

Article

Knowledge, Attitude and Practice towards the Use of Over-the-Counter Medicines: An Online Survey among Bruneian Adults amid the COVID-19 Pandemic

Faiqah Batrisyia Syaza Bahrin Dzulkharnain ¹, Naeem Shafqat ¹ , Andi Hermansyah ^{2,*} , Ching Siang Tan ³ , David Koh ^{1,4}, Khang Wen Goh ⁵  and Long Chiau Ming ^{1,2,*} 

- ¹ PAPRSB Institute of Health Sciences, Universiti Brunei Darussalam, Gadong BE1410, Brunei; azabahrin@gmail.com (F.B.S.B.D.); sheikh.shafqat@ubd.edu.bn (N.S.); ephkohd@nus.edu.sg (D.K.)
² Department of Pharmacy Practice, Faculty of Pharmacy, Universitas Airlangga, Surabaya 60115, Indonesia
³ School of Pharmacy, KPJ Healthcare University College, Nilai 71800, Malaysia; tcsiang@kpjuc.edu.my
⁴ Saw Swee Hock School of Public Health, National University of Singapore, Singapore 119077, Singapore
⁵ Faculty of Data Sciences and Information Technology, INTI International University, Nilai 71800, Malaysia; khangwen.goh@newinti.edu.my
* Correspondence: andi-h@ff.unair.ac.id (A.H.); longchiauming@gmail.com (L.C.M.)

Abstract: Globally, self-medication has increased, where 25% of adults use OTC medicines. This research is intended to assess the knowledge, attitude and practice regarding OTC medicines among adults in Brunei Darussalam. An online cross-sectional survey was performed using a questionnaire adapted from similar research conducted among students in Brunei Darussalam. A total of 364 responses were collected, where the median age of the study participants was 23 years. The mean knowledge score was 7.3 out of 9, with most respondents (77.7%) having good knowledge of OTC medicines. Almost all (92.9%) showed a positive attitude towards OTC use. A statistically significant difference ($p \leq 0.05$) was observed in attitude scores between age groups and education levels. Most of the study participants (88.2%) have practiced self-medication with OTC medicines, mainly due to their easy accessibility (79.4%). A small number practiced improper habits, such as consuming more than the recommended dose (6.0%) and not checking the expiry date (0.5%). The practice of self-medicating with OTC medicines can be advantageous when patients fully know the medications and nature of their disease. Knowledge of proper OTC medicine use among adults in Brunei Darussalam is essential to avoid improper user practices and potential health hazards associated with the misuse of medications.

Keywords: health system access; human medicine; health care; essential medicines access; medicine; health outcomes self-medication



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1. Introduction

According to the United States Food and Drug Administration (FDA) (2018), over-the-counter (OTC) medicines are medications that do not require a prescription from a healthcare professional but can be obtained off the shelf from places such as retail pharmacies and grocery stores. Purchasing OTC medicines without consulting healthcare personnel can be considered as self-medication [1,2]. Globally, self-medication to treat different ailments has been reported to increase, where 25% of people around the world self-medicate with OTC medicines [3]. OTC medicines can help relieve symptoms including fever, minor pain, constipation, sore throat and coughs. The practice of self-medicating with OTC medicines can be advantageous when patients have full knowledge of the medicines and the nature of their disease [2]. However, a lack of knowledge while self-medicating with OTC medicines can potentially lead to improper user practices and health hazards associated with the misuse of medications, e.g., experiencing adverse side effects and allergic reactions, drug interactions and even overdose [4].

Self-medication does not just involve taking OTC drugs; it can also mean sharing medications with other people or taking readily available medicines in their homes [2]. Nevertheless, in different studies, the majority prefer getting OTC drugs to treat minor ailments. For example, in several studies from Iran, Ethiopia, India and Nigeria involving self-medication among pharmacy or medical students, the source of the medicines used in self-medication were OTC medicines from medical stores or pharmacies [5–8]. Even healthcare workers from a study in Nigeria prefer self-medicating with OTC [9]. In a different study in India involving patients from a dental hospital, all participants bought their self-medication from medical stores or pharmacies [10]. These findings show that most studies conclude that using OTC medicines is the preferable way of self-medicating. The continuing use of OTC drugs has been cited as a significant barrier to the effective and safe use of medications [2].

Knowledge of OTC medicines is crucial as they could help avoid health hazards and increase the effectiveness of the medications. According to a study among college students in Kuwait, almost half of them purposely changed the dosage of their medications during their self-treatment course [11]. The consequences of incorrect dosage include greater resistance to some drugs and further deterioration in health status. Another study also states that the majority were unaware that OTC medicines are capable of causing side effects and interactions [3,12]. In a study by Saeed et al. (2014) [2], the data regarding the reported cases of self-medication among university students revealed that some participants were not knowledgeable about the names and drug classes of the medications they were taking. In a different study involving students in North India, half of the participants had no knowledge about the medicines [13]. This shows that the awareness regarding the dangers and misuse of OTC medicines among the participants in the different studies was very little.

Although several studies from varying countries have assessed the knowledge, attitude and practice of self-medication among students, to the researchers' best knowledge, no such study regarding the knowledge, attitude and practice of OTC medicines among adults in Brunei Darussalam is available. However, a study on the same topic among students has been done. There are still not many publications that address the issue of self-medication with OTC medicines among adults. Despite the fact that a similar study among students in Brunei Darussalam exists, it is still important to extend the study to the community [14]. According to a study in India, almost all the adults use OTC medicines to treat minor ailments [15]. From another study in Saudi Arabia, the misuse of OTC drugs among adults was high. Other than that, adults could consist of pregnant women, parents or guardians and elderly patients (60 years old and above). Knowledge regarding the dangers of misuse of OTC medicines is essential for adults. It could help prevent any potential health hazards and help in raising the awareness of misuse of OTC medicines in the community [16].

