A cross-sectional study of the Belgian community pharmacist's satisfaction with the implementation of the electronic prescription

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Abstract

Background Several benefits and problems of electronic prescribing (ePrescribing) are described in scientific literature, though problems remain in the implementation. In this study, we evaluated the pharmacist's perception of the ePrescription implementation within the community pharmacy software in Belgium, and the frequency and hindrance of encountered problems.

Material and methods A cross-sectional study was conducted among community pharmacists in Belgium to measure satisfaction with the ePrescribing implementation and factors influencing this satisfaction.

Results In total 246 pharmacists (3.3% response rate) rated the implementation in their software with an average score of 6.46 ± 2.16 (SD) on a scale of 10. In Belgium, French-speaking pharmacists gave a significantly higher satisfaction score compared to Dutch-speaking pharmacists ($P = 0.032$), whereas Dutch-speaking pharmacists perceived to process significantly more ePrescriptions compared to French-speaking pharmacists ($P < 0.001$). Satisfaction with the implementation of the ePrescription was significantly associated with the software package ($P < 0.001$), the knowledge of the ePrescribing workflow ($P = 0.036$), the frequency of slow responses of the software ($P < 0.001$) and the perception of unavailability of the system ($P = 0.003$).

Conclusions The Belgian pharmacist was moderately satisfied with the implementation of the ePrescription. Problems with the availability of Belgian eHealth systems and interoperability issues with national codes used between prescriber and dispenser have to be resolved in the future in order to meet the Belgian community pharmacist's needs.

1. Introduction

Furthering the digitization of healthcare is one of the key objectives for the 21st century for the World Health Organization (WHO).[1] In this study, we focused on the implementation of electronic prescription in the Belgian community pharmacy setting. Electronic prescribing, or "ePrescribing" is the computer-based electronic generation, transmission and filling of a prescription, taking the place of paper and faxed prescriptions.[2] EPrescribing was introduced in healthcare primarily for increasing patient safety and reducing prescription errors. A secondary reason was the potential administrative simplification for healthcare practitioners, healthcare insurance institutions and other governmental institutions.[3] A Finnish use case recently demonstrated that the national implementation of ePrescribing promotes medication safety, but that ambiguities and errors are still common.[4] A Swedish use case demonstrated that the majority of community pharmacists perceived that ePrescriptions, were safe and beneficial for patients, and cost-effective for the pharmacy.[5]

ePrescribing has many advantages, including enhanced patient safety[6, 7], possible cost benefit due to alerts that inform providers about more cost-effective therapies[8], direct access to the patient's prescription record[9], improved workflow for pharmacists because prescriptions no longer need to be entered manually[10], easier access to a patient's insurance status[11] and fewer prescription forgeries[12]. Unfortunately, literature also shows some disadvantages with using ePrescriptions, including an increased amount of time required to correct an erroneous ePrescription compared to manual prescribing[13], bad software design resulting in an increased number of errors[14] and cost-disadvantages for the provider due to the high start-up, maintenance, and transaction fees[15]. Many of these advantages and disadvantages depend on the quality of the implementation.

The ePrescribing started in Belgium with the e-MED project in April 2007 for ambulatory (or outpatient) care.[3] During the pilot years 2009-2012, infrastructure was tested thoroughly. In 2013, software vendors of both physicians and pharmacists were invited for mini-labs to test their software on top of the infrastructure.[16] In March 2014, the project was introduced to the public on a national basis. Independently, the project Recip-e is responsible for the temporary storage of encoded ePrescriptions on a national server. As of 2017, a barcode was used to uniquely identify the ePrescription. When an ePrescription is issued by the prescriber, the pharmacist can safely retrieve the ePrescription from the national server using the proof of ePrescription. As of January 2020, the ePrescription workflow will dematerialise and later on become paperless. The process will then only rely on the patient's electronic identity (eID) and the link that exists with the ePrescription.

