158$	$p = 0.006$	$p < 0.001$
Number of customers that purchase HDS daily								
≤ 10	4.06 ± 0.43	3.64 ± 0.50	4.08 ± 0.69	3.52 ± 0.59	4.202 ± 0.725	3.83 ± 0.71	3.57 ± 0.74	3.91 ± 0.85
> 10	4.20 ± 0.42	3.68 ± 0.61	4.19 ± 0.71	3.76 ± 0.74	4.214 ± 0.821	3.87 ± 0.70	3.68 ± 0.82	4.21 ± 0.57
	$p = 0.175$	$p = 0.788$	$p = 0.517$	$p = 0.139$	$p = 0.949$	$p = 0.800$	$p = 0.571$	$p = 0.088$

[a]Independent samples *t*-test used.
[b]In the past 6 months.

correlated positively and significantly with INT. Among these constructs, BOC, BAC, and MN had the strongest correlation with INT. Therefore, in efforts to enhance the INT of CPs to assess HDS use, enhancing BOC, BAC, and MN can be prioritized.

BOC can be enhanced by providing CPs with training and continuous education in pharmaceutical care, especially related to HDS. This is important since previous studies have shown that knowledge about HDS is inadequately covered in the

Table 5. Correlations between the constructs of the scales.

	Belief about Consequences	Social Influences	Moral Norms	Belief of Capabilities	Role and Identity	Intention	Habit / Past Behavior	Assessment of HDS Use
Belief about Consequences	1							
Social Influences	0.25*	1						
Moral Norms	0.45**	0.55**	1					
Belief of Capabilities	0.54**	0.25*	0.48**	1				
Role and Identity	0.43**	0.57**	0.75**	0.44**	1			
Intention	0.43**	0.19	0.43**	0.46**	0.33**	1		
Habit/Past Behavior	0.36**	0.41**	0.54**	0.51**	0.59**	0.38**	1	
Assessment of HDS Use	0.37**	0.37**	0.51**	0.43**	0.61**	0.38**	0.61**	1

*Correlation is significant at $p < 0.05$.
**Correlation is significant at $p < 0.01$.

undergraduate pharmacy curricula (Wahab *et al.*, 2014; 2016). Pharmacists in general, however, welcome more training in the area (Ung *et al.*, 2017). In a Malaysian study, almost all of the survey respondents were interested in having additional training in HDS (Wong *et al.*, 2018). Other studies conducted revealed that pharmacists who had training in HDS were more likely to inquire patients about HDS use (Barnes and Abbot, 2007; Brown *et al.*, 2005; Dolder *et al.*, 2003), or record HDS use (Cockayne *et al.*, 2005; Dolder *et al.*, 2003), than those without such training. Furthermore, a lack of training related to HDS had been identified as a barrier to provide care for HDS users (Al-Arifi, 2013; Semple *et al.*, 2006). This present study, however, did not capture whether CPs have had previous training in HDS. Nevertheless, our results showed that CPs with a postgraduate qualification had higher BOC level than those with only an undergraduate education, suggesting that additional training in pharmacy may enhance CPs to become more confident in assessing HDS use.

Positive BAC can be achieved by highlighting the positive consequences of assessing HDS use to CPs. In this present study, CPs were found to recognize the benefits of assessing HDS use by agreeing that the activities may result in a safer and more appropriate use of HDS, enhanced trustworthiness, increased customer loyalty, and can result in self-satisfaction. Our findings are consistent with previous studies which showed that pharmacists generally believed that their involvement in caring for HDS users is beneficial (Koh *et al.*, 2003; Kwan *et al.*, 2008; Song *et al.*, 2017; Wahab *et al.*, 2019). Additionally, the results showed that CPs who believed that they were morally obligated to assess HDS use were more likely to have the INT to perform the activity. In a previous qualitative study, moral obligation has been perceived as one of the facilitators for pharmacists to provide consultations on natural health products (Olatunde *et al.*, 2010). Hence, pharmacy educators, employers, and professional pharmacy bodies may campaign that assessing HDS use is beneficial for the community pharmacist profession, and highlight that moral obligation of CPs is not only limited to assessing drug use but should also be extended to assessing HDS use.