This study determined the perception and level of knowledge regarding OTC medicines and determined the effect of sociodemographic factors on the knowledge and attitude of OTC medicines among adults in Brunei Darussalam. This study also targeted to provide further insight regarding the issue of misuse of OTC medicines to fill the information gap of public health policy makers. The study was conducted amid the third wave of the COVID-19 pandemic in Brunei Darussalam with restricted travelling and outdoor activities, hence the findings could capture the views on OTC medicines among adults in Brunei Darussalam when the pandemic was at its peak, with a seven-day average of 4200 reported new COVID-19 cases.

2. Materials and Methods

2.1. Study Design and Distribution

This study was an online cross-sectional survey conducted from March 2022 until April 2022 involving adults in Brunei Darussalam. The eligibility criteria for the study were as follows: (i) an adult (18 to 65 years old), (ii) Bruneian citizens or permanent residents of

Brunei Darussalam and (iii) adults who were willing to participate voluntarily. Exclusion criteria included temporary residents of Brunei Darussalam.

The questionnaire, along with the participant information sheet and consent form, was distributed online by sharing the link to the survey and poster via social media and sent through the Universiti Brunei Darussalam (UBD) email to staff and students. The survey was mainly shared through WhatsApp, Instagram and Twitter. It was first shared with relatives and friends of the investigator, and later, they helped share the questionnaire through their means and their social media. It was distributed to several WhatsApp groups with different age ranges, e.g., family groups, work groups, etc. The questionnaire was open for one month, from March 2022 to April 2022. This was during the period of COVID-19 pandemic third wave with a strict border control and preventive standard operating procedure.

2.2. Study Instrument

The questionnaire used for this research project was adjusted from a survey conducted in Brunei Darussalam by Abdullah et al. (2022) [14] that explored the knowledge, attitude and practice of OTC medicines among college and university students in Brunei Darussalam. This questionnaire is preferred for the study because it contains a relevant topic that covers the use of OTC medicines. The questionnaire was provided in both English and Malay, as these are the two main languages used in Brunei Darussalam. Pilot testing of the questionnaire was already conducted by the study mentioned above which demonstrated good face and content validity.

The pilot testing, which involved face validity and pre-testing, was conducted by Abdullah et al. (2022) [14] to ensure the questions were suitable for the local setting. The face validity that involved assessing the readability, length and relevance of the online questionnaire was done by a pharmacist, a biostatistics lecturer and a physician from PAPRSB Institute of Health Sciences, Universiti Brunei Darussalam. Pre-testing was also conducted, where 38 students were involved. The internal consistency of the final questionnaire was determined using Cronbach's alpha coefficient. Cronbach's alpha values for the knowledge, attitude and practice sections were 0.74, 0.73 and 0.73, respectively [14].

The online questionnaire contained 4 sections with a total of 37 questions. There were 6 questions on sociodemographic data, which included gender, age, nationality, race, highest degree or level of education completed and monthly household income. It also consisted of 9 questions on knowledge, 8 questions on attitude and 14 questions on practice. The sections on knowledge and practice consisted of basic statements and general questions, while a five-point Likert scale of agreement was used in the attitude section.

For the knowledge section, correct responses were scored as one mark, while incorrect responses and "I do not know" were scored as zero. The total knowledge scores ranged from zero to nine, which were then categorized into "Good" (≥ 7 correct answers), "Moderate" (4 to 6 correct answers) and "Poor" (< 4 correct answers). For the attitude section, a score of 1 was given to strongly disagree, 2 to disagree, 3 to neither agree nor disagree, 4 to agree and 5 to strongly agree. The positive and negative attitude depends on the total attitude score, with a 20 and above considered a positive attitude [14].

2.3. Data Collation and Analysis

The data collected from Google Forms was exported to Microsoft Excel. All the data were statistically analysed using RStudio software and Microsoft Excel. The data collected were summarised using descriptive statistics for the frequencies, percentages, medians, means and standard deviation. Chi-square and Fisher's exact tests were used to analyse the association between variables of knowledge, attitude and sociodemographic characteristics. Fisher's exact test was preferred over the Chi-square test for data with 20% or more of the cells in the table with expected values of less than 5 or if any expected count was less than 2. RStudio version 2022.02.1 + 461 "Prairie Trillium" Release and Microsoft Excel version 16.60 were used for data analysis. A p value of < 0.05 was considered statistically significant.

2.4. Ethical Approval

Full ethical approval was obtained in March 2022 from the PAPRSB Institute of Health Sciences Research Ethics Committee (IHSREC), Universiti Brunei Darussalam (UBD/PAPRSBIH-SREC/2021/68). The data collected remained anonymous, so no participant-identifying information such as names and identification card numbers were collected. Confidentiality was also strictly maintained. Participants were asked to tick an option at the beginning of the online survey if they agreed to participate. In addition, participation was on a voluntary basis where the respondents had their own choice whether they chose to take part in the online questionnaire or not.

3. Results

3.1. Demographic Data

A total of 364 responses were collected, where the median age of the study participants was 23 years (SD = 11.1, range between 18 and 62 years). The other sociodemographic characteristics of the study sample are displayed in Table 1 below.

Table 1. Sociodemographic characteristics of study sample ($n = 364$).

Variable	n (%)
Gender	
Male	80 (22.0)
Female	284 (78.0)
Nationality	
Bruneian	353 (97.0)
Permanent Resident	11 (3.0)
Level of Education *	
Secondary education	119 (32.7)
Post-secondary non-Tertiary education	59 (16.2)
Tertiary education	186 (51.1)
Household Income per month **	
BND 900–5000	56 (46.7)
BND 5001–10,000	53 (44.2)
More than BND 10,000	11 (9.2)

* Secondary education includes O Level, A Level and International Baccalaureate (IB), post-secondary non-tertiary education consists of Foundation, Certificate and Diploma qualifications while tertiary education includes Bachelor's degree, Master's degree and Doctor of Philosophy (PhD). ** BND: Brunei Dollar (according to currency exchange rate dated 4 April 2022: 1 BND = 0.73 USD).