The ePrescription workflow in Belgium relies on different national eHealth services. For example, at the point of drug dispensation, the MyCareNet eHealth service is used for checking the patient's insurance status, while the Recip-e eHealth service is used for downloading the ePrescription. This can make the Belgian system quite complex and may create problems with possible down time of certain services as a consequence.[17] On closed fora for community pharmacists [18], different recurrent problems were already stated: (1) unavailability of the eHealth system; (2) slow response of the software; (3) differences between paper proof and digitally stored prescription; (4) unclear error messages; (5) incorrect use of codes linked to medication[1]; and (6) not permitted manual additions of the prescriber on the paper proof of prescription.

In the flow of ambulatory ePrescribing, there are three main actors: the prescriber, the patient and the pharmacist. They are sometimes referred to as the three Ps within ePrescribing.[19, 20] Pharmacists are usually the last party in the chain to act, before ambulatory patients receive the prescribed

[1] In Belgium, CNK (Code National(e) code) codes are used for identifying a medication product.

medications.[21] They are likely to observe the most problems and hindrance in processing ePrescriptions. Therefore, we investigated the satisfaction of the Belgian community pharmacist with the implementation of ePrescribing within their software and factors that influenced this. Secondly, we examined the frequency of occurrence and hindrance of problems occurring in the process.

2. Methods

2.1 Survey development

Before survey development, existing literature was reviewed and to the best of our knowledge we were not able to find a cross-sectional study questioning the satisfaction of pharmacists with the implementation of ePrescribing within their software. Therefore, the data collection instrument consisted of a structured self-administered questionnaire based on best practices. This questionnaire contained questions about demographic characteristics, the type of pharmacy software, satisfaction with the implementation of the ePrescription, knowledge about the ePrescription workflow, and frequency and hindrance rating of problems encountered in practice. Respondents were asked to score their satisfaction on a scale of one to ten, where a score of one indicated 'poor satisfaction' and ten indicated 'excellent satisfaction'. Knowledge of the workflow was tested using seven questions related to real-life scenarios. Every question was scored either one (for correct answers) or zero (for incorrect answers or when the pharmacist indicated he did not know), resulting in a possible maximum score of seven. Frequency of problems encountered in practice was measured using a 5-point Likert scale ranging from 'daily' to 'never'. Hindrance of problems encountered in practice was measured using a 5-point Likert scale ranging from 'very small hindrance' to 'very big hindrance'. Drafts of the survey were pilot tested by five pharmacists, one project leader of éénlijn.be (national initiative to bring e-health closer to first line healthcare practitioners) and the project leader of Recip-e. The questionnaire was modified in response to their feedback.

2.2 Data collection

The survey was sent to all pharmacists that were member of the national pharmacy organization, i.e. Algemene Pharmaceutische Bond (APB), via a newsletter. Data collection was conducted electronically via LimeSurvey software. The survey was provided in both Dutch and French, and distributed according to their language preferences known at APB. Ethical clearance and approval was obtained from the Ethical Review Committee of the university hospital UZ Brussel, Brussels Health Campus (reference number B.U.N. 143201835300). This cross-sectional study was conducted between March and May 2018 among pharmacists working in community pharmacies in Belgium.

2.3 Survey data analysis

Results were described in terms of frequencies, percentages and means ± standard deviations. Firstly, the study sample was described using their baseline characteristics and was compared to the characteristics of the general population, based on the language and software distribution. Secondly, the language of the respondent was related to satisfaction and to the pharmacist's perception about how frequent the ePrescription was used. Subsequently, a description of the pharmacist's knowledge of the ePrescribing workflow was given. Next the problems, found on the closed fora, were described in terms of frequency and hindrance as perceived by the respondent. Univariate relationships among variables were analyzed using independent T-tests and Chi-square tests. In a final phase, a multivariable linear regression in both directions was conducted to investigate what variables were associated with the pharmacist's satisfaction with the implementation of the ePrescription in their

software. The software of the pharmacist, all baseline characteristics[2] and all six problems identified on closed for a, along with the respondents' perception of hindrance, were included as covariates. Covariates that added or decreased the goodness of fit, based on the Akaike Information Criterion (AIC) in a step-by-step approach, in order to explain satisfaction were respectively added to or removed from the model. After the model selection procedure, underlying assumptions of normality and homoscedasticity of residuals were verified, and if necessary improved by transforming the outcome variable. All *P*-values reported were two-sided and $P<0.05$ was considered statistically significant. All analyses were performed, using RStudio version 1.1.463 running on R version 3.5.3.

