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Original Research Article

An investigation of knowledge, attitude, and practice of community pharmacists toward pharmaceutical care in private community pharmacies in Jamaica

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Abstract

Purpose: *To determine community pharmacists' knowledge, attitude and practice (KAP) towards pharmaceutical care (PC) and identify significant barriers to its provision in Jamaica.*
Methods: *Two hundred participants were selected by stratified proportionate random sampling. A self-administered questionnaire collected data on demographic factors, knowledge and attitude towards PC, and current practices and barriers to PC. Data was quantified using descriptive statistics and analysed using SPSS, version 22. Chi-Squared followed by multinomial logistic regression analyses were conducted to ascertain significant associations, with significance set at p<0.05.*
Results: *Of the 200 questionnaires distributed, 193 were completed, obtaining a response rate of 96.5%. Most pharmacists demonstrated good knowledge (>90%), and a positive attitude (>80%) towards PC, but <50% of pharmacists provided PC. Lack of resources was identified as the most significant barrier to the practice of PC, ranging from 54-85%. Several demographic factors were significantly associated with the pharmacist's KAP and perceived barriers to PC, and many remained significant in each regression model. Knowledge of PC was most positively associated with university education; attitude towards PC was >13 times predicted by PC utilisation and practice was positively associated with level of pharmacy education. Younger age of <50 years was the greatest contributor to the perceived barriers to PC practices.*
Conclusion: *Community pharmacists' good knowledge and positive attitude do not translate into sufficient practice of all pharmaceutical care activities because of the lack of resources. Overcoming this barrier is necessary to improve the practice in Jamaica.*

Keywords: *Knowledge, Attitude, Practice, Community Pharmacists, Pharmaceutical Care*

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INTRODUCTION

Over the last forty years the focus of practicing pharmacy shifted from traditional dispensing of medicinal products to patient-centred care [1]. This structured model of care is known as pharmaceutical care (PC). It requires the pharmacist to share responsibility for achieving pre-defined clinical outcomes that improves a patient's well-being [2]. Community pharmacists are medication experts, strategically placed within many health care settings that allow

patients easy access to fulfil healthcare needs [3]. This affords the pharmacists great opportunities to assist in disease management through the prevention, identification, and resolution of medication-related problems, which, if left unmanaged could increase costs to healthcare systems [4].

To practice PC successfully a good knowledge of therapeutics, a right attitude and definite skills are paramount [5,6]. Several studies found knowledge deficit, poor attitude and practice as barriers to the practice of pharmaceutical care [7,8]. Other barriers to pharmaceutical care may include insufficient support of PC practice, lack of resources (physical infrastructure, time, trained personnel, and workload), inadequate economic compensation, and low levels of public acceptance that diminishes aspirations to practice PC [9-14].

While these studies have investigated the knowledge, attitude and practice (KAP) of pharmacists towards PC in both developed and developing countries, there is a paucity of information for Jamaica. Hence, this study sought to evaluate the KAP of community pharmacists towards PC in private community pharmacies in Jamaica with a view to providing a framework for key stakeholders to implement or provide relevant support to the provision of PC.

METHODS

The targeted population for the study were pharmacists working in their associated private community pharmacies across Jamaica for 2017-2018. In Jamaica, healthcare services are provided by the Ministry of Health, non-government organizations and private sector pharmacies referred to as community pharmacies [15].) There were 1055 pharmacists in 2017-2018 and 426 community pharmacies located across the 14 parishes in Jamaica. The sample frame used was the list of registered community pharmacists in private retail pharmacies provided by the Pharmacy Council of Jamaica Register 2017-2018.

A quantitative design using a pretested self-administered questionnaire determined the KAP of community pharmacists towards PC and identified barriers that may hinder its provision. The calculated sample size was 201 associated with a 95% confidence interval and 5% margin of error, computed by Raosoft web-based inter-form survey sample size calculator and supported by sample size formula used by Krejcie & Morgan in the 1970 article entitled “Determining Sample Size for Research Activities [16]. A stratified proportionate random sampling was used in selecting the 200 participants.

The KAP questionnaire was designed through a search of the world-wide web for similar KAP studies. It consisted of 4 sections (A, B, C, D) with 30 closed and 2 open ended questions. Section A contained ten questions related to demographic data. Section B contained four questions related to knowledge of PC and seven questions related to attitude towards PC. Each set of questions utilised a five-point Likert scale, strongly agree, agree, no idea, disagree and strongly disagree. Section C had six questions that assessed current PC practices and utilised a four-point Likert scale, always, most times, seldom, and never, while section D contained six questions that listed significant barriers selected from pretested instruments.

