



Preferences of patients regarding community pharmacy services: A discrete choice experiment

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ARTICLE INFO

Article history:

Received 3 November 2020

Revised 4 July 2021

Accepted 29 August 2021

Keywords:

Patients

Pharmacist

Preferences

Cognitive pharmaceutical services

Convenience

Community pharmacy services

ABSTRACT

Background: The community pharmacy profession is in transition, with emphasis on the provision of cognitive pharmaceutical services (CPS). In contrast, previous research showed that the general public prefers more convenience related services. However, this was based on currently available services and not on innovative services.

Objective: To identify patients' preferences regarding innovative pharmacy services and whether they tend towards convenience related or CPS.

Design: Online survey using a discrete choice experiment (DCE).

Participants: Participants were from the AMP pharmacy patient panel. Main outcome measures: Preferences (utility scores) and the identification of specific classes (latent class analysis).

Results: In total 2462 panel members (27.3%) filled out the completed the online DCE questionnaire. The majority of participants were male (54.1%) with an average age of 65.3 years and used on average 4.6 medicines. Four patient classes were distinguished based on preferences for services. Highly preferred were an online medication record, prescription drugs for minor ailments without a doctors' prescription and clinical testing with diagnosis by the pharmacist.

Discussion and conclusion: The majority of participants tend towards a more CPS focused approach by the community pharmacist. Patients visiting community pharmacies can have a diverging set of preferences regarding services being provided. In daily practice, community pharmacists should provide both convenience and CPS related services to address this diverse set of preferences.

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1. Introduction

The community pharmacy profession is going through a professionalization process developing a new role for the community pharmacist with more emphasis on the provision of cognitive pharmaceutical services (CPS). Policymakers are becoming increasingly aware that community pharmacists can play an important role by providing CPS [1]. Concurrently, the capacity of the healthcare system is challenged by the increasing needs of the ageing population and because of the introduction of new technologies including medicines [2]. In reaction to this development, policymakers and professional bodies increasingly use Value Based Healthcare (VBH) in the design of healthcare facilities. In the concept of VBH, the preferences and needs of the general public and patients have a prominent place. Therefore, insights in the perspectives of patients

can contribute to the design, implementation, amount of usage and evaluation of new health services such as CPS [3,4].

The definition of CPS is 'the use of specialized knowledge by the pharmacist for the patient or health professionals for the purpose of promoting effective and safe drug therapy' [5], with examples being health promotion, the role of self-medication regarding minor ailments and medication management such as the medication review and improving adherence. CPS is increasingly offered all over the world [6]. Examples of such services are the Minor Ailment Scheme in the United Kingdom, the Sixth Community Pharmacy Agreement (6CPA) in Australia which offers for example medical checks for diabetes and the possibility for community pharmacists to offer publicly funded immunization in the majority of Canadian provinces [7–9].

In a previous study we showed that the majority of the general public prefers convenience (e.g. short waiting times) over CPS (e.g. the possibility of a private consultation with a pharmacist) [10]. However, in this previous study we described currently available services from community pharmacies and did not present the possibility of more innovative services.

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A community pharmacy serves a heterogeneous population regarding age, health state and the number of medicines in use. [11]. Thus it can be expected that each community pharmacy is confronted with different needs and preferences related to CPS and convenience for these different patients. Providing insights in preferences of patients and identifying certain classes of patients based on similar preferences can provide guidance in further developing pharmacy services.

Therefore, the goal of this study is to identify patients' preferences for future services both regarding convenience and CPS that could be provided in Dutch community pharmacies and to identify classes of patients that share similar preferences.

2. Methods

2.1. Study design

A cross-sectional study design using an online questionnaire was used among members of the AMP pharmacy patient panel, with a choice based conjoint (CBC) task on potential future community pharmacies services. Conjoint analyses, such as CBC's, are increasingly used to elicit patients' preferences for different types of healthcare interventions and services [12–16]. With the help of CBC's, researchers are able to quantify for example the (relative) importance of different treatment option or (healthcare) service, by allowing respondents to make a number of trade-offs [17]. In CBC, characteristics of treatment options or services are called attributes (e.g. when going to a community pharmacy, waiting time can be an attribute) that can vary in level (e.g. 5, 15 or 30 min). Next to the choice task, the questionnaire contained questions on background characteristics of the participants such as age, gender and the number of medication in use.

