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Article

Pharmacovigilance: an evaluation on the practice of pharmacists acting in pharmacies and drugstores

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Pharmacists acting in pharmacies and drugstores stores are some of the most accessible healthcare providers and the last to intervene before the patient takes their medicine. This puts the pharmacist in a position of authority that should be harnessed for the benefit of health. Thus, this professional is strategic for performing pharmacovigilance. Our objective of this study was to interrogate the practice of pharmacists in relation to pharmacovigilance activities, and to identify difficulties and possible stimuli for the improvement these activities in pharmacies and drugstores. The information was collected through an online questionnaire via Survey Monkey®. The data were analyzed statistically using SPSS software. Responses were received from 5174 pharmacists: mostly young women within five years of graduation and experience in pharmaceutical retail. 81% of them reported having identified suspected substandard medicines, but only 16% used the Brazilian notification system Notivisa. More than 85% of pharmacists agreed with the importance of pharmacovigilance and the recognition of reporting services as part of pharmacist duties and pharmaceutical care. The main barriers to making notifications were the lack of access and knowledge about Notivisa. Pharmacists agreed that simplifying the system would be a stimulus for notifications, and requested more feedback from notifications, as well as material and courses to understand the notification process. Pharmacists have important data to feed into pharmacovigilance systems, recognize their responsibilities and are willing to contribute, but still demonstrate low compliance. Simplification of the system and training on it are likely to increase notifications.

Keywords: Pharmacovigilance. Notifications. Pharmacists. Pharmacies. Drugstores.

INTRODUCTION

The pharmacist acting in pharmacies and drugstores - community pharmacists - are some of the most accessible healthcare providers and the last professional to intervene before the patient takes their medicine. This puts you in a position of authority that should be harnessed for the benefit of health by offering a patient-focused primary care service, in extension to medical advice (Bonal, 2001; Dalton, Byrne, 2017). In addition, the pharmacist is the health professional with the most knowledge about medications and their interactions, which enables the provision of high quality healthcare (Chisholm-Burns *et al.,* 2010). They have an important responsibility in terms of monitoring the continued safety of medicines and, given their continued contact with medicines and the population, are widely accessible to perform such activities (Oreagba, Ogunleye, Olayemi, 2011).

The area that deals with activities related to the detection, evaluation, understanding and prevention

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of drug-related problems is called pharmacovigilance (WHO, 2002). It is directly related to harm prevention through the reporting of drug problems by institutions, health professionals, regulators and users. It is essential for the safe, rational and economical use of medicines worldwide, and plays an important role in improving clinical outcomes and in reducing drug-related mortality and morbidity rates (AbdulRazzaq *et al*., 2012). In Brazil, the National Health Surveillance Agency (Anvisa) receives notifications regarding drug pharmacovigilance through a computerized system called the National Health Surveillance Notification System (Notivisa). Through it, adverse events (AE) and technical complaints (TC) related to the use of products and services under health surveillance are notified. In the notification of adverse events in Notivisa of a medication, medication errors, adverse reactions or therapeutic ineffectiveness can be reported. As TC, it is possible to report quality deviation, product without registration, counterfeit product or company without authorization to operate (Brasil, 2020).

According to the World Health Organization (WHO), the involvement of health professionals with the principles of pharmacovigilance has a great impact on the quality of care (WHO, 2002). Studies have shown that patients often report problems with medicines to pharmacists, so they play a significant role in ensuring a robust pharmacovigilance system (Said, Hussain, 2017; Li *et al*., 2018). Thus, knowing the attitudes and difficulties regarding these activities is important to stimulate and improve this practice of public interest.

The more the pharmaceutical professionals are known and the services they provide, the less distant path will be for pharmacies to effectively be characterized as health facilities (CFF, 2018). Present work intends to know the practice of these professionals in relation to pharmacovigilance activities, to identify difficulties and possible stimuli for the improvement of surveillance activities in pharmacies and drugstores.

MATERIAL AND METHODS

We conducted a cross-sectional and descriptive study in which data collection occurred through an anonymous and self-administered online instrument (questionnaire) via the Survey Monkey® platform. The instrument was sent to the e-mail address of pharmacists registered in the professional network "*Farmacêutico Clínico*" and on the website https://assistenciafarmaceutica.far.br, covering professionals from all over Brazil.

The inclusion criteria of the study were: accepted informed consent and being a pharmacist who works in a drugstore or pharmacy.

The answered questionnaires were returned to the researcher in order to build a database that was later analyzed through statistical tests.

Study tools

The questionnaire used for data collection was designed according to the questions of interest, and a pre-test was performed with thirty pharmacists of drugstores or pharmacies. Pilot test should be performed with a group of people representing the definitive sample (Boynton, 2004). The pharmacists answered the questionnaire and pointed suggestions to make it more appropriate to the proposed objectives, besides eliminating possible confounding variables. The suggested recommendations were discussed until there was consensus among the researchers, and the questionnaire was reformulated. Pharmacists who participated in the pilot study were excluded from the final analysis of the results.

The questionnaire was applied in Brazilian Portuguese and addressed questions related to pharmaceutical services and pharmacovigilance. The first theme, pharmaceutical services, will not be discussed in this study. The final version of the survey questionnaire consisted by open and closed questions, distributed in the following sections: personal profile, professional profile, education, suspected substandard medicine/reporting direction and notification of adverse events and technical complaints. This last section included questions related to the pharmacist's knowledge and use of the Notivisa in their work routine.