3. Results

3.1 Study population

The survey was distributed to 7,487 pharmacists employed in 4,943 community pharmacies[22]. In total 4,200 newsletters were sent in Dutch (56.1%) and 3,287 were sent in French (43.9%) (Figure 1). A total number of 246 respondents completed the survey (3.3% of all invited community pharmacists) of which 143 responded in Dutch (58.1%) and 103 in French (41.9%). Respondents reported the use of 10 software packages of which "Farmad Twin" (32.1%) and "Greenock" (31.3%) were the most represented (Figure 2).

Comparison of the respondent's language preference with the national language distributions, according to the APB database, showed no significant difference ($P=0.562$). Secondly, comparison of the respondent's software distribution with the software usage of all community pharmacists associated with the KLAV tarification service, one of the biggest in Belgium, also showed no significant difference ($P=0.162$).

Of the 246 respondents, 103 were men (41.9%) and 143 were women (58.1%) (Table 1). The largest group had an age between 51-60 years (28.9%) and had over 30 years of experience (28.5%). Most of the respondents were head of the community pharmacy (in Belgium called the titular[3]) (76.8%).

3.2 Satisfaction with the implementation and usage of the ePrescription

Belgian pharmacists rated their satisfaction with a mean score of 6.46 (±2.16) out of 10 (Table 4). French-speaking community pharmacists rated their satisfaction higher compared to the Dutch-speaking pharmacists (6.81±2.19 [French] vs 6.21±2.11 [Dutch], $P=0.032$).

The pharmacists estimated that almost 50% of the incoming prescriptions were electronic prescriptions. When comparing the Dutch-speaking with the French-speaking pharmacists, a significant difference was observed. French-speaking pharmacists estimated to process fewer ePrescriptions compared to Dutch-speaking pharmacists (38.03±16.92 % [French] vs 58.04±16.31 % [Dutch], $P<0.001$).

3.3 Knowledge about the workflow of the ePrescription process

In Table 3, the seven statements (Q1-Q7) about the ePrescription process workflow are provided. Q7 was scored as correct when all subquestions were answered correctly.

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[2] Age was left out, since age was correlated with number of years of experience leading to multicollinearity. Language (Dutch or French) was left out of the model, since this is less of interest in an international context.

[3] Every pharmacy in Belgium has a responsible, which is labelled as the "titular". The titular has the final responsibility and is responsible for the quality of the medicines and other health products that are delivered in the pharmacy.

The responding pharmacists had a moderate knowledge of the ePrescription workflow with an average of 3.83 (±1.11) correct answers and 152 (61.8%) pharmacists scoring four or more correct answers (Figure 3). A maximum score of seven correct answers was not obtained from any respondent.