2.2. Development process of the choice based conjoint task

The development of the CBC task was done in accordance to guidelines described in the literature [3,18,19]. The first step of CBC development entails defining attributes and levels. To identify developments regarding potential future pharmacy services (attributes in this study), a search was conducted through the grey literature. A total of 15 different developments (see supplementary material) were identified. Subsequently, these were presented to 10 experts with knowledge of the pharmacy profession. The experts scored each development on 1) relevance for the patient, 2) relevance for the community pharmacy profession, 3) feasibility to implement in daily community pharmacy practice and 4) the innovative character of the development on a scale of 0–5.

Based on the average scores provided by the experts on the 4 domains (with the emphasis on relevance for the patient), a total of 6 developments regarding community pharmacy services were purposely selected to be used as attributes in the CBC. Three of them were primarily aimed at convenience and three that could be described as a potential CPS (see supplementary material). Adding a cost attribute was not deemed relevant, as in the Netherlands, costs of healthcare services are usually reimbursed by healthcare insurance companies. Therefore, adding a cost attribute could be confusing and become the dominant attribute [20].

2.3. Data collection

Sawtooth Software (Lighthouse Studio version 9.8.0) was used to create the CBC. In the CBC task in this study, participants had to respond to 10 random choice sets with two community pharmacies as options to choose. No opt-out option was made available (meaning participants were not able to choose none of the options presented). The options presented within the choice sets were full

profile, showing all six attributes. All attributes had two levels that could be presented in the choice sets. A balanced overlap design (meaning attributes could present the same level within a choice set) was used to create the choice sets [18]. This also provides an efficient manner of gathering data. Ten questionnaire versions were generated that presented the participants the choice sets in a different order and showing different choice sets.

Participants started with a description of two fictitious community pharmacies that recently started in the same town and offered different types of convenience- and CPS related services. Participants were then provided with background information on the services that were part of the choice task. During the choice task, participants could always return to this informational page and also retrieve some information regarding attributes and levels using a *tooltip* within the choice set. See fig. 1 for a translated (Dutch into English) example of a single choice set. The questionnaire was tested by ten laymen and modified based on the feedback provided.

2.4. Study sample

Participants were recruited from the AMP pharmacy patient panel. AMP Research & Consultation in healthcare (AMP Onderzoek & Advies in de zorg) [21] is a Dutch organization focusing predominantly on mystery shopping and provision of patient information leaflets in community pharmacy practice. The AMP patient panel holds about 40.000 individuals of whom 47.5% are male and 78% uses medication for chronic diseases. The panel was formed in 2015 and is comprised of individuals that visit a community pharmacy on a regular basis and consented to be contacted for research purposes.

Individuals from the patient panel were invited once by e-mail by AMP to participate in this research. They were provided with a link that led to the online questionnaire including the CBC. No reminders were sent.

2.5. Sample size

General guidelines regarding CBC state that inclusion of 200 participants per subgroup is usually sufficient [3,18]. Other research utilizing a CBC for preferences of the general public or patients with regard to community pharmacy practice yielded response ranging from 194 to 9202 individuals [14,20,22–24]. Our goal was to be able to distinguish 5 different groups, so a total of at least 1000 individuals were deemed necessary.

2.6. Data management

Only the fully completed questionnaires were included for further analysis. Participants that did not complete the questionnaire fully were compared to participants who did, based on age and gender. Participants were excluded from analysis if there were doubts on the reliability of their answers. Potential unreliability was based on the amount of time spent on the questionnaire and the consistency of answers (constantly choosing the left- or right option). Participants finishing the questionnaire under 3 min were excluded, as this was not deemed possible. Participants were also excluded when they finished the questionnaire between 3 and 5 min and showed poor consistency in answers provided within the choice task (Root Likelihood < 0.6). Root likelihood is the mean of estimated probabilities associated with the different alternatives actually being chosen by participants (fit between utility estimates and choices made by participants). Lastly, participants were also excluded when choosing constantly the left- or right option in the choice task and provided poor consistency in answers provided (Root Likelihood < 0.6).