Finally, the participant had access to a brief explanation about Notivisa and then answered questions from an instrument adapted from Al-Worafi and collaborators, following a five-point Likert scale,

with only one possible answer from the following options: strongly disagree, disagree, neither agree nor disagree, agree and strongly agree (Al-Worafi *et al.*, 2017). This instrument aimed to evaluate opinions on pharmacovigilance, the Notivisa system, possible barriers and encouraging factors for pharmacists to report adverse events and technical complaints of medications.

The full questionnaire is available in the Supplementary Information translated into English.

Data analysis

The data from questionnaires were coded using Microsoft Excel and entered into the software SPSS® for Windows version 24 (SPSS Inc., Chicago, IL), which was used for statistical analysis. Continuous variables of interest were previously tested for normality by the Kolmogorov-Smirnov test. Regarding the descriptive analyses, absolute and relative frequencies were used for the categorical variables, while median, minimum and maximum were calculated for the continuous variables. For comparative analyses, the non-parametric Mann-Whitney U test was applied for continuous variables with non-normal distribution. Categorical variables were compared using the Pearson chi-squared test. A p-value of <0.05 represented a significant difference.

Ethical aspects

This study was approved by the Ethics Committee on Research in Human Beings of the Health Sciences sector of the Universidade Federal do Paraná (CAAE 82909318.4.0000.0102 and opinion number 2.569.648) and all participants signed the Informed Consent.

RESULTS

Received responses

We received 7496 answers. Of these, 1893 were excluded due to incomplete answers, 403 because the pharmacist was not currently working in a pharmacy or drugstore and 26 because the subject did not complete the informed consent form, totaling 5174 complete answers. Respondents came from all Brazilian states, with the highest prevalence in the southeast region (61.5%). Frequency data by region of Brazil and the top 10 respondent states are presented in Figure 1.

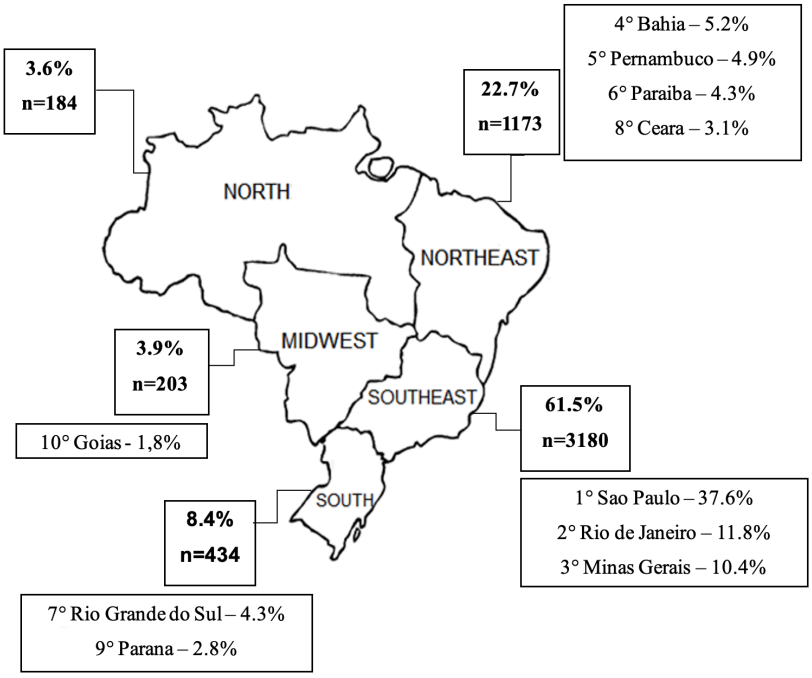

FIGURE 1 - Distribution of responses received by country region and main states.

Sample characteristics

The respondent pharmacists in this study were mostly young women with up to five years of graduation and experience in pharmaceutical retail. Most had higher education and graduated from private universities. Complete data on sample characteristics are presented in Table I.

TABLE I - Demographic and other characteristics of the study sample (n=5174)

Characteristics	Total	Female	Male
Gender (n,%)	5174 (100.0%)	3815 (73.7%)	1359 (26.2%)
Age - Median (Range)	32 (19-70) n=5173	32 (21-70) n=3814[a]	32 (19-64) n=1359
Years since pharmacy graduation – Median (Range)	5 (0-45) n=5174	5 (0-45) n=3815	6 (0-43) n=1359
Experience in pharmaceutical retail – Median (Range)	5 (0-45) n=5174	5 (0-45) n=3815	7 (0-43) n=1359
Graduated from a private university - n,(%)	4189 (81.0%)	3124 (81.9%)	1065 (78.4%)
Graduated from a public university - n,(%)	985 (19.0%)	691 (18.1%)	294 (21.6%)
Educational level - n,(%)			
BSc	4979 (96,2%)	3693 (96.8%)	1286 (94.6%)
MSc	155 (3,0%)	99 (2.6%)	56 (4.1%)
PhD	22 (0,4%)	11 (0.3%)	11 (0.8%)
Postdoc	18 (0.3%)	12 (0.3%)	6 (0.4%)
Complementary education - n,(%)			
Postgraduate *Lato Sensu*	1934 (37.4%)	1422 (73.5%)	512 (26.5%)
Professional residency	54 (1.0%)	38 (70.4%)	16 (29.6%)

[a] n=5173 An outlier completed as a two-year old was excluded, considered as an error.
BSc: Bachelor; MSc: Master; PhD: Doctoral; Postdoc: postdoctoral fellowship.