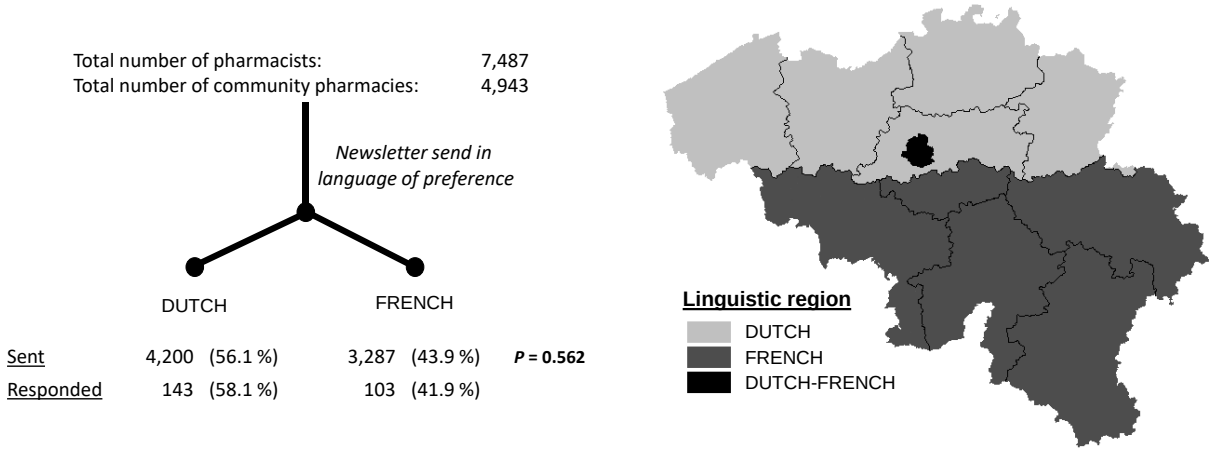


Figure 1: Language distribution of Belgian pharmacists and of the respondents

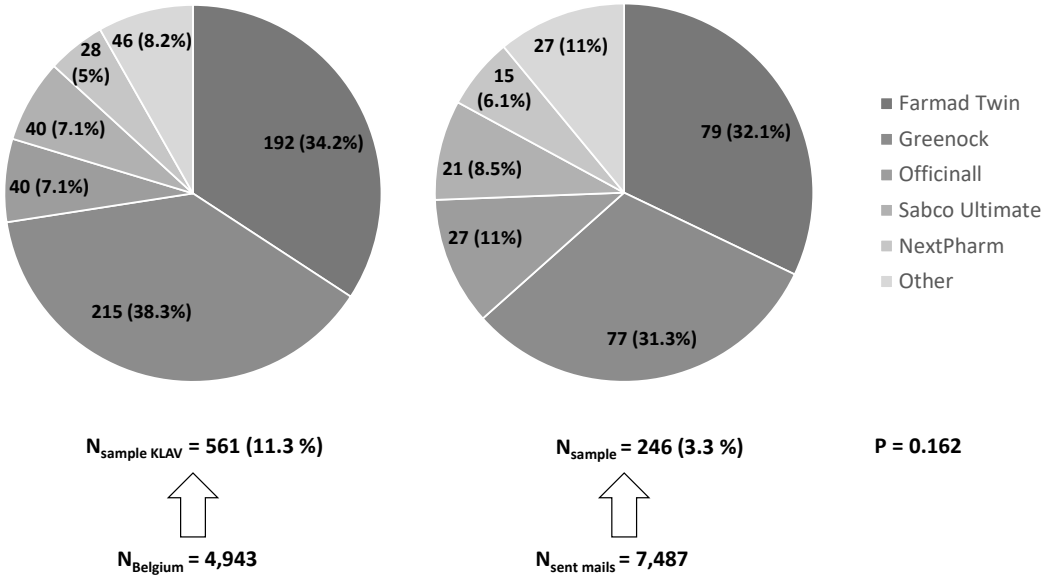


Figure 2: Distribution of software usage in Belgium of a prominent tarification service (i.e.,KLAV) (left) compared to distribution of software usage of the respondents (right) using a chi squared test

Table 1: Baseline characteristics of the respondents (n = 246)

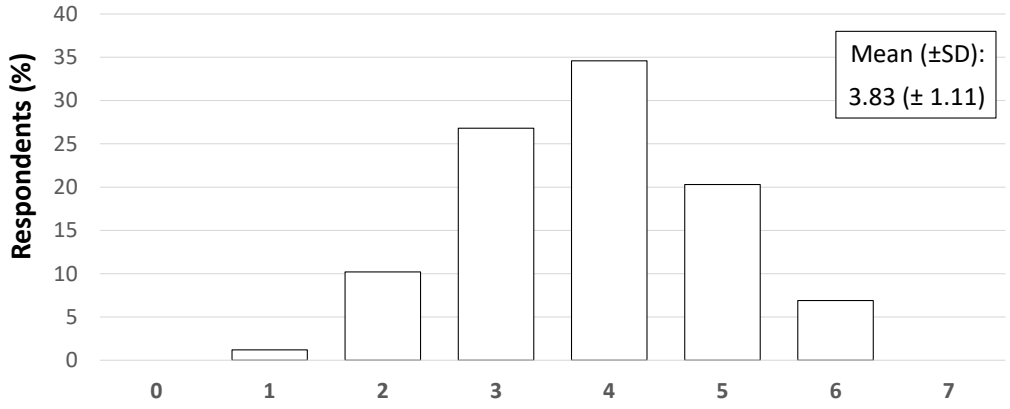
	N	%
Gender		
Male	103	41.9
Female	143	58.1
Age		
< 31 years	39	15.9
31 – 40 years	45	18.3
41 – 50 years	61	24.8
51 – 60 years	71	28.9
> 60 years	30	12.2
Years of experience as community pharmacist		
0 – 5 years	40	16.2
6 – 10 years	21	8.5
11 – 20 years	46	18.7
21 – 30 years	69	28.0
> 30 years	70	28.5
Function		
Titular: owner	149	60.6
Titular: no owner	40	16.3
Adjunct	48	19.5
Other	9	3.6
- replacement		
- adjunct: owner		