3.2. Knowledge and Attitudes towards the Use of OTC Medicines

The majority of the respondents (77.7%) obtained a cumulative “Knowledge Score” of 7 to 9, indicating good knowledge of OTC medicine use. The average percentage of correct responses was 80.9%. The mean total knowledge score is 7.3 out of 9 (Table 2). In terms of “Attitude Score”, most of the study participants (92.9%) showed a positive attitude towards OTC medicine use (Table 3). The mean attitude score of the respondents was 28.6 out of 40, where 8 was the lowest score and 40 was the highest score. More than half agreed that they should take OTC medicines when they have a minor illness (61.1%) and that pregnant and breastfeeding women may use OTC medicines with caution (56.6%). A majority agreed that OTC medicines are easily obtained (82.7%) and that self-medicating with OTC medicines is safe when used properly (84.7%). Respondents' attitudes towards OTC medicine use differed by age groups of below 40 years and 40 years and above ($p \leq 0.05$), but not in nationality or monthly household income.

Table 2. Responses to knowledge of over-the-counter (OTC) medications ($n = 364$).

Statement	Correct		Incorrect		Do Not Know	
	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)
OTC medicines are medicines you can buy without a prescription.	314	(86.3)	14	(3.8)	36	(9.9)
We are allowed to use OTC medicines to improve our health.	327	(89.8)	6	(1.6)	31	(8.5)
OTC medicines are used to treat, prevent or relieve major illnesses (brain and heart diseases).	253	(69.5)	38	(10.4)	73	(20.1)
OTC medicines are used to treat, prevent or relieve minor illnesses (fever and mild headache).	336	(92.3)	2	(0.5)	26	(7.1)
Interactions involving OTC medicines can sometimes produce unwanted results or make medicines less effective.	247	(67.9)	22	(6.0)	95	(26.1)
Some OTC medicines can also interact with foods and beverages and health conditions (high blood sugar and high blood pressure).	251	(69.0)	13	(3.6)	100	(27.5)
Pregnant and breast-feeding women should be extra cautious while using OTC drugs.	317	(87.1)	5	(1.4)	42	(11.5)
Painkiller is an example of an OTC medicine.	312	(85.7)	23	(6.3)	29	(8.0)
Paracetamol (such as Panadol) is safe and effective when used correctly, but taking too much can lead to liver damage.	292	(80.2)	6	(1.6)	66	(18.1)

Table 3. Attitudes of respondents to the use of OTC medicines ($n = 364$).

Statement	<i>n</i>	(%)
Using OTC medicines as self-medication is safe when you use them correctly.		
Strongly agree	172	(47.3)
Agree	136	(37.4)
Neither agree nor disagree	31	(8.5)
Disagree	3	(0.8)
Strongly disagree	22	(6.0)
OTC medicines are convenient to obtain and use.		
Strongly agree	161	(44.2)
Agree	141	(38.7)
Neither agree nor disagree	34	(9.3)
Disagree	6	(1.6)
Strongly disagree	22	(6.0)
OTC medicines can be used in pregnancy and breastfeeding but with caution unless stated on the label to avoid.		
Strongly agree	63	(17.3)
Agree	143	(39.3)
Neither agree nor disagree	97	(26.6)
Disagree	35	(9.6)
Strongly disagree	26	(7.1)

Table 3. Cont.

Statement	<i>n</i>	(%)
I should take OTC medicines when I have a minor illness.		
Strongly agree	55	(15.1)
Agree	167	(45.9)
Neither agree nor disagree	94	(25.8)
Disagree	30	(8.2)
Strongly disagree	18	(4.9)
OTC medicines are safe, but I would seek a pharmacist's advice if I am not sure about my minor illness and which is suitable for it.		
Strongly agree	168	(46.2)
Agree	122	(33.5)
Neither agree nor disagree	40	(11.0)
Disagree	10	(2.7)
Strongly disagree	24	(6.6)

In this study, no significant differences were observed when comparing knowledge scores among those with different demographic characteristics. On the contrary, there was a statistically significant difference in attitude scores between academic degree levels ($p \leq 0.05$), as shown in Table 4.

Table 4. Association of sociodemographic characteristics with level of “Knowledge Score” and “Attitude Score” ($n = 364$).

Characteristics	Good ¹	Moderate ²	Poor ³	<i>p</i> Value			
	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	
Knowledge Score ¹							
Gender							
Male	59	(73.8)	12	(15.0)	9	(11.3)	0.086 ^b
Female	224	(78.9)	47	(16.6)	13	(4.6)	
Age group							
Below 40 years	231	(79.7)	42	(14.5)	17	(5.9)	0.186 ^b
40 years and above	52	(70.3)	17	(23.0)	5	(6.8)	
Level of Education							
Secondary Education	95	(79.8)	16	(13.5)	8	(6.7)	0.250 ^b
Post-secondary Non-tertiary Education	40	(67.8)	13	(22.0)	6	(10.2)	
Tertiary Education	148	(79.6)	30	(16.1)	8	(4.3)	
Household Income per Month							
Less than BND 5000	31	(73.8)	7	(16.7)	4	(9.5)	0.502 ^a
BND 5000–10,000	54	(80.6)	11	(16.4)	2	(3.0)	
More than BND 10,000	8	(72.7)	3	(27.3)	0		
Attitude Score ⁴							
Gender							
Male	76	(95.0)	4	(5.0)			0.399 ^b
Female	262	(92.3)	22	(7.8)			
Age group							
Below 40 years	274	(94.5)	16	(5.5)			0.017 ^{b*}
40 years and above	64	(86.5)	10	(13.5)			

Table 4. Cont.