The present study also showed that SI was not significantly correlated with CPs' INT to assess HDS use. The CPs in the present study had a moderate agreement with all three SI statements. CPs had the lowest agreement with the statement that the local pharmacists' society would like them to assess their customers' HDS use. This finding implies that there is still limited attention by the national pharmacy association to encourage CPs

to care for HDS users. At present, there is also a limited statement from Malaysian pharmacy organizations or societies that urge CPs to integrate HDS in professional pharmacy practice. For example, the Malaysian "Community Pharmacy Benchmarking Guidelines 2015," only briefly mentioned that CPs should advise on HDS use (Pharmaceutical Services Division MOH, 2015). Other professional pharmacist's activities such as assessing and documenting HDS use and assisting customers in making an informed decision about using HDS are not included in the guideline. The CPs, however, had a more positive agreement that the customers want them to assess their HDS use. This is favorable since past studies have shown that pharmacists perceive customers who actively seek their consultations by initiating conversation or asking questions about HDS as a facilitator for them to provide care (Al-Arifi, 2013; Barnes and Abbot, 2007; Bushett *et al.*, 2011; Ogbogu and Necyk, 2016). This means that the more engagement the HDS users had with CPs, the more likely the CPs would provide care for them. Therefore, in efforts to promote safe and appropriate use of HDS, in addition to targeting CPs, the HDS users should also be targeted by encouraging them to consult CPs about their HDS use.

LIMITATIONS

Our study had several limitations. First, the study was cross-sectional, and therefore, only provided a snapshot of CPs' beliefs in assessing HDS use at the point of the survey. Furthermore, it is unknown whether CPs' beliefs about and INT to assess HDS use may change over time. A longitudinal study may be more appropriate to analyze such changes. Additionally, CPs' HPB and AHU were self-reported. It can be likely that CPs inaccurately reported their past activities due to inability to recall or due to social desirability effect. To minimize social desirability bias, the CPs were offered anonymity and confidentiality. Any information that may lead to the identification of CPs (e.g., addresses, pharmacist's registration number, etc.) were not collected by the researchers. Additionally, only a small sample of CPs from one city was recruited in the study. The recruitment of CPs from only one geographical region and the small sample size limit the generalization of our study findings. The low response rate of CPs in the present study may be attributed to the lack of time to complete the survey. However, the lack of interest in the issue of HDS may also contributed to the low response rate. Due to the small sample size, a multivariate analysis to determine the significant predictors of CPs' INT to assess customers' HDS use was not appropriate. Future studies may be carried out in a larger

population of CPs and should involve CPs from multiple states or cities.

CONCLUSION

The present study showed that CPs who responded to the survey did not regularly assess customers' HDS use. However, CPs had positive intention to assess customers' HDS use and this intention correlated positively and significantly with the extent to which CPs assess customers' HDS use. CPs' beliefs about the consequences, moral norms, capabilities, role and identity, and past behavior correlated positively and significantly with CPs' intention to assess customers' HDS use. Measures to enhance the beliefs that are positively associated with CPs' intention to assess customers' HDS use should be warranted by key stakeholders in community pharmacy practice to ensure HDS are being used appropriately and safely by consumers.

ACKNOWLEDGMENT

CONFLICT OF INTEREST

None.

FINANCIAL SUPPORT

REFERENCES

Abahussain NA, Abahussain EA, Al-Oumi FM. Pharmacists' attitudes and awareness towards the use and safety of herbs in Kuwait. Pharm Pract (Granada), 2007; 5(3):125–9.

Ajzen I. The theory of planned behavior. Organ Behav Hum Perform, 1991; 50(2):179–211.

Al-Arifi MN. Availability and needs of herbal medicinal information resources at community pharmacy, Riyadh region, Saudi Arabia. Saudi Pharm J, 2013; 21(4): 351–60.

Barnes J, Abbot NC. Professional practices and experiences with complementary medicines: a cross sectional study involving community pharmacists in England. Int J Pharm Pract, 2007; 15(3):167–75.

Boullata JI, Nace AM. Safety issues with herbal medicine. Pharmacotherapy, 2000; 20(3):257–69.

Braun LA, Cohen MM. Australian hospital pharmacists' attitudes, perceptions, knowledge and practices of CAMs. J Pharm Pract Res, 2007; 37(3):220–4.

Brown CM, Barner JC, Shah S. Community pharmacists' actions when patients use complementary and alternative therapies with medications. J Am Pharm Assoc (2003), 2005; 45(1):41–7.

Bushett NJ, Dickson-Swift VA, Willis JA, Wood P. Rural Australian community pharmacists' views on complementary and alternative medicine: a pilot study. BMC Complement Altern Med, 2011; 11(1):103.

