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Current Practice in Weekly Pillbox Preparation and Perceived Added Value of Future Collaboration between Community Pharmacists and Home Care Nurses in Belgium

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ABSTRACT

Background: Medication-related errors represent a public health burden but are mainly preventable. A strategy to reduce medication errors could be pharmacist-nurse collaboration in weekly pillbox preparation. Unfortunately, there is little inventory in the literature on the actual pharmacist-nurse collaboration in weekly pillbox preparation and its added value in the healthcare practice. **Objective:** To assess the weekly pillbox preparation practices among home care nurses and community pharmacists, their collaboration for this service, and its added value, ultimately aiming to promote patient safety. **Methods:** An extensive survey was launched in French-speaking Belgium in 2022. The study occurred across two populations: home care nurses and community pharmacists in French-speaking Belgium. A self-administered questionnaire was developed. Three main outcomes were reported: the pillbox preparation, the medication plan, and the opinion about the pharmacist-nurse collaboration. A descriptive statistical analysis was carried out. **Results:** A total of 260 home care nurses and 204 community pharmacists answered the questionnaire. Our survey showed that weekly pillbox preparation was mainly performed by home care nurses (100%) than by community pharmacists (49%) in the primary care of the Belgian health system. There was only sometimes (or even no) remuneration for this service. Most home care nurses (82.7%) and community pharmacists (57.6%) have already pointed out errors in the medication plan used for the weekly pillbox preparation. The pharmacist-nurse collaboration for the weekly pillbox preparation was rare in Belgium. However, the majority of community pharmacists and home care nurses (more than 90% of both groups) would like to collaborate for this act, with the principal motivation of improving patient safety. **Conclusion:** Our survey showed that pharmacist-nurse collaboration in the weekly pillbox preparation was perceived as helpful in primary care with the ultimate goal of patient safety. Further studies are needed to examine the impact of this intervention and if it could be cost-effective.

Keywords: Pillbox preparation; Nurses; Pharmacists; Survey; Collaboration; Primary care

INTRODUCTION

In 2017, the World Health Organization (WHO) focused the population's attention on the harmful consequences of medication-related errors from a public health and economic burden perspective¹. Indeed, the WHO estimated that medication-related errors cause more than one death per day worldwide and a related cost of almost 1% of the global health expenditure (i.e., approximately US\$ 42 billion per year)¹.

Medication-related errors are, however, mainly preventable. A systematic literature research from 2018 synthesized the epidemiology of medication-related errors². The authors showed a pooled incidence of preventable adverse drug events related to medication errors of 15/1,000 person-years².

Regarding the expected increase in the proportion of older individuals suffering from multimorbidity (i.e., with two or more concomitant chronic diseases)³ associated with the growth in life expectancy, polypharmacy to treat each condition concomitantly is increasing⁴. It, however, increases the risk of medication-related errors in return and compromises patient safety.

The sources of medication-related errors are multiple, but poor communication and collaboration between healthcare professionals were previously identified as predictive factors of medication-related errors^{1,2}. According to previous study⁵, the health professionals-related risk factors (i.e., poor communication or collaboration between them) increased from 6% to 3.5-fold the risk of medication-related errors⁵⁻⁸.

Particularly in primary care, the management of prescriptions remains challenging for the healthcare professionals and all the patients who meet this need (e.g., patients with a lack of mobility, with polypharmacy, who need intensive care, who are disabled, isolated, or leaving secondary care; the latter being increasingly recommended or made mandatory by health authorities). Indeed, home hospitalization is constantly expanding and promoted by the Belgian authorities to meet the new needs of the population and the hospital. According to the recommendations established in a report by the Belgian Federal Health Care Expertise Center (KCE), a multidisciplinary team of healthcare professionals is essential to enable the transition forward to more home care. One of the main concerns is the pillbox preparation, which could be the source of medication-related errors if there needs to be better communication between home care nurses and community pharmacists⁹. Indeed, during home care, organizing the medication plan in advance (i.e., weekly) using a pillbox organizer allows better adherence to treatment and avoids medication errors. Each day, the patient will find all the medication prescribed in a dedicated box in the pill organizer. In Belgium, this act

is mainly performed by home care nurses. The nurse visits the patient once a week and prepares the treatment to be taken daily for the next seven days. The medication plan is given to the patient by his/her general practitioners (GPs) or his/her specialist (mainly using electronic prescriptions). However, a centralized and systematic electronic repository still needs to be created in Belgium in order to ensure the follow-up of each health actor.