The questionnaire was pretested with 26 community pharmacists who did not form part of the population studied. The relevant changes were made in constructing the final questionnaire instrument. The self-administered questionnaire was hand delivered. This form of delivery was chosen due to the requests of over 75% of pretested participants who preferred hand delivery as opposed to an online survey. Participants gave signed written consent prior to completion of the questionnaire.

Ethical approval

The Research Ethics Committee of the University of Technology, Jamaica granted clearance prior to data collection (Protocol No: 2018/06/UTech.Ja./156).

Statistical analysis

Data from the questionnaires were quantified as frequencies and analysed using the Statistical Package for Social Sciences (SPSS, version 22). The knowledge and attitude questions were ranked 1 to 5, with 1 being strongly agree and 5 being strongly disagree. Similarly, the practice questions were ranked from 1 to 4, with 1 being always practiced and 4 being never practiced. The frequency of responses to each KAP question were used to further classify pharmacists as having good or poor knowledge and practice of PC and a positive or negative attitude towards PC, with frequencies >50% indicating good or positive KAP and <50% indicating poor and negative KAP. Associations were determined using Pearson Chi-Squared test followed by a multinomial logistic regression model for each KAP statement, with agree, seldom and lack of resources as the reference

categories for knowledge and attitude statements, practice statements and perceived barriers, respectively. Significant predictive variables were reported as odds ratios (OR) and model fit determined by the Nagelkerke Pseudo R-square value. For all analyses conducted, statistical significance was considered at $p<0.05$.

RESULTS

In the current study, each parish of Jamaica represented a stratum of the population of pharmacists and was adequately represented within the entire sample population, with majority of respondents from Kingston and St. Andrew (KSA; n=60, 31.1%). Of the 200 pharmacists approached, 193 completed the questionnaire producing a response rate of 96.5%. Table 1 shows the demographic characteristics of pharmacists. Females accounted for 139 (72.0%) of the population studied, while males were 54 (28.0%). The age group of the participants ranged from 21 to over 51 years of age with the majority 160 (82.9%) being less than 51 years old. Those that attained a Bachelor's degree in Pharmacy were 145 (75.1%). With regard to years of experience, 91 (47.1%) of the participants had 1-10 years of experience while participants with more than 20 years of experience accounted for 51 (26.4%). A high proportion of the respondents, 144 (74.6%) were not pharmacy owners.

Table 1: Demographic characteristics of pharmacists (n=193)

Characteristics	Frequency, n (%)
Gender	
Male	54 (28)
Female	139 (72)
Age (years)	
21-30	56 (29.0)
31-40	62 (32.1)
41-50	42 (21.8)
51 and over	33 (17.1)
Education in pharmacy	
Diploma	35 (18.1)
Bachelor	145 (75.1)
Doctor (PharmD)	9 (4.7)
Specialist	3 (1.6)
Non-response	1 (0.5)
Years of practice	
1 to 5	62 (32.1)
6 to 10	29 (15.0)
11 to 15	32 (16.6)
16 to 20	19 (9.8)
21 and above	51 (26.4)
Pharmacy ownership	
Yes	48 (24.9)
No	144 (74.6)
Non-response	1 (0.5)

Table 2 indicates that the majority of pharmacists were aware of PC (n=183, 94.8%). Most were aware for 1-10 years (n=107, 55.4%), through university studies (n=154, 79.8%), and were utilising PC in their practice (n=143, 74.1%).

Table 2: PC awareness and utilisation (n=193)

Characteristics	Frequency, n (%)
Location of practice	
KSA	60 (31.1)
St. Catherine	36 (18.7)
St. Elizabeth	8 (4.1)
St. James	16 (8.3)
Westmoreland	8 (4.1)
Clarendon	13 (6.7)
St. Ann	19 (9.8)
St. Mary	5 (2.6)
Manchester	16 (8.3)
Portland	4 (2.1)
Hanover	2 (1.0)
St. Thomas	3 (1.6)
Trelawny	3 (1.6)
PC awareness	
Yes	183 (94.8)
No	10 (5.2)
Duration of PC awareness (years)	
1 to 5	52 (26.9)
6 to 10	55 (28.5)
11 to 15	47 (24.4)
16 to 20	13 (6.7)
21 and above	25 (13.0)
Non-response	1 (0.5)
Method of PC awareness	
University studies	154 (79.8)
Continuing education	35 (18.1)
Websites	2 (1.0)
Non-response	2 (1.0)
PC utilisation	
Yes	143 (4.1)
No	49 (25.4)
Non-response	1 (0.5)