Chen X, Ung COL, Hu H, Liu X, Zhao J, Hu Y, Li P,Yang Q. Community pharmacists' perceptions about pharmaceutical care of traditional medicine products: a questionnaire-based cross-sectional study in Guangzhou, China. Evid Based Complement Altern Med, 2016; 2016.

Cockayne NL, Duguid M, Shenfield GM. Health professionals rarely record history of complementary and alternative medicines. Br J Clin Pharmacol, 2005; 59(2):254–8.

Dabaghzadeh F, Hajjari R. Practice of community pharmacists related to multivitamin supplements: a simulated patient study in Iran. Int J Clin Pharm, 2018; 40(1):190–5.

Dolder C, Lacro J, Dolder N, Gregory P. Pharmacists' use of and attitudes and beliefs about alternative medications. Am J Health Syst Pharm, 2003; 60(13):1352.

Durrheim K, Tredoux C. Numbers, hypotheses & conclusions: a course in statistics for the social sciences. Juta and Company Ltd, Kenwyn, South Africa, 1999.

Farris KB, Schopflocher DP. Between intention and behavior: an application of community pharmacists' assessment of pharmaceutical care. Soc Sci Med, 1999; 49(1):55–66.

Gabay M, Smith JA, Chavez ML, Goldwire M, Walker S, Coon SA, Gosser R, Hume AL, Musselman M,Phillips J. White paper on natural products. Pharmacotherapy, 2017; 37(1):e1–15.

Gavaza P, Brown CM, Lawson KA, Rascati KL, Wilson JP,Steinhardt M. Examination of pharmacists' intention to report serious adverse drug events (ADEs) to the FDA using the theory of planned behavior. Res Soc Adm Pharm, 2011; 7(4):369–82.

Gavaza P, Fleming M, Barner JC. Examination of psychosocial predictors of Virginia pharmacists' intention to utilize a prescription drug monitoring program using the theory of planned behavior. Res Soc Adm Pharm, 2014; 10(2):448–58.

Geller AI, Shehab N, Weidle NJ, Lovegrove MC, Wolpert BJ, Timbo BB, Mozersky RP,Budnitz DS. Emergency department visits for adverse events related to dietary supplements. N Engl J Med, 2015; 373(16):1531–40.

Godin G, Bélanger-Gravel A, Eccles M,Grimshaw J. Healthcare professionals' intentions and behaviours: A systematic review of studies based on social cognitive theories. Implement Sci, 2008; 3(1):36.

Herbert KE, Urmie JM, Newland BA, Farris KB. Prediction of pharmacist intention to provide Medicare medication therapy management services using the theory of planned behavior. Res Soc Adm Pharm, 2006; 2(3):299–314.

Koh H-L, Teo H-H, Ng H-L. Pharmacists' patterns of use, knowledge, and attitudes toward complementary and alternative medicine. J Altern Complement Med, 2003; 9(1):51–63.

Kwan D, Boon HS, Hirschkorn K, Welsh S, Jurgens T, Eccott L, Heschuk S, Griener GG, Cohen-Kohler JC. Exploring consumer and pharmacist views on the professional role of the pharmacist with respect to natural health products: a study of focus groups. BMC Complement Altern Med, 2008; 8(1):40.

Maddukuri VC, Bonkovsky HL. Herbal and dietary supplement hepatotoxicity. Clin Liver Dis, 2014; 4(1):1–3.

Mehralian G, Yousefi N, Hashemian F, Maleksabet H. Knowledge, attitude and practice of pharmacists regarding dietary supplements: a community pharmacy-based survey in Tehran. Iran J Pharm Res, 2014; 13(4):1457–65.

Odedina FT, Hepler CD, Segal R, Miller D. The pharmacists' implementation of pharmaceutical care (PIPC) model. Pharm Res, 1997; 14(2):135–44.

Ogbogu U, Necyk C. Community pharmacists' views and practices regarding natural health products sold in community pharmacies. PloS one, 2016; 11(9):e0163450.

Olatunde S, Boon H, Hirschkorn K, Welsh S, Bajcar J. Roles and responsibilities of pharmacists with respect to natural health products: key informant interviews. Res Soc Adm Pharm, 2010; 6(1):63–9.

Pharmaceutical Services Division Ministry of Health Malaysia. Community pharmacy benchmarking guideline, 2015. Available via https://www.pharmacy.gov.my/v2/en/documents/community-pharmacy-benchmarking-guideline.html (Accessed July 10 2019).