Table 2: Satisfaction with the implementation, and perception of the usage of the ePrescription
[a] Significance tested by use of a T-test comparing Dutch and French respondents

	Overall (n = 246)	Dutch (n = 143)	French (n = 103)	P [a]
Satisfaction (score 1-10)				0.032
Mean (±SD)	6.46 (±2.16)	6.21 (±2.11)	6.81 (±2.19)	
Median	7	7	7	
Min – Max	1 – 10	1 – 10	1 – 10	
Q1 – Q3 (IQR)	5 – 8 (3)	5 – 8 (3)	6 – 8 (2)	
Usage (in %)				< 0.001
Mean (±SD)	49.67 (±19.26)	58.04 (±16.31)	38.03 (±16.92)	
Median	50	60	35	
Min – Max	3 – 85	3 – 85	6 – 76	
Q1 – Q3 (IQR)	35 – 65 (30)	50 – 70 (20)	26 – 50 (24)	

Table 3: Survey questions relating to the knowledge of the ePrescription with the indication of the correct answer and the number of correct answers

	Question	Correct answer	Number of correct answers	Number of incorrect answers
Q1	Only the eID is required to obtain the ePrescription	FALSE	*201 (81.7%)*	*45 (18.3%)*
Q2	The paper proof of prescription is not a legal document	TRUE	*220 (89.4%)*	*26 (10.6%)*
Q3	In case of differences between the paper proof and what is shown on screen, the paper proof prevails	FALSE	*197 (80.1%)*	*49 (19.9%)*
Q4	The contact details of the prescriber are contained in the ePrescription	TRUE	*147 (59.8%)*	*99 (40.2%)*
Q5	Pharmaceutical preparations can be prescribed in a correct fashion by the prescriber	TRUE	*49 (19.9%)*	*197 (80.1%)*
Q6	As a pharmacist it is possible to revoke an ePrescription with the software	TRUE	*34 (13.8%)*	*212 (86.2%)*
Q7	Which actions do you execute when a patient does not want the pharmacist to fill a(n) (complete) ePrescription? - Keep proof of prescription in pharmacy - Give proof of prescription back to the patient - Close the sale in the software package - Cancel the sale in the software package	 FALSE TRUE FALSE TRUE	*95 (38.6%)*	*151 (61.4%)*



n	0	3	25	66	85	50	17	0	**246**
%	0.0	1.2	10.2	26.8	34.6	20.3	6.9	0.0	**100.0**

Figure 3: Knowledge scores distribution

3.4 Problems and hindrance in the ePrescription workflow

The most frequently reported error was an incorrect use of codes for medication identification (64.2% on a daily basis), followed by manual additions (34.6%), slow response time of the software (32.5%), differences between the paper proof and the electronic prescription (22.0%), unavailability of the eHealth system (19.5%) and uncertainties about the meaning of error messages (14.2%) (Table 4). Only one pharmacist did not report problems with the unavailability of the eHealth system.

For the perception of hindrance (Table 4), an incorrect usage of codes for medication products (60.1% indicated a big hindrance by this problem) and unavailability of the eHealth system to download the prescription (58.1% indicated a big hindrance by this problem) were perceived to be the most problematic factors. Other problems were perceived as less obstructive.