KSA = Kingston and St. Andrew; PC = pharmaceutical care

Pharmacists' knowledge of PC

Table 3 illustrates that greater than 90% of all respondents agreed (strongly agree, agree) to all four knowledge questions. The pharmacists demonstrated a good knowledge of PC as patient-centred care, wherein pharmacists take the responsibility to improve clinical outcomes in patients, provide drug related information, and prevent, identify, and resolve potential or actual drug related problems.

Gender and level of pharmacy education were significantly associated with PCS#4 (χ^2=10.552, p=0.032) and PCS#1 (χ^2=44.884, p<0.001) respectively, but were not significant predictors in the regression models. Similarly, there was an

association between location of practice and PCS#1 (χ^2=51.679, p=0.001), PCS#2 (χ^2=35.261, p=0.045), PCS#3 (χ^2=74.775, p<0.001) and PCS#4 (χ^2=43.109, p=0.010), but location was insignificant in each regression analysis.

Pharmacy ownership was significantly associated with PCS#1 (χ^2=6.483, p=0.039) and PCS#3 (χ^2=14.187, p=0.007), where pharmacy owners were 14.9 times more likely to disagree than agree (p<0.001) to PCS#1 but 19.0 times more likely to agree than disagree to PCS#3 (p<0.001). Continuing, PC awareness was significantly associated with PCS#1 (χ^2=9.050, p=0.011), PCS#2 (χ^2=10.346, p=0.035), PCS#3 (χ^2=19.176, p<0.001) and PCS#4 (χ^2=8.640, p=0.013). However, PC awareness only remained significant in the regression models for PCS#1 and PCS#4, where aware pharmacists were >3.0 times more likely to agree rather than being uncertain (having no idea) of PCS#1 (OR=3.1, p=0.035) and PCS#3 (OR=3.0, p=0.042). Similarly, there was a significant association between the method of PC awareness and PCS#1 (χ^2=49.710, p<0.001), PCS#2 (χ^2=32.215, p<0.001), PCS#3 (χ^2=98.008, p<0.001) and PCS#4 (χ^2=49.438, p<0.001). The regression analyses showed that pharmacists who were aware of PC through university studies were 5.0 times more agreeable than uncertain of PCS#1 (p=0.045), PCS#2 (p=0.004) and PCS#3 (p=0.004) and 15.1 times more likely to agree than disagree to PCS#4 (p<0.001). Additionally, pharmacists who were aware of PC through continuing education (CE) were 3.5 and 14.7 times more likely to agree rather than being uncertain of PCS#2 (p=0.045) or disagreeing to PCS#4 (p<0.001), respectively.

Pharmacists' attitude towards PC

Table 4 shows that more than 81% of pharmacists demonstrated a positive attitude by agreeing to all attitude questions. Majority (>90%) of the pharmacists embraced the PC concept as a pharmacist mandate and the gold standard of pharmacy practice that will improve a patient's quality of life and the practice of pharmacy. Majority also believed that the purpose of PC is not for economic gains but to improve patient-centred care (87.6%) and that PC integrates pharmacists within the health care teams (85.5%). Although pharmacists' score fell to 81.3% on the perception that PC is worth the additional workload, more than 90% of pharmacists are willing to practice PC daily.

Table 3: Pharmacists' knowledge of PC

PCS #	Pharmaceutical Care Statements (PCS)	Strongly agree/Agree[a] n (%)	No idea n (%)	Strongly disagree/Disagree n (%)
1	PC is a patient-centred care provided to minimize DRP.	182 (94.3)	2 (1.0)	9 (4.6)
2	PC provides drug information to improve clinical outcomes.	182 (94.3)	3 (1.6)	8 (4.2)
3	PC is pharmacists taking responsibility for clinical outcomes.	176 (91.2)	1 (0.5)	16 (8.4)
4	PC is preventing, identifying, and resolving DRP.	183 (94.8)	2 (1.0)	8 (4.2)