The community pharmacist can also do the act of preparing weekly pillboxes. In Belgium, the pharmacist has no prescription rights but has the skill to check the correctness of the medication plan and to deliver the medicines. In Belgium, the act of preparing weekly pillboxes is regulated by the law. Indeed, a royal decree of 2012 recognizes the weekly preparation of medication as a technical nursing service. The National Institute for Health and Disability Insurance of Belgium assigns a precise code number to this act. The cost of this act (code no. 424874) is obtained based on a value specific to the nature of the service (€2.365) multiplied by a coefficient defined by the National Institute for Health and Disability Insurance of Belgium (or 'INAMI'), which corresponds to the relative value of the service (€4.792593). The expected fee is, therefore, €11.33 per week completed. Currently, this fee is covered by the Belgian health care system in a proportion that varies according to the patient's status and the nurse's status (contracted or not), with a minimum of €6.38 and a maximum of €11.33.

If the added value of the pharmacist-nurse collaboration was already investigated regarding the medication adherence⁹⁻¹¹, current practice in weekly pillbox preparation and the perceived added value of future collaboration between community pharmacists and home care nurses in French-speaking Belgium has not been investigated yet. The role of the multidisciplinary healthcare team, including pharmacist-led interventions⁸, was nevertheless highlighted as crucial for patient safety in primary care, where patients are susceptible to multimorbidity and polypharmacy^{8,9}.

Researchers in Belgium have established that 37.9% of community-dwelling individuals over 65 (about 15% of the Belgian population) have multimorbidity¹². It represents a significant proportion of the Belgian population that could be at high risk of harmful consequences of medication-related errors. In addition, state strategies are converging on home support for older people, accompanied by ambulatory care to compensate for the loss of autonomy due to senescence.

Therefore, our objective was to assess the weekly pillbox preparation practices among Belgian home care nurses and community pharmacists and the perceived added value of collaboration for this service, aiming to promote patient safety.

METHODS

This report followed the guidelines of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement¹³.

Study design and population

An observational survey was launched in French-speaking Belgium (43% of the total Belgian population) between May 2022 and June 2022 to meet our objective. The survey was hosted under an online form using Google Forms® for two months. The study took place with two populations: home care nurses and community pharmacists. A self-administered questionnaire was developed to draw up an inventory of the current practices in the weekly pillbox preparation in both groups and the perceived helpfulness or added value of pharmacist-nurse collaboration for this act (see next section for the detailed tool).

To participate in the survey, the community pharmacist or the home care nurse had to meet the following inclusion criteria:

- Having a scientific degree in pharmacy or nursing;
- Being French-speaking;
- Exercising his/her profession within French-speaking Belgium at the time of the study.

Several sources enabled us to contact as many home care nurses and community pharmacists in French-speaking Belgium as possible to ensure the best representativeness of the study population.

For home care nurses, a public database established by the Belgian health insurance¹⁴ (i.e., 'INAMI') in 2019 allowed us to identify the approximate number of community nurses meeting the inclusion criteria based on a criterion of minimum activity (i.e., more than 250 ambulatory health procedures performed per year): 10,096 home care nurses were identified in French-speaking Belgium. To contact home care nurses, associations of professionals were identified. If they agreed to collaborate in the study, they helped us to disseminate widely our online survey through, for example, a newsletter of the association sent by e-mail to all its members.

For community pharmacists, the Belgian Association of Pharmacists (APB)¹⁵ and the authorities of French-speaking Belgium (i.e., National Institute for Health and Disability Insurance or 'INAMI') allowed us to estimate, using their public reports, a population of 1,850 community pharmacists meeting the inclusion criteria. The online survey was disseminated by e-mail with the help of the APB and other associations of professionals through their online newsletter.

Moreover, some professionals (i.e., home care nurses and community pharmacists) were contacted by phone

when the phone number was publicly available. During the call, we explained the goal of our survey, and if the individuals agreed, an online link referring to our survey was forwarded by e-mail.

All participants responded to the survey voluntarily after giving informed consent. Participants did not receive compensation for participation in the survey.

Self-administered questionnaires

A one-month observation of community pharmacists' and home care nurses' practices allowed the development of a specific questionnaire. Three main elements were observed or questioned in both groups:

- The weekly pillbox preparation,
- The medication plan,
- The perceived helpfulness of pharmacist-nurse collaboration.