If these were the two community pharmacies to choose from, which one would you choose?

	Community pharmacy 1	Community pharmacy 2
Drugs for minor ailments without a doctors' prescription	Also Rx Drugs	Only OTC drugs
Pharmacogenetics	No advice regarding pharmacogenetics	Advice regarding pharmacogenetics
Point-of-care-testing	Offers tests	Does not offer tests
Track & Trace	No track & trace	Provides track & trace
Ways of communicating with pharmacy team	Face-2-face, by telephone and online	Face-2-face, by telephone
Medication record	Only on paper	On paper and online
	Choose	Choose

Fig. 1. Example of a choice set for participants showing the two choice options, attributes and different levels.

2.7. Data analysis

Data gathered with the CBC choice task were analyzed using Saw tooth Software (Lighthouse Studio version 9.8.0). This results in utilities which represent the relative attractiveness of an attribute and level. Positive values reflect a preference and higher values mean a greater attractiveness. Latent class analysis [25] was used to determine if subgroups (classes) were present based on preferences provided. With latent class analysis, one tries to identify an underlying (latent) variable by means of researching observable variables. The number of classes was based on the goodness-of-fit for the model. Multiple goodness-of-fit statistics are available within latent class analysis. The Log Likelihood, McFadden's pseudo p^2 , Akaike and Bayesian information criteria [19,25] and were used to determine the number of classes present within the study sample. Participants were assigned to the class on which they had the highest probability.

Parametric (student T-test) and non-parametric tests (Mann-Whitney U and Kruskal-Wallis) were used, depending on the distribution of data, to determine differences between classes on background characteristics. For all analyses, p-values were considered statistically significant when < 0.05 . Microsoft Excel 2016 and SPSS version 23.0 were used for descriptive analysis of basic characteristics.

3. Results

3.1. Respondents

In total, a random selection of 9025 panel members was invited to participate in the study between November 2019 and February 2020. The questionnaire was accessed by 3697 (41.0%) invited panel members. Of these, 2533 (28.1%) panel members completed the questionnaire (see supplementary material for information regarding drop-out rate per step of the total questionnaire). No statistical significant differences were found between participants who fully completed the questionnaire and those who did not with respect to gender and age ($n = 1067$).

After quality check of the data on potential unreliability, an additional 71 participants (0.8%) were excluded, resulting in a study population of 2462 (27.3%) participants. Table 1 shows participants' basic characteristics.

Table 1

Basic characteristics of participant.

Characteristic	N = 2462*
Gender (male), % (N)	54.1% (1333)
Age, mean (SD)	65.3 (10.8)
Educational level, % (N)	
• Low (none, primary school or pre-vocational education)	21.4 (526)
• Middle (secondary or vocational education)	36.1 (888)
• High (professional higher education or university)	41.2 (1015)
Ethnicity, % (N)	
• Migratory background	3.4 (85)
• Non-migratory background	95.8 (2358)
Number of medicines in use, mean (SD)	4.6 (3.3)
Urbanization, % (N)**(Strongly) urbanized	47.3 (1145)
Slightly urbanized	21.0 (509)
• (Strongly) rural	31.7 (770)

* Percentages not cumulating to 100% and numbers not adding up to 2462 indicate missing values.

** Urbanization was defined as: (strongly) urbanized as ≥ 1000 inhabitants/km²; slightly urbanized as 500–999 inhabitants/km²; (strongly) rural as < 500 inhabitants/km².

3.2. Latent class analysis

The latent class analysis resulted in a four-class model showing a McFadden's pseudo ρ^2 of 0.25 (0.2–0.4 indicates a good fit). With 5 classes or more, fit statistics improved only slightly and yielded smaller classes with unclear differentiation from other classes (see supplementary material). The average maximum membership probability was 83.5%. Part-worth utilities of each class per attribute level are shown in fig. 2 and in more detail in the supplementary material.