[a]A five-point Likert scale was utilised, strongly agree, agree, no idea, disagree, strongly disagree; DRP = drug related problems

Table 4: Pharmacists' attitude towards PC

A #	Attitude (A) statements	Strongly agree/ Agree[a] n (%)	No idea n (%)	Strongly disagree/ Disagree n (%)
1	PC is a pharmacist mandate.	176 (91.2)	4 (2.1)	13 (6.7)
2	PC is practiced to improve patient care, not for economic factors.	169 (87.6)	4 (2.1)	20 (10.4)
3	PC is the gold standard of practice to improve a patient's quality of life.	183 (94.8)	1 (0.5)	9 (4.7)
4	Provision of PC will improve the practice of pharmacy.	183 (94.8)	-	9 (4.7)
5	Practice of PC integrates pharmacist within the health care teams.	165 (85.5)	10 (5.2)	18 (9.3)
6	Providing PC is worth the additional workload.	157 (81.3)	12 (6.2)	24 (12.5)
7	I would like to provide PC in my everyday practice.	179 (92.7)	5 (2.6)	9 (4.7)

[a]A five-point Likert scale was utilised, strongly agree, agree, no idea, disagree, strongly disagree; Non-response to statement 4 = 0.5%

Gender was significantly associated with A#7 (χ^2=8.388, p=0.015), where males were 2.5 times more likely to be uncertain if they wanted to provide PC in everyday practice (p=0.030). Pharmacy ownership and location of practice were significantly associated with A#3 (χ^2=46.795, p=0.004) and A#6 (χ^2=13.073, p=0.011) respectively, but were not significant in each regression model.

PC utilisation was significantly associated with A#1 (χ^2=15.016, p=0.049), A#2 (χ^2=10.415, p=0.034), and A#5 (χ^2=15.299, p=0.004). Pharmacists who utilised PC were >13.0 times more uncertain rather than agreeable to A#1 (OR=13.0, p<0.001) and A#2 (OR=13.1, p<0.001), but 20.0 times more likely to agree than disagree to A#5 (p<0.001).

Pharmacist's practice of PC

Regarding the practice of PC, Table 5 shows that 88 (45.6%) community pharmacists always or most of the time screened patients for blood pressure and blood glucose, while 84 (43.5%) indicated that they seldom screened patients and 21 (10.9%) did no screening. There were lower frequencies of responses of 43 (22.3%), 84 (43.5%) and 84 (43.6%) for always and most times practicing PC activities related to the creation of patient medical records, reviewing patient data and making medical leaflets respectively. When therapeutic goals were not met, majority of respondents (n=111, 57.5%) carried out interventions always or most times. With regards to monitoring of adverse drug reactions, there was an almost equal division among pharmacists that monitored (n=93, 48.2%) and those that seldom or did not monitor (n=100, 51.8%). A high proportion of pharmacists (n=138, 71.5%) monitored (always and most times) for medication adherence.

Age was significantly associated with the practice of P#1 (χ^2=17.807, p=0.037) and P#2 (χ^2=10.875, p=0.049). Regression showed that the odds of pharmacists below age 50 years practicing P#1 most of the time, was at least one time lower than seldom practicing for those within the 21-30 years (OR=1.2, p=0.021), 31-40 years (OR=1.0, p=0.050) and 41-50 years (OR=1.1, p=0.047) age groups. This was the same for practice of P#2 for pharmacists within the 31-40 years age group (OR=1.0, p=0.050). Level of pharmacy education was significantly associated with P#1 (χ^2=15.663, p=0.047), P#3 (χ^2=10.751, p=0.019), P#4 (χ^2=18.586, p=0.029), P#5 (χ^2=23.906, p=0.021), P#6 (χ^2=23.303, p=0.025) and P#7 (χ^2=11.297, p=0.026), but was not significant in each regression model. Similarly, duration of PC awareness (χ^2=34.906, p=0.003) was significantly associated with P#1 and method of PC awareness was significantly associated with P#2 (χ^2=37.245, p<0.001) and P#7 (χ^2=16.889, p=0.050), but were not significant in each regression model.

PC utilisation was significantly associated with P#1 (χ^2=13.281, p=0.039) and P#6 (χ^2=13.181, p=0.040). Regression showed that when pharmacists utilised PC, the odds of screening most of the time decreased by 0.9 (p=0.035) but odds of monitoring ADRs, increased by 16.6 times (p<0.001) compared to seldom practicing each.