Characteristics	Good ¹	Moderate ²	Poor ³	<i>p</i> Value	
Nationality					
Bruneian	328	(92.9)	25	(7.1)	0.563 ^a
Permanent Resident	10	(90.9)	1	(9.1)	
Level of Education					
Secondary Education	112	(94.1)	7	(5.9)	0.030 ^{b*}
Post-secondary Non-tertiary Education	50	(84.8)	9	(15.3)	
Tertiary Education	176	(94.6)	10	(5.4)	
Household Income per Month					
Less than BND 5000	40	(95.2)	2	(4.8)	0.753 ^a
BND 5000–10,000	62	(92.5)	5	(7.5)	
More than BND 10,000	10	(90.9)	1	(9.1)	

^a Fisher's exact test. ^b Chi-square test for independence. * Statistically significant *p* value. ¹ Good = 7–9 marks; ² Moderate = 4–6 marks; ³ Poor = < 4 marks. ⁴ Positive attitude = score of 20 and above; Negative attitude = score of below 20.

3.3. Respondents' Practices Regarding the Use of OTC Medicines

A large number of the study participants (88.2%) have practiced self-medication with OTC medicines, and half of the respondents (50.3%) normally consume them when they experience manageable or minor symptoms. A majority of them (79.4%) use OTC medicines due to the convenience and easy accessibility (Table 5). When using OTC medicines, more than half (56.9%) consult with their family members beforehand. They also get information from the internet (51.1%), pharmacists (41.8%), doctors (41.8%), friends (37.6%), patient information leaflets (18.4%) and social media (13.7%) (Figure 1).

Table 5. Respondents' actions on the use of OTC medicine (*n* = 364).

Statements	<i>n</i>	(%)
Have you ever practiced self-medication with OTC medicine(s)?		
Yes	321	(88.2)
No	43	(11.8)
When do you usually consume OTC medicine(s)?		
Symptoms are minor or manageable	183	(50.3)
Whenever I feel sick	88	(24.2)
Whenever I cannot visit a doctor	45	(12.4)
When pain or discomfort is unbearable	8	(2.2)
Common reason(s) for using OTC medicines is:		
Time-saving	228	(62.6)
Low cost	150	(41.2)
Safe and well tolerable	128	(35.2)
Easy accessibility (access to OTC products)	289	(79.4)
Effectiveness	3	(0.8)
Have you experienced adverse effects from the OTC medicine(s)?		
Yes	24	(6.6)
No	246	(67.6)
Do not know	51	(14.0)
Have never self-medicated with OTC medicine	43	(11.8)

Table 5. Cont.

Statements	<i>n</i>	(%)
Have you ever taken more than the recommended dose for the OTC medicine(s)?		
Yes	22	(6.0)
No	294	(80.8)
Do not know	5	(1.4)
Have never self-medicated with OTC medicine	43	(11.8)
How often do you read the instructions on the medicine's label before use?		
Always	203	(55.8)
Often	63	(17.3)
Sometimes	39	(10.7)
Rarely	15	(4.1)
Never	1	(0.3)
Have never self-medicated with OTC medicine	43	(11.8)
How often do you check the expiry date?		
Always	216	(59.3)
Often	51	(14.0)
Sometimes	41	(11.3)
Rarely	11	(3.0)
Never	2	(0.5)
Have never self-medicated with OTC medicine	43	(11.8)
How often do you store your OTC medicine(s) in a cool, dry place or as stated on the label?		
Always	218	(59.9)
Often	81	(22.3)
Sometimes	13	(3.6)
Rarely	8	(2.2)
Never	1	(0.3)
Have never self-medicated with OTC medicine	43	(11.8)
If the OTC medicine showed a change in shape, colour, or odour, I would immediately discard the medicine.		
Yes	309	(84.9)
No	4	(1.1)
Do not know	8	(2.2)
Have never self-medicated with OTC medicine	43	(11.8)

The most common ailment for self-medicating with OTC medicines among the adults was headache (81.9%). Other minor illnesses included fever (77.2%), cold and flu (75.8%), diarrhoea (37.9%), constipation (28.0%), allergies (25.8%), eczema (0.5%), sore throat (0.3%), eye infections (0.3%), rashes (0.3%) and mouth ulcers (0.3%). About half reported that they used OTC medicines for pain (53.6%), and some of the respondents specified the different kinds of pain they self-medicate for; gastric pain ($n = 3$, 0.8%), menstrual pain ($n = 2$, 0.5%), muscle pain ($n = 2$, 0.5%) and joint pain ($n = 1$, 0.3%) (Figure 2). The categories of OTC medicines mainly used were cold and flu drugs (66.8%), painkillers (64.3%), vitamins (59.3%), antipyretics (46.7%), antacids (31.3%), anti-allergy medications (16.8%), anti-diarrhoeal medications (13.5%), skin emollients like creams and ointments (1.4%) and mouth gel (0.3%) (Figure 3).