Based on our observations and exchanges with the health professionals, we have developed a specific questionnaire for each population because of their different responsibilities in the weekly pillbox preparation in Belgium and their different skills and knowledge in health science, care, and practice. The questionnaire was mainly composed of closed questions. The questionnaire was pre-tested on a 13-individual sample (i.e., ten home care nurses and three community pharmacists, not included in the final analyses) to ensure the relevance of the questions, the comprehensibility of all the terms used, and to measure the feasibility of the questionnaire in the estimated time (i.e., 10 minutes). The final questionnaires were disseminated online in collaboration with the health professional' associations as previously described.

Home care nurse self-administered questionnaire

Six sections were investigated (i.e., yielding 18 questions available in **Supplementary Material 1**):

- Inclusion criteria,
- Weekly pillbox preparation and remuneration received,
- Working environment,
- Storage of medicines,
- Medication plan,
- Opinion and interest regarding the pharmacist-nurse collaboration for the weekly pillbox preparation.

The comprehensive French questionnaire is available in supplemental material 3.

Community pharmacist self-administered questionnaire

Three sections were considered:

- Inclusion criteria,
- Weekly pillbox preparation (specific role of the pharmacist) and remuneration received,

- Opinion and interest regarding the pharmacist-nurse collaboration for the weekly pillbox preparation.

Starting from 9 mandatory questions, the pharmacist completed a total number of questions ranging between 11 and 14, available in **Supplementary Material 2**, according to their implication in the weekly pillbox preparation (i.e., if they do the act: 11 questions; if they did not prepare weekly pillboxes: 14 questions).

The comprehensive French questionnaire is available in supplemental material 4.

Ethical considerations

The study protocol and data collection were approved by the Ethics Review Committee of the University Hospital of Liège (CHU of Liège) (under the reference: 2022/56). All participants gave their written informed consent. All procedures involving human participants were conducted per the 1964 Helsinki Declaration and its amendments. Furthermore, the international regulations for personal data protection (i.e., the General Data Protection Regulation or 'GDPR') were followed, and the anonymity of the participants was guaranteed. The data will be stored for two years.

Statistical analysis

The database was cleaned to ensure the analysis of reliable data. Two questions allowed us to check that the respondent met all the inclusion criteria in the survey. By this filter, 36 individuals were excluded from the analysis because they did not meet the inclusion criteria. We further checked the data consistency by a quick visual review of their frequencies. No missing data were observed: the final questionnaire validation was subject to the obligation to answer all the questions.

A descriptive analysis was undertaken. First, the quantitative variables were described using the mean (μ) \pm the standard deviation (σ). Second, the qualitative variables (binary or categorical) were reported in absolute (n) and relative (%) frequencies using Tables or Figures.

All statistical analyzes were performed using Excel® spreadsheet software (Microsoft 365®, Microsoft Ireland Operations Limited, Ireland).

RESULTS

Sample of community pharmacists and home care nurses

Of the 825 home care nurses who received the survey, 260 answered the entire questionnaire, representing a participation rate of 31.5%. Concerning community pharmacists, 204 were included in the analysis out of 1,854 who received the survey,

representing a participation rate of 11% based on the estimated number of professionals for the region.

Home care nurses' responses profile

Table 1 describes the 260 home care nurses' practices and opinions regarding the weekly pillbox preparation, the medication plan, and the pharmacist-nurse collaboration.

Weekly pillbox preparation

On average, the home care nurses prepared 6.5 weekly pillboxes, mainly remunerated via the fee provided for that specific purpose by the Belgian healthcare system (53.5%). In this population, 61.9% of weekly routines were performed in the patient domicile at a place not explicitly dedicated. Most home care nurses surveyed prepared the weekly pillbox based on the medication plan (89.0%). Medicines storage was, in most cases, attainable to the patient (41.2%), and 67.7% of the nurses observed at least once the self-medication behavior using medicines from the community pharmacy. In most cases (55.9%), the patients' relatives stocked the medications, sourced from the community pharmacy. The supply frequency was usually once a month (52.3%) (**Table 1**).

Medication plan

The general practitioner was, in most cases, in charge of the medication plan (58.8%), while the community pharmacist rarely received questions (0.8%) (**Table 1**). Medication errors were observed by the home care nurses (82.7%), mainly due to dosage errors (68.8%).