Pharmacist's perceived barriers to PC

Pharmacists' perceived barriers to PC practice are listed in Table 6. The most significant barrier found to prevent the practice of PC was the lack of resources (time, work force, and physical infrastructure) ranging between 54.9–84.0% for all practice variables.

Table 5: Pharmacists' PC practices

P #	Practices (P)	Always[a] n (%)	Most times n (%)	Seldom n (%)	Never n (%)
1	Screened patients for blood pressure and blood glucose.	5 (2.6)	83 (43.0)	84 (43.5)	21 (10.9)
2	Created personal medical records for patients.	3 (1.6)	40 (20.7)	97 (50.3)	53 (27.5)
3	Checked patient's personal medical records upon return visits for goals of therapy.	12 (6.2)	73 (37.8)	79 (40.9)	29 (15.0)
4	Intervened, when a patient has not achieved set goals.	11 (5.7)	100 (51.8)	79 (40.9)	3 (1.6)
5	Made medical leaflets for patients.	9 (4.7)	75 (38.9)	102 (52.8)	7 (3.6)
6	Monitored for adverse drug reaction.	9 (4.7)	84 (43.5)	92 (47.7)	8 (4.1)
7	Monitored adherence to medication in chronically ill patients.	10 (5.2)	128 (66.3)	53 (27.5)	2 (1.0)

[a]A four-point Likert scale was utilised, always, most times, seldom, never

Table 6: Perceived barriers to PC practice by community pharmacists

Barriers	Screening patients n (%)	Creating database n (%)	Reviewing database n (%)	Intervening to achieve goals n (%)	Providing educ. materials n (%)	Monitoring patients n (%)
Lack of economic compensation (LEC)	8 (4.1)	11 (5.7)	5 (2.6)	3 (1.6)	15 (7.8)	6 (3.1)
Lack of knowledge (LK)	5 (2.6)	10 (5.2)	4 (2.1)	8 (4.1)	1 (0.5)	6 (3.1)
Lack of resources (LR)	164 (85.0)	148 (76.7)	160 (82.9)	106 (54.9)	151 (78.2)	135 (69.9)
Lack of support (LS)	7 (3.6)	13 (6.7)	7 (3.6)	33 (17.1)	8 (4.1)	17 (8.8)
Lack of patient acceptance (LPA)	5 (2.6)	4 (2.1)	5 (2.6)	29 (15.0)	8 (4.1)	22 (11.4)

Educ = educational; Non-response: screening patients = 2.1%, creating database = 3.6%, reviewing database = 6.2%, intervening to achieve goals = 7.3%, providing educational materials = 5.2%, monitoring patients = 3.6%

Screening patients, reviewing patients' medical records and providing educational materials were the variables that showed the highest value towards lack of resources (85.0%, 82.9%, and 78.2%, respectively). All other barriers such as lack of knowledge, economic compensation, lack of support and patient acceptance were not perceived as major barriers to the practice of PC, as all PC activities related to these variables scored less than 17.1%.

Gender was significantly associated with the perceived barriers to pharmacists intervening to achieve goals (χ^2=9.415, p=0.049), where male pharmacists were 1.5 times more likely to perceive LK as a barrier to intervening in comparison to LR (p=0.021). Age was significantly associated with the perceived barriers to the screening of patients (χ^2=30.776, p=0.009), creating databases (χ^2=51.679, p=0.001) and intervening to achieve goals (χ^2=25.219, p=0.047). In comparison to LR, pharmacists below age 40 years perceived LEC and LPA as >18 times more significant as a barrier to intervening (21-30 years: OR=18.3, p<0.001) and screening of patients, respectively (21-30 years: OR=18.8, p<0.001 and 31-40 years: OR=18.7, p<0.001). However, compared to LR, LPA and LS were 17.7 and >1.6 times less likely to be perceived as a barrier to creating databases for the 21-30 years (LPA: OR=17.7, p<0.001, LS: OR=2.6, p=0.006), 31-40 years (LPA: OR=17.7, p<0.001, LS: OR=2.1, p=0.011) and 41-50 years (LS: OR=1.6, p=0.050) age groups.

Level of pharmacy education (χ^2=33.859, p=0.027) and years of practice (χ^2=33.326, p=0.031) were significantly associated with the perceived barriers to pharmacists intervening to achieve goals and providing educational material (χ^2=36.458, p=0.014) but were not significant in the regression models.