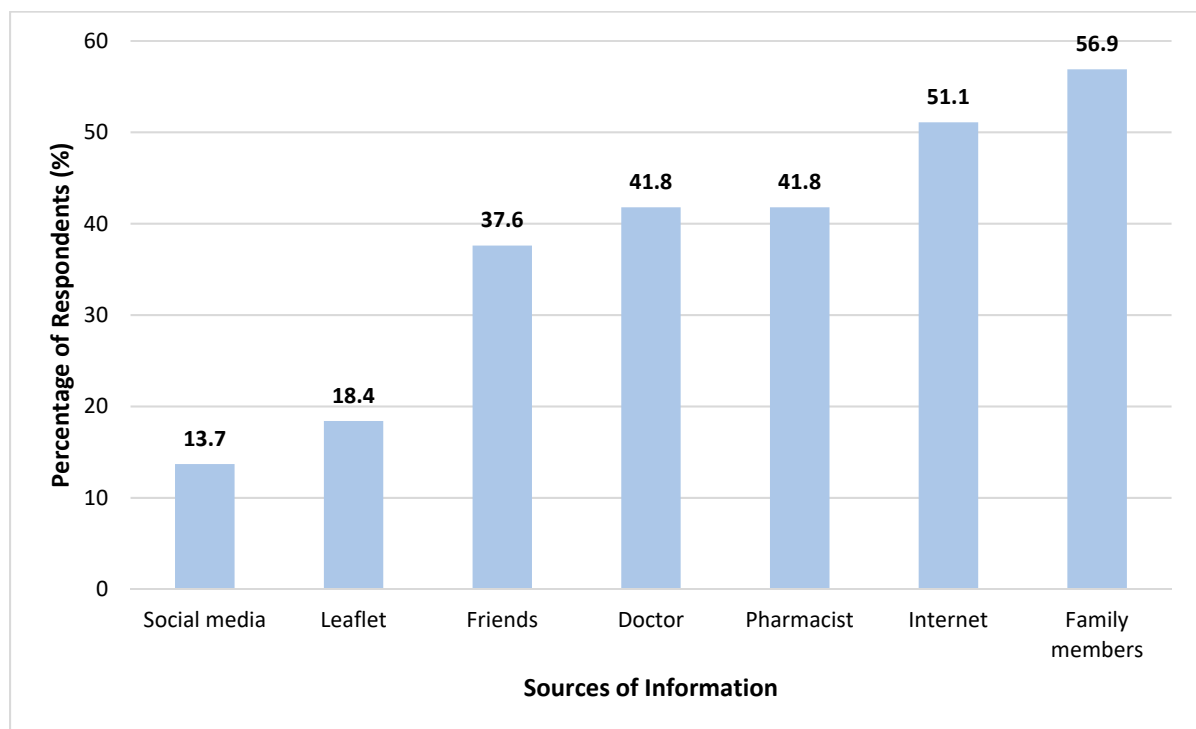


Figure 1. Sources of information considered by respondents before using OTC medicines.

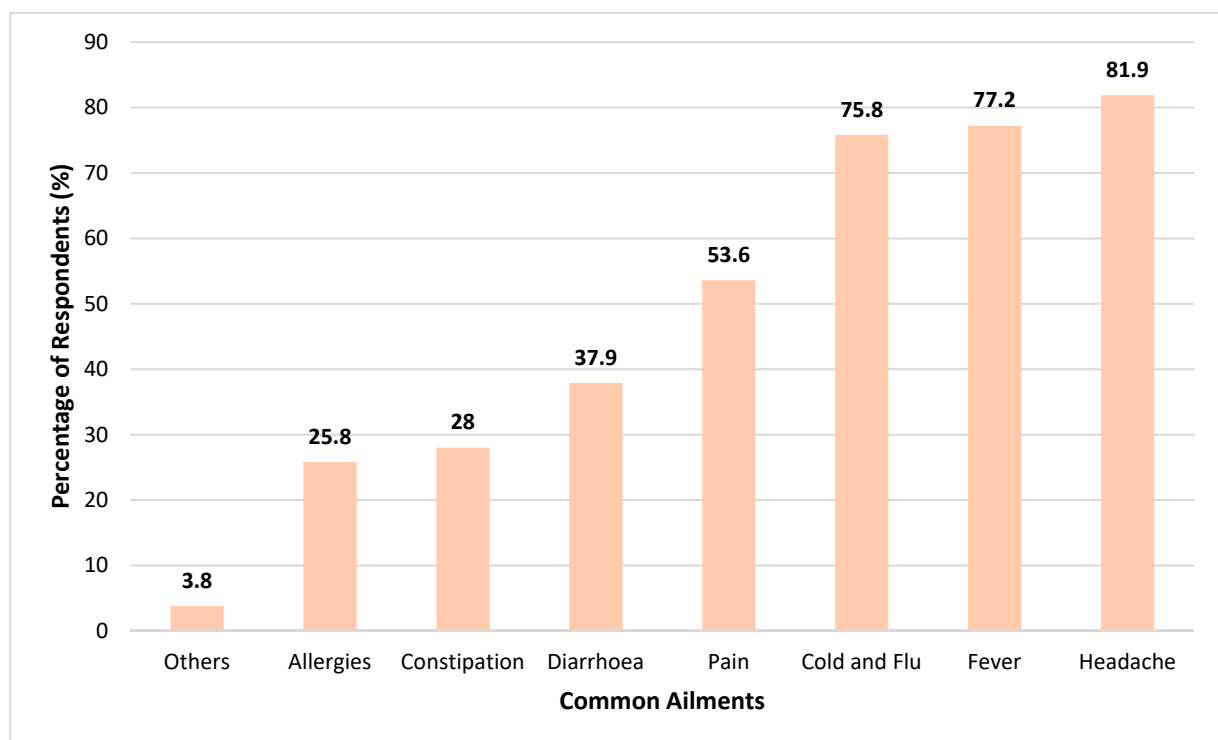


Figure 2. Respondents' common ailments for self-medication with OTC medicines.