Pharmacist-nurse collaboration in the weekly pillbox preparation

Among the 260 surveyed home care nurses, 152 (58.5%) declared that a pharmacist-nurse collaboration could be helpful in the weekly pillbox preparation. They provided four reasons: refining knowledge about medicines, simplifying drug storage, optimizing care and patient safety, and reducing workload. **Figure 1** depicts the opinion (favorable, unfavorable, neutral) of the home care nurses about the pharmacist's role and its collaboration in weekly pillbox preparation.

The first incentive mentioned by the nurse for considering improvements in collaboration with the community pharmacist was an equal repartition of the work between the collaborators and to receive a satisfactory remuneration for the act. (**Table 1**).

Pharmacists responses profile

Table 2 reports the 204 community pharmacists' practices and opinions regarding the weekly pillbox preparation, the medication plan, and the pharmacist-nurse collaboration.

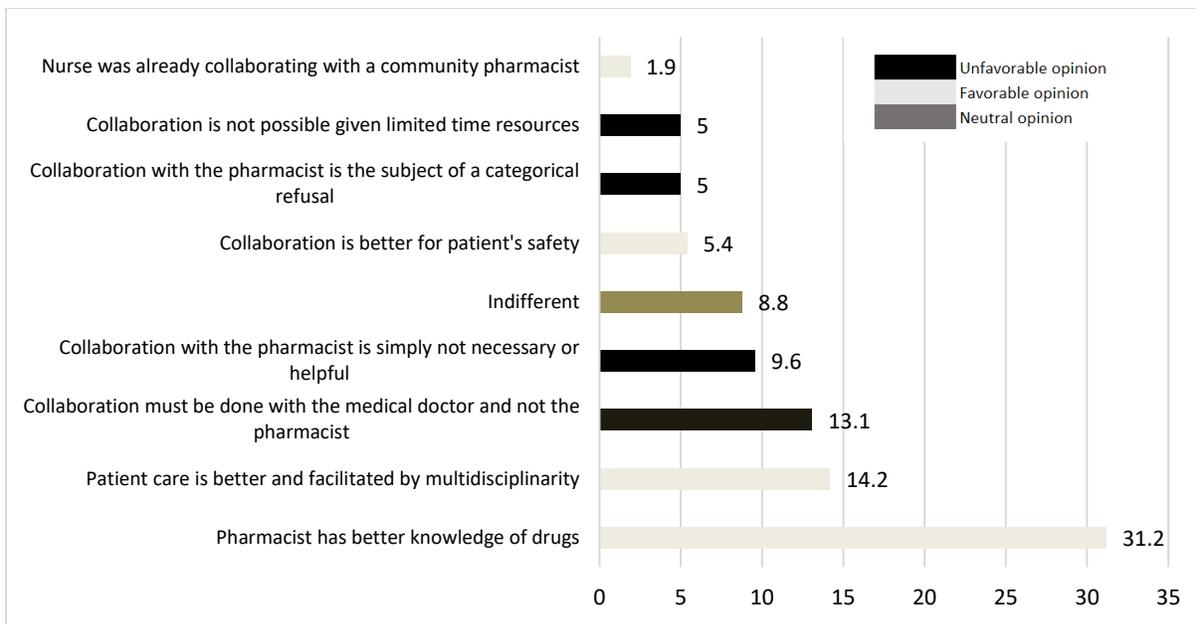


Figure 1. Opinion of the home care nurses about the role of the pharmacist and its collaboration in weekly pillbox preparation (%)

Weekly pillbox preparation

Of the 204 community pharmacists surveyed, 49% had the task of preparing weekly pillboxes, mainly according to a medication plan, and 28% were remunerated for the service. Those who never prepared weekly pillboxes (51%) explained that they did not because this service was never proposed to them. However, most community pharmacists (91%) were willing to perform the service if they were remunerated. Moreover, 45.5% considered the preparation of weekly pillboxes by others (i.e., relatives or home care nurses) as a risk factor for patient safety.

Medication plan

Medication errors were observed by the community pharmacists (57.6%) based on the medication plan, mainly due to dosage errors (17.6%) (Table 2).

Pharmacist-nurse collaboration in the weekly pillbox preparation

A vast majority of community pharmacists (90.1%) considered that a pharmacist-nurse collaboration could be helpful for the weekly pillbox preparation, mainly by optimizing care and patient safety (Table 2).