Pharmacy ownership was significantly associated with perceived barriers to creating a database (χ^2=6.483, p=0.039), where pharmacy owners perceived LR as a more significant barrier in comparison to LPA (OR=47.7, p<0.001). Duration of PC awareness was significantly associated with the barriers to reviewing databases (χ^2=39.883, p=0.030), where pharmacists with <20 years of PC awareness were >26 times more likely to perceive LR as a barrier in comparison to LS. Perception of LR increased as a barrier to reviewing databases with 1-5 years (OR=27.2, p<0.001), 6-10 years (OR=27.4, p<0.001), 11-15 years (OR=27.8, p<0.001) and 16-20 years (OR=26.1, p<0.001) of PC awareness. Also, the method of PC awareness was significantly associated with perceived barriers to creating a database (χ^2=49.710, p<0.001) and screening of patients (χ^2=39.223, p=0.001). Pharmacists who were aware of PC through university and through CE, perceived LR as 5.7 (p=0.039) and 6.0 (p=0.037) times more significant as a barrier to screening of patients than LS. Finally, PC utilisation was significantly associated with the barriers to reviewing databases (χ^2=32.472, p<0.001), where pharmacists who utilised PC were more likely to perceive LR as a barrier to reviewing a database in comparison to LEC (OR=2.0, p=0.016) and LS (OR=27.8, p<0.001).

DISCUSSION

An important finding of this study was that the majority of pharmacists in Jamaica were knowledgeable about PC, although most held an undergraduate degree. This finding is dissimilar to previous reports where pharmacists educated at the Bachelor's and PharmD levels showed poor knowledge of PC [1,8]. Additionally, most became aware of PC through university studies, which contributed to them being at least 5 times

more knowledgeable of PC, and as such, lack of knowledge was among the least identified barriers to PC provision. This demonstrates that Jamaican pharmacists are poised to offer PC since knowledge is foundational to effective practice [5,6].

Despite the good knowledge noted, pharmacy owners, who accounted for the minority of the population, were more likely to disagree that PC is patient-centred care aimed at minimizing drug related problems. This core function of PC aims at improving clinical outcomes of patients' therapy and their quality of life [2,3,4]. Therefore, there is a need to educate pharmacy owners to gain full acceptance of PC and enable greater support and facilitation of its implementation and subsequent practice within their pharmacy spaces. This educational programme should highlight the need to provide PC for patients and the economic gains to be achieved which may be hard to quantify [6]. Training can be done at the annual pharmacy owners seminar hosted by the Pharmacy Council of Jamaica (PCJ).

Over 80% of respondents agreed to all attitude statements, showing that Jamaican pharmacists have a positive attitude towards PC, comparable to reports in other studies [9,10]. However, attitudes towards PC were significantly impacted by gender and PC utilisation. Although fewer males were included in the study, they were 2.5 times more uncertain about practicing PC. This finding opposes previous reports that male pharmacists had a more positive attitude towards PC than their female counterpart [1]. This current study also found that males viewed lack of knowledge as a significant barrier to making intervention to patients' therapy if clinical outcomes were not achieved. Therefore, it is reasonable to recommend that more attention be focused on male students in pharmacy school to improve their knowledge and consequent attitude towards PC, as both credentials are critical to its performance [6].

Furthermore, pharmacists who utilised PC were much more agreeable that PC integrates them into the healthcare team. Correspondingly, lack of support from other healthcare providers was not identified as a significant barrier to PC practice, suggesting that the collaboration required among other healthcare professionals for achieving patient goals would be available to the community pharmacists in Jamaica, and this contributes to a positive attitude. Similarly, a study done in the Ethiopian pharmacy sector showed that 70-90% of nurses and physicians accepted pharmacist interventions as integral to improved patient care [13]. Pharmacists were, however, unsure if patient care should be the focus of PC rather than for financial gains, which implies that economic factors are important to PC practice as is patient care. This was evidenced by the finding where younger pharmacists (21-30 age group) were 18.3 times more likely to state that lack of economic compensation is a more significant barrier than lack of resources.