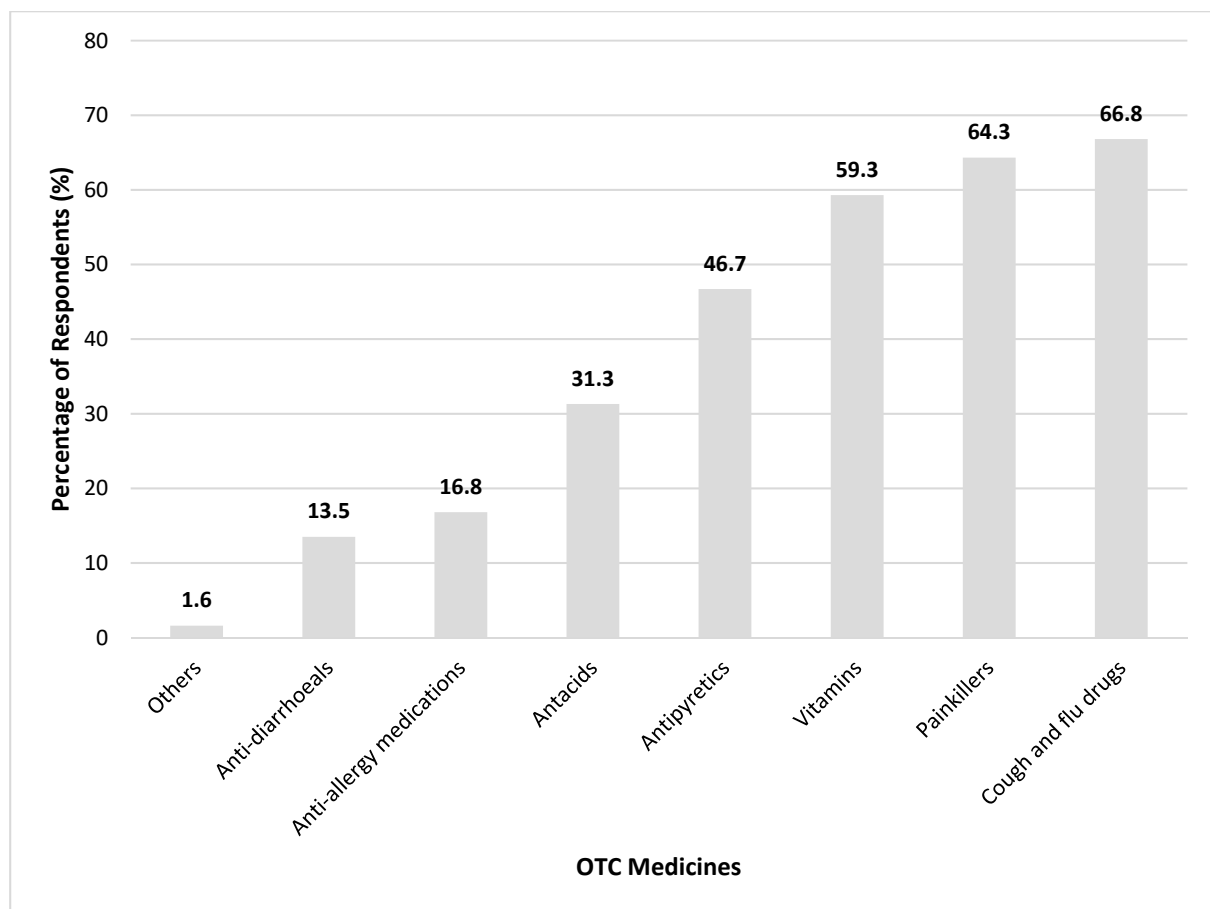


Figure 3. Most-used OTC medicines by respondents for self-medication.

A small number of the respondents have experienced adverse effects from self-medicating with OTC medicines (6.6%), while 14% were unsure if they have. Out of the 24 participants that experienced side effects, a few have specified that they had an allergic reaction (16.7%), diarrhoea (12.5%), drowsiness (8.3%) and nausea (8.3%). Moreover, some mentioned what they did after they experienced the side effects, which included taking a rest (25.0%), stopping taking the medication (12.5%), going to the hospital (12.5%) and drinking a lot of water (4.2%).

In addition, a few of them have also consumed more than the recommended dose ($n = 22$, 6.0%). Most reported that they took more to get a better or stronger effect ($n = 8$, 36.4%) or a faster effect ($n = 4$, 18.2%). Other reasons included taking them by accident, e.g., misreading instructions or forgetting how many they have taken ($n = 5$, 22.7%), being unable to tolerate the pain ($n = 3$, 13.6%) and even a few cases of intentional overdose ($n = 2$, 9.1%).

Most of the study participants always read the instructions on the packaging or leaflet before use (55.8%), check the expiry date (59.3%) as well as store the OTC medicines in a cool and dry place (59.9%). A majority (84.9%) also reported that they would immediately throw away the medicine if it showed alterations in shape, colour and odour (Table 5).

4. Discussion

The level of knowledge of OTC use in this present study was good for the majority, as more than half of the respondents (77.7%) obtained a good knowledge score of 7 to 9. Compared to a similar study by Abdullah et al. (2022) that assessed the knowledge, attitude and practice of OTC medicine among students from public institutions of higher learning in Brunei Darussalam, this study showed no observations of significant differences when comparing knowledge scores among those with different sociodemographic characteristics.

In the aforementioned study, a statistical significance was observed between knowledge of OTC medicines depending on the academic degree. It was reported that students studying health science-related courses had a higher percentage of good knowledge than students taking other courses [14]. Education seems to play a massive role in influencing self-medication, as demonstrated by one study conducted among 200 junior medical students in India [13]. Their findings reported that most medical students become more careful towards self-medication after learning about possible adverse drug reactions and drug resistance [13].

Another study among 170 medical and pharmacy students at the Zabol University of Medical Sciences, Iran states that self-medication is higher among students than in the general population due to more knowledge and better access to the Internet [17]. In a few studies among university students, the reason for the practice of self-medication could be due to self-confidence and knowledge learnt about the medications [3,5,17]. Having a good level of knowledge on self-medication with OTC medicines and understanding of the proper utilisation of medications may help improve one's health and may even reduce the economic burden on the government.

While considering the attitude toward self-medicating with OTC medicine, our study obtained results where a majority of the study participants (92.9%) showed a positive attitude towards OTC medicine use. This is supported by findings from a study from Saudi Arabia that assessed the knowledge, attitude, and practices on OTC oral analgesics among 440 female university students from medical/computer science or arts programmes. That particular study reported that a positive attitude towards the use of analgesics was more common among medical students [12]. In our study, we found a significant difference between the cumulative attitude score and age groups and level of education. A total of 338 respondents obtained a positive attitude score, where 81.1% were aged below 40 years, and about half (52.2%) have completed tertiary education. Interestingly, in comparison to the study among students in Brunei Darussalam, they did not observe any significant differences when comparing attitude scores among those with different demographic characteristics [14].