Pharmacists who reported less than one year of graduation, experience and/or current work filled in the field as 0 (zero).

Substandard medicines

Most of the study pharmacists, i.e. 81.1% (n=4195), reported having identified in their routine work in pharmacies and drugstores suspected substandard medicine, especially problems related to the drug content in the packaging. The frequencies and quality problems identified are presented in Table II.

Upon identification of a suspected substandard medicine, most pharmacists, i.e. 64.9% (n=2723) and 56.6% (n=2374), notified the manufacturer and their immediate superior, respectively. Only 304 pharmacists (7.2%) reported having notified Notivisa and 257 (6.1%) reported to state and municipal surveillance.

TABLE II – Drug quality defects identified by pharmacists (n=4195)

Drug quality defects	n (%)
Excessive or missing tablets/capsules, contents below specification, no medicine in packaging	3267 (77.9%)
Packaging material problems (damaged, leaking, cracking, open packaging, difficult to open packaging)	2734 (65.2%)
Color change, odor, taste, turbidity, altered appearance	2301 (54.9%)
Breaks and divisions in pharmaceutical form, broken, crumbled tablets. Tablet/capsule does not dissolve or dissolves too fast.	2223 (53.0%)
Precipitation, crystal presence, phase separation, difficulty in dissolving or homogenizing, gas formation	1416 (33.8%)
Dirt and foreign matter, pigment in tablets	1057 (25.2%)
No label, unglued label, information erased or difficult to read	973 (23.2%)
Errors in packaging information, packaging changed	480 (11.4%)
Errors in the package leaflet, label that does not correspond to the medicine	132 (3.2%)

Knowledge of Notivisa

Most of the study pharmacists, i.e. 78.6% (n=4067), reported knowing about Notivisa. There was a statistical association between knowledge of Notivisa and the education level of the pharmacists in the study, with higher percentages in the groups with a Master's degree until the post-doctorate level and in the group with specialization. The type of university where training was obtained also showed a statistical association with knowledge of Notivisa, which was predominant among pharmacists from public universities. There was also greater knowledge of the system among women and in the group of professionals with management positions. The results of the association between Notivisa knowledge and sociodemographic variables are shown in Table III.

Only 16.1% (n=832) of the study pharmacists had already made notifications to Notivisa; with 42.4% (n=353) of them reporting substandard medicines and 30.1% (n=250) reporting adverse events. Other technical complaints from the product or the manufacturer (such as suspicion of unregistered drugs, counterfeit, irregular company) totaled 13.7% (n=114).

TABLE III - Association between Notivisa's knowledge and sociodemographic variables

Variables	Know Notivisa	Don't know Notivisa	p-value
Gender (n,%)			-
Female	3028 (74.5%)	787 (71.7%)	
Male	1039 (25.5%)	320 (28.9%)	0.024*
Academic education (n,%)			
Private university (n,%)	3254 (80.0%)	935 (84.5%)	0.001*
Public university (n,%)	813 (20.0%)	172 (15.5%)	

TABLE III - Association between Notivisa's knowledge and sociodemographic variables

Variables	Know Notivisa	Don't know Notivisa	p-value
Educational level (n,%)			
BSc	3894 (78.2%)	1085 (21.8%)	0.006*
MSc	138 (89.0%)	17 (11.0%)	
PhD	19 (86.4%)	3 (13.6%)	
Postdoc	16 (88.9%)	2 (11.1%)	
Complementary education (n,%)			
Postgraduate *Lato Sensu*	1615 (83.5%)	319 (16.5%)	<0.001*
Professional residency	47 (87.0%)	7 (13.0%)	0.129
Management position			
Yes	1106 (76.6%)	338 (23.4%)	0.028*
Not	2961 (79.4%)	769 (20.6%)	

*Statistical association
BSc: Bachelor; MSc: Master; PhD: Doctoral; Postdoc: Postdoctoral fellowship.

Use of Notivisa

As for the knowledge of Notivisa, there was a statistical association between the use of Notivisa and the level of education (Master's degree to post-doctorate level, specialization and professional residency) and academic training at a public university. The percentages of association between use of Notivisa and sociodemographic variables are shown in Table IV.

Figure 2 shows, in gray, the pharmacists working states who had a percentage of knowledge of Notivisa greater than the national percentage, i.e., greater than 78.6%. Comparatively, Figure 3 shows states with a Notivisa use percentage higher than the overall 16.1%. Comparing Figures 2 and 3, there was a greater discrepancy between knowledge and use of Notivisa in northern Brazil, with most states presenting percentages above the average knowledge of the system and below average in relation to the use of the program. The south and southeast regions presented higher percentages of Notivisa use.