3.5 Regression analysis modelling satisfaction

The software used by the pharmacist was significantly associated with satisfaction with the implementation ($P<0.001$) (Table 5). A better knowledge of the workflow was associated with a higher satisfaction with the implementation in their software package, adjusted for all other covariates ($P=0.036$). The perceived frequency of occurrence of slow responses of the software was associated with satisfaction, adjusted for other covariates ($P<0.001$). A trend was observed for perceived frequency of unavailability ($P=0.086$). When both of these problems were perceived to occur less frequently, the community pharmacist's satisfaction was higher. When a pharmacist indicated to have problems with the unavailability of the system, the pharmacist was asked to estimate the percentage of time that the services were down. A median percentage of perceived unavailability of 15% was observed, with a maximum of 90%. This covariate was also significantly associated with satisfaction ($P=0.003$).

Table 4: Frequency and perception of the hindrance of the problems that arise in the workflow of the ePrescribing. Bold text indicates where a cumulative percentage of over 50% was reached

	n	%	Cum %		n	%	Cum %
Frequency of problems				Perception of hindrance in doing the daily job			
1: Unavailability of the eHealth system							
Daily	48	19.5	19.5	Very big hindrance	82	33.3	33.3
Weekly	106	43.1	**62.6**	Big hindrance	61	24.8	**58.1**
Monthly	66	26.8	89.4	Moderate hindrance	51	20.7	78.8
Less than monthly	25	10.2	99.6	Small hindrance	34	13.8	92.6
Never	1	0.4	100	Very small hindrance	18	7.3	100
2: Slow response time of the software							
Daily	80	32.5	32.5	Very big hindrance	67	27.2	27.2
Weekly	76	30.9	**63.4**	Big hindrance	52	21.1	48.3
Monthly	47	19.1	82.5	Moderate hindrance	54	22.0	**70.3**
Less than monthly	29	11.8	94.3	Small hindrance	43	17.5	87.8
Never	14	5.7	100	Very small hindrance	30	12.2	100
3: Differences between paper proof and electronically stored prescription							
Daily	54	22.0	22.0	Very big hindrance	55	22.4	22.4
Weekly	64	26.0	48.0	Big hindrance	57	23.2	45.6
Monthly	48	19.5	**67.5**	Moderate hindrance	58	23.6	**69.2**
Less than monthly	58	23.6	91.1	Small hindrance	40	16.3	85.5
Never	22	8.9	100	Very small hindrance	36	14.6	100
4: Uncertainties about the meaning of error messages							
Daily	35	14.2	14.2	Very big hindrance	36	14.6	14.6
Weekly	54	22.0	36.2	Big hindrance	46	18.7	33.3
Monthly	77	31.3	**67.5**	Moderate hindrance	56	22.8	**56.1**
Less than monthly	57	23.2	90.7	Small hindrance	67	27.2	83.3
Never	23	9.3	100	Very small hindrance	41	16.7	100
5: Incorrect usage of codes for medication identification							
Daily	158	64.2	**64.2**	Very big hindrance	82	33.3	33.3
Weekly	60	24.4	88.6	Big hindrance	66	26.8	**60.1**
Monthly	16	6.5	95.1	Moderate hindrance	51	20.7	80.8
Less than monthly	6	2.4	97.6	Small hindrance	28	11.4	92.2
Never	6	2.4	100	Very small hindrance	19	7.7	100
6: Prescriber manually adds medication on the paper proof of electronic prescription							
Daily	85	34.6	34.6	Very big hindrance	45	18.3	18.3
Weekly	75	30.5	**65.1**	Big hindrance	36	14.6	32.9
Monthly	44	17.9	83.0	Moderate hindrance	52	21.1	**54.0**
Less than monthly	34	13.8	96.7	Small hindrance	66	26.8	80.8
Never	8	3.3	100	Very small hindrance	47	19.1	100

Table 5: Multivariable analysis explaining what influences the satisfaction score of the pharmacist

[a] For privacy reasons, no information about the software vendors (n = 6) was given
[b] One observation was dropped out of the analysis, because when a pharmacist indicated he never faced problems with unavailability of the system, he never obtained the question about the perception of the percentage of unavailability
[c] Normality and homoscedasticity of the residuals was obtained by squaring the outcome variable (satisfaction)
[d] (*) p-value is less than 0.05; (**) p-value is less than 0.01; (***) p-value is less than 0.001