All attributes significantly contribute to the model. The results show that class 1 ($n = 822$, 33.4%) predominantly prefers community pharmacies an online medication record (utility of 1.58 and RI of 41.9%). Class 2 disfavors predominantly community pharmacies offering prescription drugs for minor ailments (utility of -0.31 and RI of 35.6%). Class 3 predominantly prefers community pharmacies offering prescription drugs for minor ailments (utility of 1.3 and RI

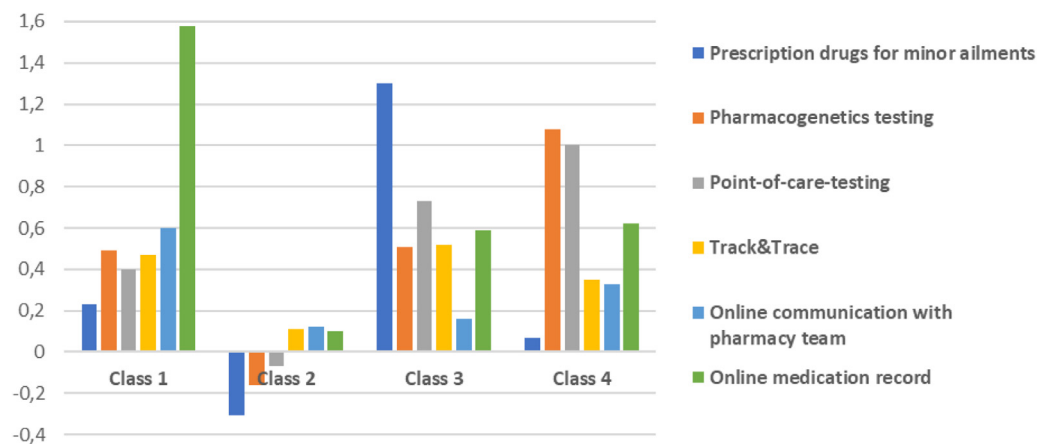


Fig. 2. Part-worth utilities of each attribute only showing the extended service level per class.

Table 2

Overview of background characteristics of each class. Percentages not cumulating to 100% indicate missing values. *p*-value calculated using the Kruskal-Wallis test.

Background characteristic	Class 1 (N = 840)	Class 2 (N = 333)	Class 3 (N = 404)	Class 4 (N = 885)	<i>p</i> -value
Gender, % (N)					< 0.001
Male	54.1 (454)	55.9 (186)	63.4 (256)	49.4 (437)	
Female	45.7 (384)	44.1 (147)	36.1 (146)	50.3 (445)	
Age, mean (SD)	63.7 (11.3)	68.3 (9.3)	66.0 (11.2)	65.3 (10.4)	0.683
Number of drugs in use, mean (SD)	4.4 (3.1)	4.7 (3.0)	4.6 (3.8)	4.6 (3.3)	0.138
Educational level, % (N)					0.091
Low	18.7 (156)	21.8 (72)	22.4 (89)	24.1 (209)	
Middle	37.5 (312)	36.9 (122)	32.5 (129)	37.4 (325)	
High	43.8 (365)	41.4 (137)	45.1 (179)	38.5 (334)	
Urbanization, % (N)					0.056
(Strongly) urbanized	46.4 (388)	49.0 (160)	49.2 (194)	46.4 (403)	
Slightly urbanized	24.0 (200)	20.9 (68)	17.8 (70)	19.7 (171)	
(Strongly) rural	29.6 (247)	30.1 (98)	33.0 (130)	33.9 (295)	
Pharmacy visits frequency, % (N)					0.817
Daily - weekly	5.2 (44)	6.0 (20)	4.5 (18)	4.3 (38)	
Monthly - quarterly	90.8 (762)	89.8 (299)	90.4 (365)	91.7 (811)	
Yearly - never	4.0 (34)	4.2 (14)	5.1 (21)	4.0 (36)	
Grade for current community pharmacy, mean (SD)	8.0 (1.1)	8.0 (1.1)	8.0 (1.3)	8.0 (1.2)	0.508
Views community pharmacist as healthcare provider, % (N)					0.022
Agree	86.6 (727)	82.9 (276)	84.2 (340)	89.3 (790)	
Disagree	13.4 (113)	17.1 (57)	15.8 (64)	10.7 (95)	