Regarding the practice of self-medicating with OTC medicines, most of our study participants (88.2%) have practiced self-medication. A study from North India also reported a high number of respondents (86.5%) who have practiced self-medication, despite the attitude of being against it [13]. Most of the respondents from this study (79.4%) use OTC medicines due to their convenience and easy accessibility. Sivasakthi et al. (2020) [18] state that most people prefer self-medication due to the health facilities being far from home, making OTC medicines convenient and easily accessible. Most studies have reported that the reasons for self-medication were often due to saving time and quick relief. However, in a cross-sectional study done among a rural population in India, no participant took OTC medicines due to the time-saving reason. Instead, a majority of them take them due to the low cost [19]. OTC medicines being low cost is also another common reason, according to the different studies [20,21]. On the other hand, only less than half of our study participants (41.2%) consume OTC medicines due to their low cost. This may be due to the different prices of OTC medicines in retail stores and pharmacies worldwide.

The most common ailments for self-medicating with OTC medicines were headache (81.9%), fever (77.2%) and cold and flu (75.8%). A study in Yemen also reported similar findings where most of the self-medication was to treat headaches, flus or colds followed by fevers [20]. According to other studies on self-medication, the most common ailments for practising self-medication were fever, headache, cough and the common cold, which is also in tandem with our findings [3,5,10,18]. About half of our respondents (53.6%) reported that they treat pain with OTC medicines. Pain is also one of the most common symptoms being self-treated using OTC medicines, and it can be of different nature [11,12,18,19]. A few have specified in our questionnaire the nature of their pain, including gastric pain, joint pain, muscle pain and menstrual pain. In two studies from Saudi Arabia, one of the most common indications for using OTC painkillers was dysmenorrhea [12,21].

In our study, from 364 study participants, we observed that 24 (6.6%) of them experienced side effects after consuming OTC medicines. Out of the 24 participants, a few have specified that they had an allergic reaction (16.7%), diarrhoea (12.5%), drowsiness (8.3%) and nausea (8.3%). A study from Kuwait reports a similar result where only a small number (14.2%) experienced adverse effects while self-medicating [11].

A majority of the respondents (80.8%) from our study have never taken over the recommended dose, but a small number (6%) have. The reasons for doing so were to get a better or stronger effect ($n = 8$, 36.4%), by accident which included misreading instructions or unaware or forgotten how many they have taken ($n = 5$, 22.7%), to get a faster effect ($n = 4$, 18.2%), the pain being unendurable ($n = 3$, 13.6%) and even intentional overdose ($n = 2$, 9.1%). Goyal et al. (2018) [19] also report that only 6% have consumed more than the recommended dose.

Another study reported more than half (52.9%) alter the dose of their medications [3]. These findings suggest that there is the presence of irrational usage and malpractices of OTC medicines, which may potentially lead to accidental drug poisoning and may increase the risk of health-threatening complications.

We found that most respondents read the instructions on the medicine's label or packaging and checked the expiry date before use. In the study by Abdullah et al. (2022) [14], only a small number of the participants rarely or never read the instructions on the medicine labels before taking it. However, in one study involving a rural population in India, only a few participants read the instructions on the medicines and always checked the expiry date before using them [19]. Interestingly, in a different study of another rural area in India, the majority of the people read the given information, but only less than half of them understand it completely [18]. This shows that general knowledge regarding medicines is required to grasp the information fully.

When adopted effectively and appropriately, self-medication with OTC medicines can be advantageous to both the patients and the healthcare system. It may help relieve minor illnesses and lessen treatment costs for patients. It can also reduce physician interaction time as well as waiting time in hospitals or clinics.

Limitations

The results of this study should be interpreted while considering these limitations. Firstly, the main limitation of the study is the cross-sectional design, where the findings are determined by the participants' self-rated responses. Thus, inference and cause-effect are not achievable and response bias is likely to occur. The answers may also affect the knowledge scores if the respondents looked for answers through books or the internet. Secondly, recall bias could also potentially occur as the survey's practice section contained recall questions on OTC medicine use. Thirdly, the online questionnaire was shared and collected after only a month. This was due to the time constraint when conducting the research. Finally, there is an oversampling of females in our study and this could be due to the non-responsiveness of male adults. However, due to the large sample size and sharing the online questionnaires using social media that could reach out to larger audience, our findings presented the current pattern of knowledge and attitudes of Bruneian adult population.

5. Conclusions

Generally, adults in Brunei Darussalam have a good level of knowledge and a positive attitude towards the use of OTC medicines. There are still some inappropriate habits and practices, especially concerning taking more than the recommended dose and not reading the label and packaging of the medication. However, only a small number were observed that showed these improper practices. Increased awareness and knowledge on the appropriate use of OTC medicines among adults in Brunei Darussalam is essential in preventing improper practices in OTC medicine use.