TABLE IV - Association between use of Notivisa and sociodemographic variables

Variables	Used Notivisa	Didn't use Notivisa	p-value
Gender (n,%)			
Female	598 (15.7%)	3217 (84.3%)	0.183
Male	234 (17.2%)	1125 (82.8%)	
Academic education (n,%)			
Private university (n,%)	645 (15.4%)	3544 (84.6%)	0.006*
Public university (n,%)	187 (19.0%)	798 (81.0%)	

TABLE IV - Association between use of Notivisa and sociodemographic variables

Variables	Used Notivisa	Didn't use Notivisa	p-value
Educational level (n,%)			
BSc	772 (15.5%)	4207 (84.5%)	
MSc	48 (31.0%)	107 (69.0%)	<0.001*
PhD	5 (22.7%)	17 (77.3%)	
Postdoc	7 (38.9%)	11 (61.1%)	
Complementary education (n,%)			
Postgraduate *Lato Sensu*	394 (20.4%)	1540 (79.6%)	<0.001*
Professional residency	24 (44.4%)	30 (55.6%)	<0.001*
Management position			
Yes	223 (15.4%)	1221 (84.6%)	0.438
Not	609 (16.3%)	3121 (83.7%)	

* statistical association
BSc: Bachelor; MSc: Master; PhD: Doctoral; Postdoc: Postdoctoral fellowship.

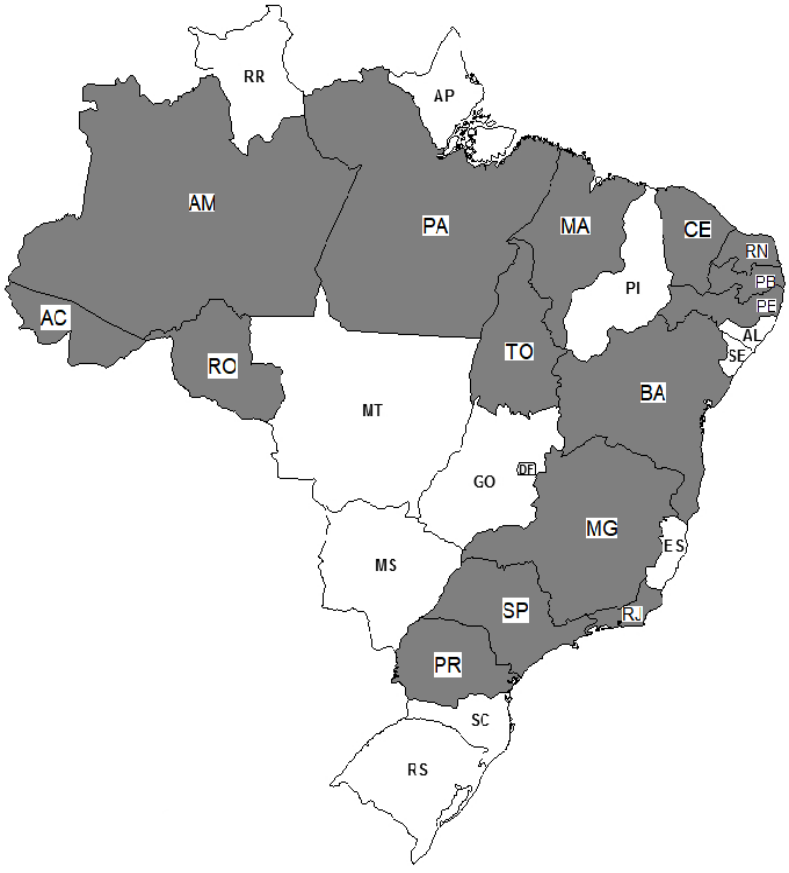

FIGURE 2 - States with knowledge of Notivisa greater than national percentage.

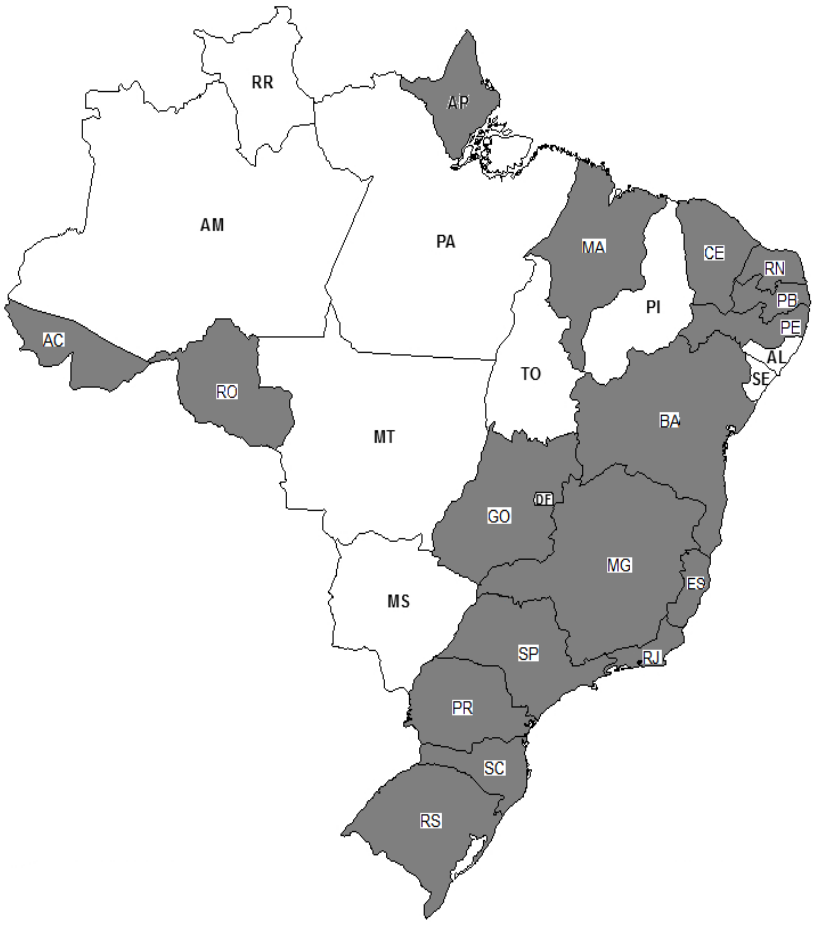

FIGURE 3 - States using Notivisa in a higher proportion than the national percentage.