DISCUSSION

Our survey showed that weekly pillbox preparation was mainly performed by home care nurses

(100%) compared to community pharmacists (49%) in primary care of the Belgian health system. There was not always (or even no) remuneration for this service. This act, performed in collaboration, is crucial for patient safety. Most home care nurses (82.7%) and community pharmacists (57.6%) have already reported errors in the medication plan used in the weekly pillbox preparation, mainly due to dosing errors. The storage of drugs dedicated to the weekly pillbox preparation caught attention since, in 41.1% of cases, the family pharmacy remains accessible to the patient, which exposed him/her to medication errors or self-medication that could lead to adverse health side effects, especially if the patient was dependent or confused. Without supervision from the pharmacist, it raised the question of harmful consequences of the self-medication of the patient in primary care, already requiring polypharmacy and thus at high risk of adverse drug reactions or drug-drug interactions¹⁶.

The community pharmacist-nurse collaboration for the weekly pillbox preparation was rare in Belgium. However, most community pharmacists and home care nurses felt ready to collaborate for this service to improve patient safety. Home care nurses and community pharmacists expressed a condition: they would like to receive remuneration from the Belgian health care system for this act.

The pharmacist is a medicines specialist, and his/her role is essential for public health¹⁷. Nevertheless, some findings of our survey were challenging. For example, our survey showed that the pharmacist was

Table 1. Inventory of the acts and the opinions regarding the weekly pillbox preparation, the medication plan, and the pharmacist-nurse collaboration according to the 260 home care nurses surveyed.

	$\mu \pm \sigma$ or n (%)
Weekly pillbox preparation	
Number of weekly pillboxes prepared <i>by week</i>	6.5 \pm 3.8
Remunerated <i>via</i> the fee provided for this purpose	
<i>Yes, specific remuneration (direct fee)</i>	139 (53.5%)
<i>No, lump sum remuneration</i>	121 (46.5%)
Means to prepare the weekly pillbox	
<i>Medication plan</i>	231 (88.8%)
<i>From memory</i>	23 (8.8%)
<i>Both, it varies</i>	5 (1.9%)
Medicines storage	
<i>At patients' home: accessible only to the home care nurse</i>	74 (28.3%)
<i>At patients' home: accessible to the home care nurse and the patient's relatives</i>	60 (23.1%)
<i>At patients' home: accessible to all (patient, relatives, and nurse)</i>	107 (41.2%)
<i>Outside the patient's home</i>	19 (7.3%)
Observation of a self-medication behavior using medicines intended for the weekly pillbox preparation, <i>yes</i>	176 (67.7%)
Places dedicated to the weekly pillbox preparation	
<i>Patient's domicile: place not dedicated</i>	161 (61.9%)
<i>Patient's domicile: place dedicated</i>	85 (32.9%)
<i>Nurse's office</i>	7 (2.8%)
<i>Nurse's domicile</i>	6 (2.5%)
<i>Nurse's vehicle</i>	1 (0.2%)
Medication plan	
Healthcare professional in charge of medication plan	
<i>General practitioner</i>	153 (58.8%)
<i>General practitioner at the request of the medical specialist</i>	53 (20.4%)
<i>Medical specialist</i>	28 (10.8%)
<i>Nurse</i>	24 (9.2%)
<i>Pharmacist</i>	2 (0.8%)
Medication errors detected by the home care nurse in the medication plan, <i>yes</i>	215 (82.7%)
Sources of medication errors detected in the medication plan (<i>categories not exclusive</i>)	
<i>Dosage errors</i>	183 (70.4%)
<i>Deleting a treatment</i>	179 (68.8%)
<i>Adding a treatment</i>	159 (61.2%)
<i>Drug-drug interaction</i>	73 (28.1%)
<i>Treatment incompatibility</i>	94 (36.2%)
Medicines supply means	
<i>At the pharmacy: obtained by the relatives</i>	145 (55.9%)
<i>At the pharmacy: obtained by the patient</i>	62 (23.7%)
<i>Community pharmacist's home visit</i>	25 (9.7%)
<i>Home care nurse's home visit</i>	24 (9.3%)
<i>Home delivery</i>	4 (1.4%)
Pharmacist-nurse collaboration in the weekly pillbox preparation	
Pharmacist-nurse collaboration could be helpful for patient safety, <i>yes</i>	152 (58.5%)
Perceived added value of the pharmacist-nurse collaboration (<i>categories not exclusive</i>)	
<i>Refining knowledge about medicines</i>	58 (22.3%)
<i>Simplifying drug storage management</i>	57 (21.9%)
<i>Optimization of care</i>	32 (12.3%)
<i>Save time and reduce workload</i>	55 (21.2%)
Incentives to collaborate with a community pharmacist	
<i>Sharing tasks and fees</i>	93 (35.8%)
<i>Do not want to collaborate</i>	81 (31.2%)
<i>Only when the weekly pillbox preparation is in the frame of a lump sum</i>	47 (18.1%)
<i>Is not pronounced</i>	29 (11.2%)
<i>Only if the patient's profile requires it</i>	10 (3.8%)