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References

1. Eva, J.J.; Kassab, Y.W.; Neoh, C.F.; Ming, L.C.; Wong, Y.Y.; Hameed, M.A.; Hong, Y.H.; Moklesur Rahman Sarker, M. Self-care and self-management among adolescent T2DM patients: A review. *Front. Endocrinol.* **2018**, *9*, 489. [CrossRef] [PubMed]
2. Saeed, M.; Al-Worafi, Y.A.; Long, C.; Alkhoshaiaban, A. Perception of self-medication among university students in Saudi Arabia. *Arch. Pharm. Pract.* **2014**, *5*, 149. [CrossRef]
3. Mourya, A.; Mary, C.; James, C.; Jose, J.; Srinivasan, R. A Survey on Over The Counter Drug usage in the Community. *J. Drug Deliv. Ther.* **2019**, *9*, 406–416.
4. Anderson, L. OTC (Over the Counter) Drug Database-Drugs.com. Available online: <https://www.drugs.com/otc/> (accessed on 9 May 2022).
5. Mirdoosti, S.M.; Mirzaei, M.; Saadati, A.; Rahimi Hendavalan, M.; Vakili, V. Knowledge, Attitude, and Practice of Self Medication among Medical Students of Mashhad University of Medical Sciences, Mashhad, Iran. *J. Patient Saf. Qual. Improv.* **2020**, *8*, 193–201. [CrossRef]
6. Bekele, K.M.; Abay, A.M.; Mengistu, K.A.; Atsbeha, B.W.; Demeke, C.A.; Belay, W.S.; Yimenu, D.K. Knowledge, Attitude, and Practice on Over-the-Counter Drugs Among Pharmacy and Medical Students: A Facility-Based Cross-Sectional Study. *Integr. Pharm. Res. Pract.* **2020**, *9*, 135–146. [CrossRef] [PubMed]
7. Mgbahurike, A.A.; Nenwi, G. F Prevalence, Knowledge, Practice and Perception of Self Medication among Pharmacy Students in a Nigerian tertiary Institution. *J. Med. Biomed. Appl. Sci.* **2020**, *8*, 494–503. [CrossRef]
8. Sankdia, R.K.; Agrawal, M.; Rekha, P.B.; Kothari, N. A Questionnaire Based Study Regarding the Knowledge, Attitude and Practice of Self-Medication Among Second Year Undergraduate Medical Students. *Int. J. Pharmacol. Clin. Sci.* **2017**, *6*, 1–5. [CrossRef]
9. Tobin, E.A.; Erhazele, J.; Okonofua, M.; Nnadi, C.; Nmema, E.E.; Odigie, G. Self-medication among health care workers in a tertiary hospital in southern Nigeria: Knowledge, attitude, and practices. *Med. J. Indones.* **2020**, *29*, 403–409. [CrossRef]
10. Raja, K.; Darshanram, R.; Menaka, V.; Kumar, P.D.M. Knowledge, Attitude and Practice of Self-Medication Among Patients Visiting A Dental Hospital in Chennai—A Cross Sectional Study. *Int. J. Recent Sci. Res.* **2018**, *9*, 29395–29398. [CrossRef]
11. Mitra, A.K.; Imtiaz, A.; Al Ibrahim, Y.A.; Bulbanat, M.B.; Al Mutairi, M.F.; Musaleem, S.F. Al Factors influencing knowledge and practice of self-medication among college students of health and non-health professions. *IMC J. Med. Sci.* **2019**, *12*, 57–68. [CrossRef]
12. Salih, S.; Madkhali, A.; Al-Hazmi, W.; Al-Khaldy, A.; Moafa, T.; Al-Gahtani, E.; Al-Muhib, M. Knowledge, attitude and practices on over the counter oral analgesics among female students of Jazan University. *Int. J. Med. Dev. Ctries* **2019**, *3*, 311–315. [CrossRef]
13. Parihar, A.; Sharma, D.; Malhotra, P. Questionnaire based assessment of knowledge attitude and practice of self medication among medical undergraduates of a medical college in North India. *JK Sci.* **2018**, *20*, 67–72.
14. Abdullah, I.S.; Chaw, L.L.; Koh, D.; Hussain, Z.; Goh, K.W.; Hamid, A.A.A.; Ming, L.C. Over-the-Counter Medicine Attitudes and Knowledge among University and College Students in Brunei Darussalam: Findings from the First National Survey. *Int. J. Environ. Res. Public Health* **2022**, *19*, 2658. [CrossRef] [PubMed]
15. Premini, S.; Sylus, S.; Sreeja, I. Knowledge and Practice Regarding Over the Counter Medicines among Adults. *J. Couns. Fam. Ther.* **2019**, *2*, 22–28. [CrossRef]
16. Salem, S.; Kherallah, K.; Almituri, M.; Altoom, A.; Alenazi, R.T.; Alshelail, S. Knowledge and Attitude about Misuses of Over-The-Counter (OTC) Medications among Saudi Adults. *J. Health Med. Nursing* **2017**, *44*, 33–41.
17. Hashemzaei, M.; Afshari, M.; Koohkan, Z.; Bazi, A.; Rezaee, R.; Tabrizian, K. Knowledge, attitude, and practice of pharmacy and medical students regarding self-medication, a study in Zabol University of Medical Sciences; Sistan and Baluchestan province in south-east of Iran. *BMC Med. Educ.* **2021**, *21*, 49. [CrossRef] [PubMed]
18. Sivasakthi, K.; Koshila, K.S.; Viswa, S. Assessment of Knowledge, Attitude and Practice about Self Medication among Rural Areas in Erode District. *Indian J. Pharm. Pract.* **2020**, *13*, 228–231. [CrossRef]

19. Goyal, A.; Gaur, A.; Chhabra, M.; Deepak, K. Knowledge, Attitude and Practices of over the Counter (OTC) Medicines among rural Population—A Cross Sectional Study. *Asian J. Pharm. Pharmacol.* **2018**, *4*, 227–231. [[CrossRef](#)]
20. Alshakka, M.; Al-Abd, N.; Alkubati, S.S. Knowledge, Attitude and Practice of Self Medication: A Cross-sectional Study among Yemeni Health Profession Students. *J. Drug Deliv. Ther.* **2019**, *9*, 130–137. [[CrossRef](#)]
21. AlRaddadi, K.; Barakeh, R.; AlRefaie, S.; AlYahya, L.; Adosary, M.; Alyahya, K. Determinants of self-medication among undergraduate students at King Saud University: Knowledge, attitude and practice. *J. Health Spec.* **2017**, *5*, 95. [[CrossRef](#)]