Pharmacovigilance and notification to Notivisa

More than 85.0% of pharmacists agreed with the importance of pharmacovigilance and recognition of reporting services as part of pharmacist duties and pharmaceutical care.

Regarding the use of Notivisa, 33.5% (n=279) of pharmacists who had already used the system agree that making a notification is complex, and 33.7% (n=280) agreed that notifying the system is a time-consuming task. Full data regarding these questions are presented in Table SI, in the Supplementary Material.

Barriers for notifications to Notivisa

As barriers to making notifications, most pharmacists disagreed that they lacked knowledge or were not motivated to report. On the other hand, the affirmations with the highest percentages of agreement as possible barriers to reporting were not having access to the system at work, not knowing the e-mail address to send the report to and not knowing how to notify the system. Complete results are presented in Table SII, in the Supplementary Material.

Encouraging factors for notifications to Notivisa

Pharmacists agreed that simplifying the system would be a stimulus for notifications, and requested more feedback from notifications, as well as material and courses to understand the notification process. Complete results are presented in Table SIII, in the Supplementary Material.

DISCUSSION

In 2018, Brazil had 221,258 pharmacists enrolled in the board of pharmacy (CFF, 2018). Based on this, the present study included 2.3% of the Brazil's pharmacists. According to the same data, 51.7% of Brazilian pharmacists work in pharmacies and drugstores, being the main area of action for these professionals (CFF, 2018).

Since 2014, Brazilian federal law No. 13,021 wich defines pharmacies and drugstores as health facilities, includes as a requirement for pharmacist to notify health professionals and competent health agencies, as well as the industrial laboratory, of side effects, adverse reactions, intoxications and drug addiction observed and recorded in the practice of pharmacovigilance; in addition to establishing pharmacological surveillance protocols (Brasil, 2014). Although most of the pharmacists interviewed had already identified drug problems, the percentage of reports directed to Notivisa or municipal or state surveillance was low, and most professionals reported never having used the Notivisa system. Such data indicates the low adherence to pharmacovigilance practices by community pharmacists. Another study reported a similar situation: only 3% of the community pharmacists interviewed in their study have already notified the national pharmacovigilance system (Oreagba, Ogunleye, Olayemi, 2011). It was demonstrated more reports of drug problems from pharmaceutical industry and doctors than from pharmacists (Tsuchiya *et al*., 2019). Another study also described low reports by pharmacists to health surveillance agencies, demonstrating that these professionals still do not have the practice of reporting these information to health agencies, but more often address problems to manufacturers of medicines, as also observed in the answers of our questionnaire (Canibal, Firmino, Castilho, 2017).

In the study by Canibal, Firmino and Castilho, the return of notifications made to Notivisa was rated as "poor" by 28% of respondents and "bad" by 17%, totaling 45% of unsatisfactory assessment. In the present study, pharmacists reported that they would be more motivated to notify if they received more feedback from reports. On the other hand, in the same study cited, 18% and 12% of respondents considered "excellent" and "good", respectively, the return of the drug manufacturer's laboratory after notification of a problem (Canibal, Firmino, Castilho, 2017). In this paper, notification to the manufacturer of the drug was cited as an action taken by more than half of pharmacists who had already identified substandard medicines. These data suggest that greater attention from the notification receiving agency may encourage the practice of notifications. The pharmacists in this study, as well as other researches believe that pharmacovigilance is important and that reporting is part of the pharmaceutical care and duties of pharmacists (Oreagba, Ogunleye, Olayemi, 2011; Yu *et al*., 2016; Al-Worafi *et al.,* 2017; Hajj *et al*., 2018; Li *et al*., 2018). Thus, the lack of awareness on the topic does not seem to be a limitation for carrying out these activities, nor even the lack of clinical and technical knowledge about medicines, as also reported by the pharmacists in this work. One of the probable reasons for this omission seems to be related to the lack of knowledge about the existence of a Brazilian notification system. Such ignorance was also reported in studies with pharmacists from other countries (Bawazir, 2006; Vessal, Mardani, Mollai, 2009; Oreagba, Ogunleye, Olayemi, 2011; Mahmoud *et al*., 2013; Jha *et al*., 2017).

The low percentage of pharmacovigilance activities carried out by pharmacists in Brazilian community pharmacies can also be explained by the routine of these professionals, which are often based on administrative activities and dispensing medications to the detriment of the clinical approach of patients (Correr *et al*., 2004; Fernandes, Freitas, Melchiors, 2015). According to the work of Júnior Hipólito, less than half of the patients had access to pharmacists, and indicate the need to increase trained human resources and hours of work dedicated to clinical activities in order to provide effective pharmaceutical care (Júnior Hipólito, 2017). In addition to Brazil, in other countries the work routine also seems to be a barrier to the performance of clinical activities by pharmacists; in research conducted with community pharmacies in thirteen European countries, pharmacists were routinely involved in general activities, such as screening medical records, but were rarely involved in patient-centered professional activities (Hughes *et al*., 2010). A study in India also addresses excessive administrative activities at the expense of the pharmacist's clinical activities (Amrita, Roomi, 2011). It was reported

the lack of time for Australian pharmacists as the main barrier to reporting (Li *et al*., 2018).