	AIC using significance		After transformation[c]	
	Beta estimate of change in satisfaction (±SE)	***P*-value[d]**	**Beta estimate of change in satisfaction (±SE)**	***P*-value[d]**
(Intercept)	4.788 (±0.389)	< 0.001 ***	30.950 (±3.850)	< 0.001 ***
Software[a]	**-**	**< 0.001 *** **		**< 0.001 *** **
Knowledge	**0.250 (±0.103)**	**0.016 *** **	**2.563 (±1.222)**	**0.036 *** **
Frequency of unavailability of system		**0.026 *** **		**0.086**
Daily (ref)	-	-	-	-
Weekly	0.875 (±0.303)	0.004 **	8.787 (±3.610)	0.016 *
Monthly	0.572 (±0.346)	0.100	6.053 (±4.100)	0.141
Less than monthly	0.947 (±0.456)	0.039 *	9.742 (±5.422)	0.074
Never[b]	NA	NA	NA	NA
Frequency of slow responses		**< 0.001 *** **		**< 0.001 *** **
Daily (ref)	-	-	-	-
Weekly	1.217 (±0.288)	< 0.001 ***	13.644 (±3.392)	< 0.001 ***
Monthly	1.430 (±0.342)	< 0.001 ***	16.710 (±4.005)	< 0.001 ***
Less than monthly	1.191 (±0.422)	0.005 **	13.823 (±4.868)	0.005 **
Never	1.043 (±0.520)	0.046 *	14.155 (±6.091)	0.021 *
Perception of the percentage of unavailability	**-0.019 (±0.006)**	**0.003 *** **	**-0.225 (±0.076)**	**0.003 *** **
Perception manual addition		**0.083**		
Very big hindrance (ref)	-	-		
Big hindrance	0.003 (±0.383)	0.994		
Moderate hindrance	0.801 (±0.352)	0.024 **		
Small hindrance	0.637 (±0.340)	0.062		
Very small hindrance	0.513 (±0.366)	0.163		

4. Discussion

In this study, satisfaction of Belgian community pharmacists with the implementation of the ePrescription in their pharmacy software was investigated. Factors associated with this satisfaction, including knowledge and problems faced in practice were observed as well. In general, the Belgian community pharmacists were moderately satisfied with the implementation of the ePrescription in their software. Secondly, the pharmacists' knowledge of the ePrescription was moderate to good. The most frequently perceived error was the incorrect usage of medication identification, together with manual additions on the paper proof and slow response times of the system. The greatest hindrances perceived were the problems of incorrect medication identification and unavailability of the system. Satisfaction was associated with the software package itself, the knowledge a pharmacist had about the ePrescribing process, frequency of a slow responsive system and the perception about the percentage of unavailability of the system.

To the best of our knowledge, this is the first study evaluating the national perception about the implementation of ePrescribing within the community pharmacist's software package. In Finland, a survey demonstrated that pharmacists felt that ePrescribing promoted medication safety in many areas (e.g., lower number of prescription forgeries, reduced risk of dispensing errors, etc.).[4] Additionally, Finnish pharmacists noted that ambiguities and errors are common in ePrescriptions. These errors can lead from a delay in dispensing medication to serious risks for medication safety. In Sweden, the attitude of Swedish community pharmacists towards ePrescribing was also questioned, but then in an indirect manner by focusing on the benefits related to ePrescribing.[6] The study showed that Swedish community pharmacists were generally satisfied with the ePrescribing. Similarly to the Finnish study, we observed that ePrescribing led to ambiguities, including differences between the paper proof and the stored ePrescription, and incorrect usage of coding that might lead to incorrect dispensation of products. The present study however questioned the community pharmacists directly about their specific implementation of the ePrescription, and their attitude towards the implementation.

In our study, Dutch-speaking community pharmacists gave a lower satisfaction score compared to the French-speaking community pharmacists in Belgium (Table 2). This may partly be explained by the lower estimated incoming prescription rate observed by the French-speaking respondents. A more frequent use of the ePrescription leads to the possibility of facing more problems and this may lead to lower satisfaction.

