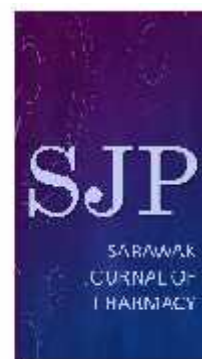




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Pharmacists' perceived confidence in dispensing oral antineoplastic agents: A cross-sectional study in Miri General Hospital

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ABSTRACT

INTRODUCTION: The development of oral antineoplastic agents (OAA) allows chemotherapy patients to receive a home-based therapy. The shift of treatment paradigm from inpatient to outpatient basis has indirectly transferred the responsibility in ensuring the proper use of anticancer drugs to the patient or caregiver and other healthcare professionals. Pharmacists will be tasked to dispense and educate patients on OAAs more frequently compared to a decade ago due to the surge in use of OAAs.

OBJECTIVE: This study assessed the perceived confidence of pharmacists in Miri General Hospital in counselling patients, identifying drug interaction and side effects of oral

chemotherapy and the perceived barriers towards counselling and maintenance of knowledge on OAAs.

METHOD: A cross-sectional study done on all pharmacists in Miri General Hospital using a questionnaire developed based on previous surveys. Formal consent obtained and participants given one week to fill in and return the hard copy questionnaire. Data analysed using descriptive statistics.

RESULTS: With a response rate of 86.7%, the respondents varied in number of years of pharmacy experience and pharmacy position. At least two-thirds of the respondents reported no confidence in counselling patients, identifying drug or herbal interactions and adverse drug events related to all the 10 OAAs selected for this survey. Only 9.6% of the participants received training or education on OAAs in the past one year. A significant proportion of responding pharmacists perceived the level of training or knowledge was the main barrier to counselling patients over OAAs. Majority of the participants (94.2%) interested in attending continuing professional education on OAAs.

CONCLUSION: A substantial proportion of pharmacists in Miri General Hospital lack of perceived confidence in counselling patients, identifying drug or herbal interactions and adverse drug events of OAAs. More education or training on OAAs involving the collaborative engagement of drug manufacturers, government agencies and the pharmacy profession is critically needed to increase the baseline knowledge of pharmacists.

KEYWORDS: oral chemotherapy, oral antineoplastic agents, pharmacist, perceived confidence

Introduction

Over the past decades, a better understanding of genetic, genomic and molecular changes involved in tumour progression has been achieved through advances in technology and medicine. This increased knowledge in tumour biology has led to a revolution in anticancer drug development (1). Many new oral antineoplastic agents (OAA) targeting abnormal proteins and signalling pathways specific to cancer cells have been marketed in the last few years. It is anticipated that the development of oral chemotherapy drug will continue to surge in the future. According to the National Comprehensive Cancer Network (NCCN) report in 2008, an estimation of about 25% - 30% of antineoplastics in the pipeline reported to be oral products and the annual growth of OAAs predicted to be between 30% to 35% (2). In 2013, 75% of new cancer drugs approved for use comprised of oral antineoplastic agents. With the advent of many novel OAAs, this represents a major shift in managing cancer from the contemporary directly observed intermittent intravenous therapy to self-administered oral chronic therapy (1).

The OAAs provide cancer patients with many potential advantages over conventional parenteral chemotherapy (2-4). Several studies have shown that oral anticancer chemotherapy is generally preferred by patients with different types of neoplasms with the assumption the oral agents are equally efficacious. In comparison to intravenous chemotherapy, OAAs offer patients with undeniable advantages in the aspects of pharmacoeconomic issues and patient convenience. With the development of OAAs, patients can receive a home-based treatment without the need for frequent hospital or clinic visits. Besides, oral chemotherapy allows patients to avoid the invasive catheter placement and potential complications related to intravenous access (2, 3, 5, 6).

However, with these benefits in the shift of treatment paradigm poses a new set of problems. There are a number of additional risk factors associated with self-administered

OAAs. More often than not, chemotherapy poses a greater risk of life-threatening adverse events due to its narrow therapeutic index and complexity of the treatment regimens. However, new oral formulation does not seem to eradicate the risks (1, 3). The risk might be heightened when patients cannot comprehend the complex instructions on oral chemotherapy drug administration and this may lead to medication error. As much about 46% of patients wrongly misinterpreted the one or more of the dosage instructions on drug label (6). Non-adherence is another challenge as it can render the treatment to be ineffective and aggravate disease progression (1, 7).

The transition from inpatient to outpatient treatment has indirectly entrusted the responsibility of monitoring possibly fatal adverse drug events and medication adherence from the hospital or clinic oncology team to patients, caregivers and other healthcare professionals such as pharmacists. Due to the upward trend in self-administered OAAs, pharmacists will be tasked to dispense and counsel patients on OAAs more frequently compared to a decade ago. In general, pharmacists are often the last healthcare personnel that patients have access to before commencing a medication therapy (1-3). Thus, pharmacists play an indispensable role in facilitating the safe use of OAAs among chemotherapy patients.