In addition to the barriers already mentioned, training in the notification system in this work was an important encouraging factor for reporting. Also in agreement with the report by Oreagba, Ogunleye and Olayemi (2011), most community pharmacists were willing to practice pharmacovigilance if there was training. Prakasam, Nidamanuri, Kumar (2012) And Hajj *et al.* (2018) also cited the need for training for community pharmacists. Such stimulus makes sense with the statistical associations found in this work, in which there was greater knowledge and use of Notivisa among pharmacists with specialization and residency (Oreagba, Ogunleye, Olayemi, 2011; Prakasam, Nidamanuri, Kumar 2012; Hajj *et al*., 2018).

It was demonstrated that educational interventions with health professionals promoted a greater than 100% increase in the absolute number of drug-induced event reports (Varallo, Planeta, Mastroianni, 2017). The strategies applied in the intervention improved participants' knowledge of pharmacovigilance and increased their ability to correctly complete report forms. The analysis of Ribeiro-Vaz and collaborators (2011) also demonstrated an increase in notifications after educational interventions and adds that notifiers need regular interventions to stay participatory. The urgent need for educational programs was highlighted in order to increase the knowledge and awareness of pharmacists in relation to notification processes (Oreagba, Ogunleye, Olayemi, 2011; Mahmoud *et al.,* 2014). Other studies have also reported benefits to notifications with training (Laven, Schmitz, Franzen, 2018).

A possibility of spreading knowledge about pharmacovigilance may be the inclusion of this topic in the curricula of undergraduate pharmacy programs. Some authors comment on this need (Prakasam, Nidamanuri, Kumar, 2012; Li *et al.* 2018). According to Smith and Webley (2013) trengthening the teaching of pharmacovigilance at the undergraduate level could help change the culture of identifying and reporting drug-related problems for future pharmacists. In October 2017, a norm was published that instituted the National Curricular Guidelines for the Undergraduate Pharmacy Course in Brazil, including Pharmacovigilance to the "Pharmaceutical Sciences" Component, with mandatory coverage of 50% of the total course load. The term of adaptation of the curriculum by the institutions of higher education expires in October 2020 (Brasil, 2017). Thus, it is expected that in the coming years pharmacists will have better knowledge in this area.

However, there is no point in stimulating the knowledge and use of Notivisa by pharmacists if the system is not suitable for the proposed purpose. Among pharmacists who have used Notivisa, the majority reported that the system is complex and time-consuming and also presented. strong agreement that simplification of the process would act as a stimulus for notification. In addition to these responses, there are indications that the Brazilian national notification system has flaws and weaknesses (TCU, 2016). In order to improve the quality of information monitoring, after the completion of this work, Anvisa launched a new system for receiving notifications of adverse events, mandatory use by health institutions - called Vigimed (Brasil, 2019). There are still no reports that demonstrate the advantages of this system over the old one, however, Notivisa remains in force for receiving technical complaints and adverse events by citizens and professionals (Brasil, 2020). In Notivisa, prior to notification, for health professionals and institutions, a registration is required (Brasil, 2020). At Vigimed, there is no previous step, being the first sign of simplification (Brasil, 2019). Thus, in addition to Notivisa training programs, improvements to the system are necessary to make it simpler and more objective, thereby minimizing errors during the notification process, to increase the motivation of professionals and institutions to contribute to pharmacovigilance and to provide a more assertive analysis of the data.

CONCLUSION

The answers to the questionnaires given by community pharmacists, predominantly women and younger people within five years of graduation and experience in pharmaceutical retail, showed that these professionals have data to feed pharmacovigilance systems, since they are in direct contact with medicines and patients who report medication-related problems

to them. Professionals recognize their responsibilities towards pharmacovigilance actions and are willing to contribute, but still show low adherence to these activities, mainly due to the lack of knowledge about the Brazilian pharmacovigilance system. Pharmacists are likely to make or increase notifications if properly instructed, and there is a need to simplify the system and receive feedback from notifications after they have been made.

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CONFLICT OF INTEREST

The authors Mayra Bruna Fedalto, Fernanda Stumpf Tonin, Helena Hiemisch Lobo Borba, Vinicius Lins Ferreira, Cassyano Januário Correr, Fernando Fernandez-Llimos and Roberto Pontarolo have no conflicts of interest that are directly relevant to the content of this study.

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SUPPLEMENTARY INFORMATION

DATA COLLECTION INSTRUMENT

PERSONAL PROFILE
Gender ( ) Male ( ) Female ( )
How old are you (in years)?
What state do you work in?

1. **How long have you been a pharmacy graduate?** (In years, integer, e.g. 1, 2, etc., 0 being less than 1 year).
2. **How long have you been working in pharmaceutical retailing?** (In years, integer, eg 1, 2, etc., 0 being less than 1 year).