Table 2. Inventory of the acts and the opinions regarding the weekly pillbox preparation, the medication plan, and the pharmacist-nurse collaboration according to the 204 community pharmacists surveyed.

	$\mu \pm \sigma$ or n (%)
Weekly pillbox preparation	
Weekly pillbox preparation, <i>yes</i>	100 (49.0%)
Number of weekly pillboxes prepared <i>by week</i> (n=100 pharmacists)	3.5 \pm 1.3
Means to prepare the weekly pillbox (n=100 pharmacists)	
<i>Medication plan</i>	96 (96.0%)
<i>From memory</i>	3 (3.0%)
<i>Both, it varies</i>	1 (1.0%)
Fees perceived for the service (n=100 pharmacists), <i>yes</i>	28 (28.0%)
Reasons to not prepare weekly pillbox (n=104 pharmacists)	
<i>No request</i>	71 (68.0%)
<i>Service entrusted to home care nurses</i>	29 (27.0%)
<i>Financial and time-resource consuming</i>	3 (4.0%)
<i>Online medical plan in primary care proposal</i>	1 (1%)
Willing to perform this service if paid, <i>yes</i>	95 (91.3%)
Fees needed to perform the service (n=204 pharmacists)	
<i>Yes, if the national health system manages the fees</i>	96 (47.0%)
<i>Yes, always</i>	75 (36.8%)
<i>No, this is a free service for the patient safety</i>	33 (16.2%)
Preparation by other healthcare providers perceived as a risk for patient safety, <i>yes</i>	93 (45.5%)
Perceived risk factors (<i>categories not exclusive</i>)	
<i>Preparation by home care nurses or relatives</i>	190 (93%)
<i>Neutral</i>	90 (44%)
<i>Preparation by relatives</i>	84 (41%)
<i>Medicines storage as a potential source of self-medication</i>	12 (6%)
Medication plan (n=100 pharmacists who prepared weekly pillboxes)	
Medication errors detected by the pharmacist in the medication plan, <i>yes</i>	57.6 (57.6%)
Sources of medication errors detected in the medication plan (<i>categories not exclusive</i>)	
<i>Dosage errors</i>	17.6 (17.6%)
<i>Deleting a treatment</i>	20.6 (20.6%)
<i>Adding a treatment</i>	22.1 (22.1%)
<i>Drug-drug interaction</i>	10.7 (10.7%)
<i>Treatment incompatibility</i>	14.5 (14.5%)
Pharmacist-nurse collaboration in the weekly pillbox preparation	
Pharmacist-nurse collaboration could be helpful for patient safety, <i>yes</i>	184 (90.1%)
Perceived added value of the pharmacist-nurse collaboration (<i>categories not exclusive</i>)	
<i>Refining nurses' knowledge of medicines</i>	21 (10.4%)
<i>Simplifying drug storage management</i>	68 (33.5%)
<i>Optimization of care and patients' safety</i>	86 (42.2%)
<i>Better management of workload</i>	28 (13.9%)

rarely involved in the medication plan used for the weekly pillbox preparation (only 0.8% of medication plans were elaborated with the collaboration of the community pharmacist). However, most home care nurses and community pharmacists have observed medication errors in the medication plan proposed by the GP. Furthermore, about half of the pharmacists filled weekly pillboxes, and 28% were paid for the act,

meaning that the vast majority (72%) received no compensation for the work. However, 100% of the nurses were remunerated for this task.