In 2014, according to the Malaysian Pharmaceutical Services Divisions, oncology pharmacy service provided by a total number of 64 public hospitals in Malaysia (8). Clinical oncology pharmacists possess specific expertise and sufficient training in promoting adherence and educating patients. Their roles include identifying medication errors, ensuring the correct drug and appropriate dose and dosing instructions delivered to the patients or caregivers (1, 3). However, not all dispensing of OAAs performed by oncology pharmacists in all public hospitals in Malaysia. In Miri General Hospital, dispensing of OAAs not carried out by oncology pharmacists. Patients often obtain their OAAs from outpatient and inpatient

pharmacy department. Without specific oncology pharmacy service, the responsibility of counselling chemotherapy patients is solely dependent on any pharmacist who dispenses the prescription for an OAA. It is therefore important to gauge pharmacist's comfort and confidence in dispensing oral chemotherapy to patients. Our study aims to analyse the perceived confidence in counselling patients, identifying drug interaction and side effects of oral chemotherapy and the perceived barriers towards counselling and maintenance of knowledge on OAAs among pharmacists in Miri General Hospital.

Methods

A cross-sectional, anonymous, 50-item survey developed based on previous studies by the authors according to the study objective. The face validity of the questionnaire assessed by two senior pharmacists in Miri General Hospital who have had more than 10 years of experience in pharmacy. The initial instrument then pilot-tested on two pharmacists who were then excluded from the final survey to check for comprehension and clarity of questions. Comments adapted and incorporated into the final questionnaire which then distributed out to all pharmacists working in Miri General Hospital in hard copy. Consent obtained and study participants given one week to fill and return the questionnaire.

The first section of the survey designed to collect pharmacists' demographics and practice characteristics. The second part constructed to determine pharmacists' perceived confidence in counselling patients, identifying drug or herbal interactions and adverse drug events as well as their dispensing history for 10 OAAs. The chosen 10 OAAs were medications that were available in Miri General Hospital. In this survey, pharmacists also asked about their perceived barriers to counselling, how they maintained their knowledge regarding OAAs, if

they had received training or education regarding OAAs and their perceived importance and interest in continuing professional education (CPE) program.

Statistical analysis

Data from the survey analysed by using descriptive statistics.

Results

Among 60 surveys we received 52 (response rate of 86.7%). Table 1 summarises the survey respondents' demographic information, maintenance of knowledge of OAAs and their perceived barriers to counselling patients. The pharmacists varied in amount of pharmacy experience and pharmacy position. A significant proportion of responding pharmacists (90.4%) indicated that they had not received any training or education on OAAs in the previous 1 year. Majority of the respondents maintained their knowledge on OAAs by using drug information resources like books or software. However, they also indicated that package inserts were commonly used. All the selected OAAs in this survey reported to be dispensed in the past 6 months with the dispensing rate of less than 50% for all of the chosen OAAs.

The level of training or knowledge perceived to be the main barrier to counselling patients over OAAs by majority of the respondents (Table 1). At least two-third of respondents reported that they had no confidence in counselling, identifying drug or herbal interactions and identifying adverse drug events related to all the selected OAAs (Table 2). Most of the respondents expressed that it was important to know about OAAs and interested in attending CPE on OAAs.

Table 1. Respondent demographic characteristics, maintenance of knowledge of OAAs, and perceived barriers to counselling (N = 52)

Characteristic	Response	No. pharmacists (%)
Pharmacy experience	< 1 year	12 (23.0)
	1-3 years	14 (26.9)
	4-7 years	18 (34.6)
	>7 years	8 (15.5)
Pharmacy Position	Pharmacist intern	14 (26.9)
	Fully registered pharmacist	38 (73.1)
Received training or education on OAAs in the past 12 months	Yes	5 (9.6)
	No	47 (90.4)
Maintenance of knowledge regarding OAAs (mark all that apply)	Internet	21 (40.4)
	Package inserts	36 (69.2)
	Drug information books/software (e.g. Lexicomp)	37 (71.2)
	Drug information service in hospital	5 (9.6)
	Workshop/ CPE	9 (17.3)
	Drug talks organized by drug company	15 (28.8)
	I do not maintain my knowledge	12 (23.1)
Barriers perceived to counselling patients over OAAs (mark all that apply)	Level of training /knowledge	51 (98.1)
	Level of confidence	29 (55.8)
	Time	17 (32.7)

Table 2. Perceived confidence in counselling, identifying drug or herbal interactions and identifying adverse drug events related to the 10 selected OAAs (N = 52)