EDUCATION
How long have you been a pharmacy graduate (in years)?
Where did you graduate? ( ) Public university ( ) Private university
Check the option(s) for your current education:
( ) Graduated
( ) Specialization (Lato Sensu Graduate)
( ) Professional Residence
( ) Master Degree
( ) Doctorate degree
( ) Post doctoral

SUSPECTED SUBSTANDARD MEDICINE AND REPORTING DIRECTION

10. Choose the case (s) that you have already identified or received complaints from patients in your day to day work related to substandard medicines.
( ) Color change, odor, taste, turbidity
( ) Precipitation, dissolution and/ or homogenization difficulty, gas formation
( ) Dirt and foreign matter, pigment in tablets
( ) Problems with packaging material (leakage, cracking), damaged and/ or open packaging
( ) Breaks and divisions in pharmaceutical form
( ) Lack of tablets in blister pack, contents below package size, no medicine in package
( ) Packing changed, packing errors
( ) Errors in the package leaflet
( ) I was not aware of any substandard medicine

11. What action (s) did you take after noticing or receiving complaints of quality deviating medications? (You can choose more than one option)
( ) Notified the prescribing professional or other healthcare professional accompanying your patient
( ) Notificou algum órgão sanitário.
( ) Made a spontaneous notification on NOTIVISA
( ) Notified Regional Pharmacy Council
( ) Notified your pharmacy network
( ) Notified the medicine distributor
( ) Notified the pharmaceutical manufacturer
( ) Warned your immediate superior
( ) No attitude
( ) Other. What?

NOTIFICATION OF ADVERSE EVENTS AND TECHNICAL COMPLAINTS

12. Do you know Health Surveillance Notification System - "NOTIVISA"?
( ) I don´t know (Forward to question 14)
( ) I know but never used it (Forward to question 14)
( ) I know and already used it (Forward to question 15)

13. What kind of problems have you notified on NOTIVISA?
( ) Adverse Event
( ) Therapeutic Ineffectiveness
( ) Medication Error
( ) Suspected of substandard medicine
( ) Product suspected to be unregistered
( ) Irregular Company Product
( ) Suspected Counterfeit Product
( ) Product with other irregular practices

14. [Questions for pharmacists who have never used Notivisa]
Notivisa is an Anvisa system available on the Internet that receives reports of suspected adverse events and technical complaints medication. An adverse event has resulted in patient injury and could be an adverse drug reaction,

therapeutic ineffectiveness, or medication errors. The technical complaint is a problem observed in the product that did not cause harm to the patient's health, and may be a quality deviation or problems in complying with the legislation. Detecting, evaluating, understanding and preventing these problems is called pharmacovigilance.

We would like to hear your thoughts on pharmacovigilance by pharmacists in pharmacies / drugstores by notifying us of adverse events and technical complaints of medicines to Notivisa. There are no right or wrong answers. Check the option that best represents your opinion:

	Strongly Disagree	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly Agree**
a) I believe pharmacovigilance is important	( )	( )	( )	( )	( )
b) Notify on Notivisa is part of the pharmacist's duties	( )	( )	( )	( )	( )
c) Notify on Notivisa is part of pharmaceutical care	( )	( )	( )	( )	( )
d) I don't report on Notivisa because I am not sure of the cause of the problem	( )	( )	( )	( )	( )
e) I don't notify because I do not have access to Notivisa at my work	( )	( )	( )	( )	( )
f) I don't report on Notivisa because I do not know the email address to send the reports	( )	( )	( )	( )	( )
g) I don't report on Notivisa because I am not convinced of the confidential handling of reported information	( )	( )	( )	( )	( )
h) I don't report on Notivisa because I find it hard to admit that patients have been harmed	( )	( )	( )	( )	( )
i) I don't notify Notivisa because I'm afraid of being legally responsible for the issues	( )	( )	( )	( )	( )
j) I am not motivated to notify on Notivisa	( )	( )	( )	( )	( )
k) I don't report on Notivisa because my clinical knowledge is insufficient	( )	( )	( )	( )	( )
l) I don't report on Notivisa because my technical knowledge of medicines is insufficient	( )	( )	( )	( )	( )
m) I don't notify because I don't know how to do this	( )	( )	( )	( )	( )

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
I will notify more if:					
n) I take courses to understand the notification process	( )	( )	( )	( )	( )
o) I receive material to understand the notification process	( )	( )	( )	( )	( )
p) The notification process is taught in college	( )	( )	( )	( )	( )
q) Notification process is simplified	( )	( )	( )	( )	( )
r) It is part of my professional duty	( )	( )	( )	( )	( )
s) There is an incentive	( )	( )	( )	( )	( )
t) I get more feedback from notifications	( )	( )	( )	( )	( )
u) Notification is required	( )	( )	( )	( )	( )

15. [Questions for pharmacists who have already used Notivisa]

Notivisa is an Anvisa system available on the Internet that receives reports of suspected adverse events and technical complaints medication. An adverse event has resulted in patient injury and could be an adverse drug reaction, therapeutic ineffectiveness, or medication errors. The technical complaint is a problem observed in the product that did not cause harm to the patient's health, and may be a quality deviation or problems in complying with the legislation. Detecting, evaluating, understanding and preventing these problems is called pharmacovigilance.