Knowledge about the ePrescribing process for Belgian community pharmacists was moderate to good (Figure 3). In Belgium, pharmacists are trained to use software during internships as part of their higher education. When healthcare actors want to know more, an initiative like éénlijn.be might help since they offer various workshops and training sessions for various types of software. However, four years after the national launch of this ePrescribing project, none of the pharmacists succeeded in getting a maximum score on the knowledge questions. This study demonstrated that an increase in knowledge is associated with a higher satisfaction of the pharmacist.

Literature shows that ePrescribing technology introduces new errors related to incorrect entry of drug information.[23, 24] Most of the reported errors were related to wrong dosing directions, wrong dosage formulation or the selection of a wrong drug. The most frequently reported problem by the pharmacists in our study, was the incorrect usage of codes for medication identification (Table 4). The most likely explanation is that there is yet no authentic database with CNK codes (the national identifier for medication) accessible for both the prescribers and pharmacists. A second possible explanation is the use of inadequate software that captures the wrong information as compared to what was meant by the prescriber. Similarly, in a study by Anderson[25] about barriers in eHealth, 79.3% of the physicians named the vendor's inability to deliver acceptable products as a significant barrier to implementation of IT in their practice. In Belgium, a barrier to successful adoption lies in those unauthentic databases used in the back-end of the software. Community pharmacists mostly pay a subscription fee to receive updates in a timely fashion. Prescribers on the other hand often use a derived database that often is used locally and is not well-maintained.

The response rate within this study was only 3.3%. Other studies reported higher response rates of 65%[4] and 52%[5] with respect to a randomized set of pharmacists. We opted for not working with a randomized set, since too few randomization factors, before the study started were known. However, comparison of the distribution of the software package usage of respondents with the distribution of the software of all pharmacists working with the largest tarification service in Belgium (Figure 2) showed no significant difference. Additionally, also the language randomization factor in the population showed no significant difference with our sample (Figure 1). A second limitation is that

causal associations about the satisfaction of the pharmacist cannot be inferred because of the cross-sectional study design. A final limitation is that with the survey we conducted an indirect evaluation of the implementation by questioning their perceptions.

Future research should focus on the problems that were observed in this study and how to solve them. Moreover, comparing the usability of different software implementations would lead to meaningful insights as to what (improved) software features are desired. An important problem in Belgium remains the sporadic unavailability of the eHealth system. This study demonstrated a median perceived down time of 15% and a maximum of 90% of the eHealth services related to the ePrescriptions. Future research should objectively measure the causes of this unavailability in the eHealth workflow and focus on how to solve it. Additionally, attention should be focused on the correct use of CNK codes in Belgium. Currently, a national effort is underway between prescribers and pharmacists to use a common shared database of medication products, i.e. SAM (Source Authentique des Médicaments).

5. Conclusion

Belgian community pharmacists are moderately satisfied with the implementation of ePrescribing within their software. This satisfaction was associated with the type of software, knowledge about the workflow, unavailability of eHealth systems and slow responses within their software. The most frequent and hindering problems reported, were the incorrect use of identification codes for medication and unavailability of the system. Future efforts in Belgium should go to supporting resources for keeping the eHealth systems up and running to limit possible down times, and in using an authentic source of medication identification.

What was already known about the topic?
- ePrescriptions increase patient safety and reduce prescription errors. - ePrescriptions have the potential to remove a part of the administrative burden. - The vendor's inability to deliver acceptable products is perceived as a significant barrier to implementation of eHealth solutions in practice. - Information on community pharmacist's satisfaction with the implementation of ePrescribing in the pharmacist software is lacking.
What this study added to our knowledge?
- Belgian pharmacists were moderately satisfied with the implementation of ePrescribing in their software. - Knowledge about the ePrescribing process was positively associated with the satisfaction of implementation. - ePrescriptions in Belgium suffer from problems with unavailability of services and slow responses of software, which affects the user satisfaction. - ePrescribing should benefit from interoperable standards and smooth integration in the software.

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