Pharmaceutical Services Division Ministry of Health Malaysia. Daftar lesen, 2018. Available via https://www.pharmacy.gov.my/v2/ms/maklumat/daftar-lesen.html (Accessed April 30 2018).

Puspitasari HP, Costa DS, Aslani P, Krass I. An explanatory model of community pharmacists' support in the secondary prevention of cardiovascular disease. Res Soc Adm Pharm, 2016; 12(1):104–18.

Reinhard MJ, Nassif TH, Bloeser K, Dursa EK, Barth SK, Benetato B, Schneiderman A. CAM utilization among OEF/OIF veterans:

findings from the National Health Study for a new generation of US veterans. Med Care, 2014; 52:S45–9.

Schnabel K, Binting S, Witt CM, Teut M. Use of complementary and alternative medicine by older adults–a cross-sectional survey. BMC Geriatrics, 2014; 14(1):1.

Semple SJ, Hotham E, Rao D, Martin K, Smith CA, Bloustien GF. Community pharmacists in Australia: barriers to information provision on complementary and alternative medicines. Pharm World Sci, 2006; 28(6):366–73.

Song M, Ung COL, Lee VW-y, Hu Y, Zhao J, Li P, Hu H. Community pharmacists' perceptions about pharmaceutical service of over-the-counter traditional Chinese medicine: a survey study in Harbin of China. BMC Complement Altern Med, 2017; 17(1):9.

Steyn H. Practically significant relationships between two variables. SA Journal of Industrial Psychology, 2002; 28(3):10–5.

Strouss L, Mackley A, Guillen U, Paul DA, Locke R. Complementary and Alternative Medicine use in women during pregnancy: do their healthcare providers know? BMC Complement Altern Med, 2014; 14(1):1.

Taber KS. The use of Cronbach's alpha when developing and reporting research instruments in science education. Res Sci Educ, 2018; 48(6):1273–96.

Ung COL, Harnett J, Hu H. Community pharmacist's responsibilities with regards to traditional medicine/complementary medicine products: a systematic literature review. Res Soc Adm Pharm, 2017; 13(4):686–716.

U.S. Food & Drug Administration. Questions and answers on dietary supplements, 2015. Available via https://www.fda.gov/drugs/questions-answers/dietary-supplements-questions-and-answers (Accessed April 30 2019).

Végh A, Lankó E, Fittler A, Vida RG, Miseta I, Takács G, Botz L. Identification and evaluation of drug–supplement interactions in Hungarian hospital patients. Int J Clin Pharm, 2014; 36(2):451–9.

Wahab MSA, Ali AA, Zulkifly HH, Aziz NA. The need for evidence-based complementary and alternative medicine (CAM) information in Malaysian pharmacy curricula based on pharmacy students' attitudes and perceptions towards CAM. Curr Pharm Teach Learn, 2014; 6(1):114–21.

Wahab MSA, Othman N, Othman NHI, Jamari AA, Ali AA. Exploring the use of and perceptions about honey as complementary and alternative medicine among the general public in the state of Selangor, Malaysia. J Appl Pharm Sci, 2017; 7(12):144–50.

Wahab MSA, Sakthong P, Winit-Watjana W. Pharmacy students' attitudes and perceptions about complementary and alternative medicine: a systematic review. Thai J Pharm Sci, 2016; 40(2).

Wahab MSA, Sakthong P, Winit-Watjana W. Development and validation of novel scales to determine pharmacist's care for herbal and dietary supplement users. Res Soc Adm Pharm, 2019 (Article in press).

Wahab MSA, Sakthong P, Winit-Watjana W. Qualitative exploration of pharmacist care for herbal and dietary supplement users in Thai community pharmacies. J Pharm Health Serv Res, 2019; 10(1):57–66.

Welna EM, Hadsall RS. Pharmacists' personal use professional practice behaviors and perceptions regarding herbal and other natural products. J Am Pharm Assoc (2003), 2003; 43(5):602–11.

Wong PN, Braun LA, Paraidathathu T. Exploring the interface between complementary medicine and community pharmacy in Malaysia—a survey of pharmacists. Malays J Public Health Med, 2018; 18(1):130–8.

World Health Organization. General Guidelines for Methodologies on Research and Evaluation of Traditional Medicine, 2000 Available via http://apps.who.int/iris/bitstream/10665/66783/1/WHO_EDM_TRM_2000.1.pdf (Accessed 10 July 2019).