We would like to hear your thoughts on pharmacovigilance by pharmacists in pharmacies / drugstores by notifying us of adverse events and technical complaints of medicines to Notivisa. There are no right or wrong answers. Check the option that best represents your opinion:

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
I believe pharmacovigilance is important	( )	( )	( )	( )	( )
b) Notify on Notivisa is part of the pharmacist's duties	( )	( )	( )	( )	( )
f) Notify on Notivisa is part of pharmaceutical care	( )	( )	( )	( )	( )
g) Notifying Notivisa is complex	( )	( )	( )	( )	( )
h) Notifying Notivisa takes too long	( )	( )	( )	( )	( )

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
I will notify NOTIVISA more often if:					
i) I take courses to understand the notification process	( )	( )	( )	( )	( )
j) I receive material to understand the notification process	( )	( )	( )	( )	( )
k) The notification process is taught in college	( )	( )	( )	( )	( )
l) Notification process is simplified	( )	( )	( )	( )	( )
m) It is part of my professional duty	( )	( )	( )	( )	( )
n) There is an incentive	( )	( )	( )	( )	( )
o) I get more feedback from notifications	( )	( )	( )	( )	( )
p) Notification is required	( )	( )	( )	( )	( )

Table SI - Pharmacists' opinion about pharmacovigilance, notification and Notivisa

		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Percentage Disagree[1]	Percentage Agree[2]
Pharmacists' opinion about pharmacovigilance, notification (n=5174)								
a) I believe pharmacovigilance is important	%	0,4	0,2	1,4	40,5	57,6	0,6	98,1
	n	20	11	70	2096	2979		
b) Notify on Notivisa is part of the pharmacist's duties	%	0,2	1,0	8,2	54,1	36,5	1,2	90,6
	n	9	51	425	2800	1889		
c) Notify on Notivisa is part of pharmaceutical care	%	0,5	2,2	11,6	58,3	27,5	2,7	85,8
	n	24	113	600	3016	1421		
Pharmacists' opinion about Notivisa (n=832)								
a) Notifying Notivisa is complex	%	5,0	25,6	35,8	25,4	8,2	30,6	33,5
	n	42	213	298	211	68		
b) Notifying Notivisa takes too long	%	3,8	24,0	38,5	26,6	7,1	27,9	33,7

[1] Percentage of disagree (strongly disagree + disagree) [2] Percentage of agree (agree + strongly agree)

Table SII - Possible barriers to do notifications (n=4342)

		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Percentage Disagree[1]	Percentage Agree[2]
a) I don't report on Notivisa because I am not sure of the cause of the problem	%	6,1	28,7	40,2	21,9	3,1	34,8	25,0
	n	266	1247	1746	952	133	1513	1085
b) I don't notify because I do not have access to Notivisa at my work	%	7,4	27,9	32,6	23,1	8,9	35,4	32,0
	n	323	1213	1417	1004	385	1536	1389
c) I don't report on Notivisa because I do not know the email address to send the reports	%	9,5	32,2	26,8	25,5	6,0	41,7	31,5
	n	411	1399	1166	1107	259	1810	1366
d) I don't report on Notivisa because I am not convinced of the confidential handling of reported information	%	13,3	40,7	34,1	10,1	1,8	54,0	11,9
	n	579	1767	1480	437	79	2346	516
e) I don't report on Notivisa because I find it hard to admit that patients have been harmed	%	16,1	46,9	29,7	6,2	1,1	63,0	7,3
	n	697	2036	1289	271	49	2733	320
f) I don't notify Notivisa because I'm afraid of being legally responsible for the issues	%	16,4	48,0	27,3	6,8	1,5	64,4	8,3
	n	713	2086	1184	294	65	2799	359
g) I am not motivated to notify on Notivisa	%	11,4	38,8	29,7	16,4	3,6	50,2	20,1
	n	495	1684	1292	713	158	2179	871
h) I don't report on Notivisa because my clinical knowledge is insufficient	%	15,2	46,1	26,5	10,7	1,5	61,3	12,2
	n	660	2001	1152	463	66	2661	529
i) I don't report on Notivisa because my technical knowledge of medicines is insufficient	%	18,4	52,7	21,8	6,2	0,9	71,1	7,1
	n	799	2289	945	268	41	3088	309
j) I don't notify because I don't know how to do this	%	9,1	28,8	26,2	29,3	6,5	38,0	35,9
	n	397	1251	1136	1274	284	1648	1558

[1] Percentage of disagree (strongly disagree + disagree) [2] Percentage of agree (agree + strongly agree)

Table SIII - Possible encouragement factors for realizing notifications (n=5174)

Possible encouraging factors for notifications (n = 5174)		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Percentage Disagree[1]	Percentage Agree[2]
I will notify more if:								
a) I take courses to understand the notification process	%	3,9	14,8	16,6	46,4	18,3	18,7	64,7
	n	202	766	860	2399	947	968	3346
b) I receive material to understand the notification process	%	2,6	8,6	11,2	56,1	21,5	11,2	77,6
	n	135	44	580	2905	1110	179	4015
c) The notification process is taught in college	%	7,2	24,0	24,0	32,6	12,3	31,2	44,9
	n	371	1241	1241	1685	636	1612	2321
d) Notification process is simplified	%	2,5	10,5	21,6	48,7	16,6	13,0	65,3
	n	131	542	1119	2522	860	673	3382
e) It is part of my professional duty	%	3,2	13,3	23,1	45,3	15,1	16,5	60,4
	n	164	690	1197	2344	779	854	3123
f) There is an incentive.	%	5,0	20,8	24,1	36,9	13,2	25,8	50,1
	n	259	1077	1248	1909	681	1336	2590
g) I get more feedback from notifications	%	2,1	8,5	20,3	49,7	19,5	10,6	69,2
	n	107	438	1048	2574	1007	545	3581
h) Notification is required	%	6,4	25,3	29,6	28,3	10,4	31,7	38,7
	n	329	1211	1533	1465	536	1540	2001

[1] Percentage of disagree (strongly disagree + disagree) [2] Percentage of agree (agree + strongly agree)