Drugs	<u>Count of respondents with perceived confidence in</u>					
	<u>Counselling</u>		<u>Identifying drug or herbal interactions</u>		<u>Identifying adverse drug events</u>	
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
Capecitabine	7 (13.5)	45 (86.5)	3 (5.8)	49 (94.2)	7 (13.5)	45 (86.5)
Cyclophosphamide	6 (11.5)	46 (88.5)	4 (7.7)	48 (92.3)	9 (17.3)	43 (82.7)
Hydroxyurea	17 (32.7)	35 (67.3)	5 (9.6)	47 (90.4)	12 (23.1)	40 (76.9)
Letrozole	14 (26.9)	38 (73.1)	4 (7.7)	48 (92.3)	9 (17.3)	43 (82.7)
Imatinib	5 (9.6)	47 (90.4)	3 (5.8)	49 (94.2)	3 (5.8)	49 (94.2)
Nilotinib	4 (7.7)	48 (92.3)	3 (5.8)	49 (94.2)	1 (1.9)	51 (98.1)
Ruxolitinib	1 (1.9)	51 (98.1)	2 (3.8)	50 (96.2)	1 (1.9)	51 (98.1)
Bicalutamide	9 (17.3)	43 (82.7)	2 (3.8)	50 (96.2)	6 (11.5)	46 (88.5)
Tamoxifen	17 (32.7)	35 (67.3)	4 (7.7)	48 (92.3)	11 (21.2)	41 (78.8)
Mercaptopurine	7 (13.5)	45 (86.5)	4 (7.7)	48 (92.3)	6 (11.5)	46 (88.5)

Discussion

The results of this survey show that many pharmacists responded not confident in giving counselling to patients on OAAs, identifying drug or herbal interactions and drug adverse events. It is not surprising that majority of them are relatively unfamiliar with oral anticancer agents as many of these drugs are relatively new in the market and these drugs may be infrequently dispensed. The rapid surge in the development and approval of oral chemotherapy agents has led to a knowledge gap regarding these agents. This unfamiliarity is of utmost concern, given the fact that most chemotherapy has narrow therapeutic index and extensive adverse effect profile. In comparison to the majority of drugs dispensed, chemotherapy medications usually involve more complex drug handling, dosing regimen and special counselling points. Chemotherapy often administered for only a certain days during each treatment cycle. A review has shown the common medication errors related to outpatient chemotherapy treatment involved wrong dose (38.8%), incorrect drug (13.6%), wrong number of days supplied (11.0%) and missed dose (10.0%) (9). Pharmacists taking up the role of

delivering counselling and pharmaceutical care to chemotherapy patients need to be well-equipped on knowledge of OAAs so that they are capable in educating chemotherapy patients and hence, medication errors can be minimized.

Non-adherence is a risk associated with home-based treatment of chemotherapy. Reports have shown an adherence rate ranging from 16% to 100%, depending on the type of chemotherapy and the measurement or definition of adherence (10). Pharmacists, being at the frontline of pharmaceutical care, play a vital role in promoting compliance. However, to identify barriers to adherence, it is essential for pharmacists to have specialized knowledge on chemotherapy. Numerous studies have shown that intervention by pharmacists through education resulted in improved medication adherence among patients (11, 12). Therefore, it is imperative for pharmacists to maintain up-to-date knowledge on oral chemotherapy agents to enhance medication adherence and therapeutic outcome among patients.

The results of this study highlight the need for education or training on these types of medication. The level of knowledge or training perceived to be the main barrier by majority of the respondents. Therefore, more opportunities for training and continuing professional development on oral chemotherapy are warranted. Collaboration of efforts from multidisciplinary sectors such as manufacturers of OAAs, government agencies, professional pharmacy organisations and schools of pharmacy is much needed. Educational initiatives should be launched. For instance, continuing professional education on OAA topics should be provided and minimum core oncology requirements should be established within pharmacy curricula. This inclusion is relevant since many of the oral chemotherapy agents have been approved in the past decade. By providing more opportunities of learning, it is assumed that pharmacists will be more confident in dispensing and educating these groups of patients (13, 14).

Limitations

One limitation of this study was that it only conducted in one practice setting. There may be differences between pharmacists from different healthcare institutions. Besides, this study did not assess pharmacists' knowledge of OAAs and therefore, we could not assess the knowledge level of the respondents and association could not be measured to determine if their perceived confidence of dispensing, identifying drug or herbal interactions and adverse drug events related to their knowledge level.

Conclusion

The results of this study demonstrate the critical need for more education or training opportunities for pharmacists, especially for those working in a setting where oncology pharmacy speciality service is not available. Cooperative endeavour involving drug manufacturers, government agencies and the pharmacy profession is needed to increase baseline knowledge of pharmacists regarding OAA. Given the large market for OAAs, it is an emerging area of pharmacy practice that will bring increasing challenge to all pharmacists.

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