Furthermore, although the frequency of pillbox prepared by pharmacists was less than the nurses (3.5 *versus* 6.5 pillbox preparations per week), this act was sometimes performed by the pharmacist. Therefore, community pharmacists were mostly filling the pillboxes

because of their value of healthcare (i.e., they thought it was the best thing to do for patient safety). Interestingly, almost all (91%) of the pharmacists who did not fill pillboxes indicated that remuneration would incentivize them to do so.

Furthermore, home care nurses could have better perceived the pharmacists' expertise. Indeed, only 31.2% of the home care nurses surveyed recognized that community pharmacists' had better knowledge about medicines. This poor perceived pharmacists' expertise has been previously highlighted in the literature¹⁸⁻²⁰ and could be improved by normative enablers, policy decisions and interprofessional education.²⁰

It is essential to promote collaboration between the various healthcare professionals. In particular, the pharmacist-nurse collaboration could help avoid errors in the medication plan (and, subsequently, in the weekly pillbox preparation) and optimize the storage of drugs to avoid patient self-medication.

Indeed, a meta-analysis showed that a multidisciplinary collaboration as an intervention to reduce medication errors in the primary care setting tended to be effective (estimated reduction of 1% in hospital admissions, 29% in emergency department visits, and 2% in mortality)²¹. Two more recent systematic reviews (2022) reached the same conclusions, specifically on the pharmacist-nurse collaboration in primary care: it improved disease management, prevented adverse drug events, and reduced hospitalizations^{22,23}.

To compare the behavior of the two health professionals to an unsupervised situation, it is interesting to note that in the case of self-medication, a systematic review has shown that self-medicated older individuals almost always experienced a side effect (75% of cases), and 26.7% could be more or less serious adverse severe drug reactions²⁴.

Study strengths and limitations

To our knowledge, this survey was the first to make a comprehensive inventory of the practices and opinions of the pharmacist-nurse collaboration in primary care through the weekly pillbox preparation act. However, our research has some limitations. We opted for convenience sampling. Unfortunately, this procedure did not allow us to generalize our results to all Belgian community pharmacists and home care nurses due to a potential selection bias.

In addition, information bias related to self-declaration could not be ruled out. Indeed, all data were self-reported and may have been relayed, voluntarily or not, inaccurately or erroneously. To minimize this bias, we tried to develop an easily understandable questionnaire.

The topic addressed by our study exposed it to a social desirability bias. Social desirability refers to the

willingness of the individual to put forward a behavior or an opinion that is socially acceptable in the eyes of the interviewer²⁵. During our survey, and despite a strict guarantee of anonymity, some might have concealed relevant data (in particular, to report medication errors from their colleagues or self-medication behaviors). Therefore, we can assume that the proportion of self-medication behaviors or medication errors could be more widespread in 'real life' than the proportion reported here.

Perspectives

It was suggested that pharmacist-nurse collaboration in primary care has a beneficial public health impact (e.g., reduction of morbidity, emergency room visits, and mortality)^{11,26-29}. The practice could then be improved in Belgium, knowing that Belgian community pharmacists and home care nurses were in demand of this collaboration. Furthermore, collaboration in the weekly pillbox preparation should be financially valued for both. Therefore, more studies are needed to determine whether this intervention could be cost-effective in Belgium for promoting patient safety in primary care.

Furthermore, our study highlighted the need for improving the collaborative system and policies regarding interprofessional collaboration aiming at promoting medication safety and medication-adherence-enhancing interventions^{26,27}. Regulators could close the existing gap in interprofessional collaboration by legislating. Indeed, other authors also noted the importance of the role of decision-makers and funders in developing efficient interprofessional collaboration³⁰⁻³². It would be interesting to evaluate the impact of the number of years of professional practice for the two professions in order to see if it influences the results obtained.

CONCLUSION

Our survey showed that a pharmacist-nurse collaboration in the weekly pillbox preparation was rare in the Belgian healthcare system. However, a better pharmacist-nurse collaboration to perform this act was well-perceived to improve patient safety. In addition, the health professionals desired remuneration for this act. However, further studies are needed to examine whether the impact of this intervention could be cost-effective from a public health perspective.

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Conflict of interest

The author declares that there isn't any conflict of interest regarding the publication of this paper.

Supplementary material

Table summarising the included studies can be accessed online through the journal website at https://aprh.journals.ekb.eg/publisher?_action=publish&article=323955&related_issue=-1

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