The good knowledge and positive attitudes towards PC, did not translate into good practice of PC, as >50% of Jamaican pharmacists indicated that they seldom or never executed most PC activities. This is not unique to Jamaica, as trends of low PC practice was also observed in some European countries where pharmacists focused more on dispensing medications rather than patient-centred care [6]. Also, it appears that pharmacists' knowledge of PC may be more theoretical at the bachelor's level and suggests a lack of the necessary skills to perform PC activities as was reported in other countries [1,9]. Although educational level was significantly associated with all PC practice statements it was not a significant predictor to PC practices in the regression analyses, this could have been influenced by the small number of PharmDs. As such, upgrading to the PharmD may be necessary to acquire the clinical skills and competencies offered at this level of education, as recommended in previous studies [8,9,11].

Nevertheless, most pharmacists indicated that they intervened when patient goals were not met (57.5%) and monitored for medication adherence in chronically ill patients (71.5%). These encouraging findings are important to Jamaica and many other countries, as these two PC activities are geared towards the prevention of readmissions and hospitalization of chronically ill patients, which may reduce the costs of managing these issues within healthcare systems [3,4]. Additionally, in Jamaica, intervening and monitoring adherence in real life practice settings are less resource-demanding compared to all other practices, and are to a large extent associated with mandatory pharmacy laws related to prescription documentation, such as indicating refilling times and the medication dispensed on the prescription script.

Hence, it's a strong possibility that pharmacists' interpretation of intervening and monitoring for medication adherence is equated to checking prescription refills and documentation. Therefore, governmental intervention through a greater legislative framework and support from other pharmacy stakeholders may prove useful in assisting the island-wide implementation and full

practice of PC by community pharmacies, as was recommended in other studies [2,7,11]. Also, an economically viable model of PC such as medication therapy management which is practiced in many community pharmacies across countries [3,6] is highly recommended. However, further research is needed to confirm and adopt the model that is best suited for the Jamaican culture of practice.

A major hindrance to the adequate practice of PC by most of the Jamaican pharmacists who indicated a willingness to practice PC in Jamaica was limited resources (time, manpower, physical infrastructure). Similar studies reported pharmacy layout, insufficient physical space, and time as barriers to PC practice [10,12,14]. In fact, further examination of the practice results showed that the poorly practiced statements appeared to be more resource demanding. This was seen in regression analysis, where pharmacists were much more likely to monitor for adherence as opposed to monitor for adverse drug reactions, and younger pharmacists (below age 50 years) who utilised PC, seldom screened patients or created medical records. These are the younger majority with an anticipated greater number of years of practice and greater opportunity to implement and practice PC, which means targeted interventions aimed at overcoming the barrier of lack of resources and meeting the specific needs of the different age groups are paramount to the successful implementation and sufficient practice of PC.

These interventions should also involve key stakeholders of pharmacy and a multidimensional approach [11,12]. To afford the pharmacist more time to practice PC, delegation of non-technical activities to other qualified and competent staff members can be pursued. Additionally, there may be a need for pharmacists to collaborate with owners of their associated pharmacies to develop strategies for reallocation of resources and improvement of practice environments conducive to the implementation and sustenance of PC provision. This may become necessary as 74.6% of the community pharmacists were not owners, which speaks to a possible lack of control to implement the PC activities that demand more resources.

Limitations of the study

The study had some limitations including the possibility that self-reported responses may be exaggerated. The use of fixed choice questions lacked flexibility; hence respondents answer within the options provided, and this has the potential to affect external validity. The study was not designed to determine which resource variable (time, manpower or physical infrastructure) played the greater role in preventing the provision of PC. Further studies will be needed to assess the impact of the individual resource parameters.

CONCLUSION

The present study demonstrates that while pharmacists in Jamaica have good knowledge and a positive attitude towards pharmaceutical care, there is a need for improved practice. It is also important that lack of resources identified as the main barrier to PC practice be overcome through greater collaboration with pharmacy owners and other stakeholders. An economically viable method of PC practice within the Jamaican practice setting should be sought which includes compensation for Pharmacists. A further recommendation is that training be acquired through continuing education and upgrading to the PharmD degree level.

DECLARATIONS

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Conflict of interest

No conflict of interest is associated with this work.

Contribution of authors

We declare that this work was done by the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors. The authors further declare that Rose Victory Evans conceptualized, designed and collected the data for this study. Lisa Bromfield and Peta-Gaye Thomas-Brown further strengthened the design. All three authors (Rose Victory Evans, Lisa Bromfield, and Peta-Gaye Thomas-Brown) analysed the data and wrote the manuscript. A further declaration is made that all authors read and approved the manuscript for publication and

that the information found within this article is original and not obtained fraudulently.

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