of 34.1%). Class 4 mostly prefers community pharmacies offering pharmacogenetic testing (utility of 1.08 and RI of 31.3%).

Background characteristics of participants in each class are presented in table 2, with class 3 containing more males compared to other classes and class 4 consisting of participants who more often regard the community pharmacist as a healthcare provider compared to other classes.

4. Discussion

This study shows that differences regarding preferences for community pharmacy services exist within the population of chronic medication users. A total of four different patient classes can be distinguished, with some classes having a preference for convenience related services whereas others prefer CPS.

Class 1 (*n* = 822, 33.4%) contains mostly participants that highly prefer convenience related services, predominantly access to online medication records and to a lesser degree online communication options with the community pharmacy team and track and

trace of the dispensing process. This is in accordance with results from an earlier study, as it also found a large proportion of participants preferring convenience over CPS [10]. However, this study population differs from participants in the previous study [10] with this study including more elderly and a larger proportion of people with a lower educational level.

Class 2 (*n* = 351, 14.3%) is probably most notable among the 4 classes, as participants belonging to class 2 do not have a clear preference regarding services provided by community pharmacies. This could be due to the study not containing attributes that participants within class 2 highly prefer, or not prefer at all. But this may also suggest that participants belonging to class 2 are satisfied with current community pharmacy practice and do not prefer an expanded role for community pharmacists, or lack a clear preference due to indifference regarding community pharmacy practice. Class 2 consists of relatively old people with more medicines in use compared to the other classes. Also, class 2 has a relatively high proportion of lower educated people. Perhaps these can be considered more conservative and less prone to change. Also, ear-

lier research found that consumers have concerns regarding pharmacist training and qualifications, as well as limited privacy and extra costs when it comes to an expanded role of community pharmacists [26].

Class 3 ($n = 425$, 17.3%) favors CPS over convenience. Class 3 highly prefers the dispensing of prescription drugs after counseling for minor ailments by community pharmacists, without a doctor's prescription. This would give greater responsibility to the pharmacist, as he/she would also play a more prominent role in diagnosing as well as in choosing the adequate pharmacotherapy. In several countries such as the UK and Canada pharmacy prescribing for minor ailments is already possible under certain conditions [27] and was found that patients were positive towards a pharmacist prescribing. A review article studying the views and experiences of patients and the public regarding the prescribing pharmacist, shows that experiences of patients were generally positive [28].

Class 4 ($n = 64$, 35.1%) also favors CPS over convenience but predominantly prefers community pharmacies that offer point-of-care-testing (POCT), as well as community pharmacies providing advice regarding pharmacogenetics. This could imply a preference of patients for a greater involvement of the community pharmacist in offering diagnosis material and consultation and thereby providing insights to patients themselves.

A previous study suggested that PGx testing in community pharmacy practice is feasible, because patients are interested and it consumes little additional time from the pharmacist [29].

A systematic literature review concluded that community pharmacies are well suited to deliver POCT and with satisfactory quality and effectiveness. It also showed that interventions coming from POCT were effective overall [30]. Another study showed that consumers are willing to pay for POCT from community pharmacies [31].

Both class 3 and class 4 prefer more services related to CPS, compared to class 1 and class 2. With class 1 preferring predominantly online services and class 2 even stating a negative preference for services related to CPS. Unfortunately this study provides only limited insights regarding the association between background characteristics and preferences regarding services to be provided by community pharmacies. Class 3 contains more male participants. Suggesting that especially males prefer the dispensing of prescription drugs without a doctors' prescription. Over all classes the great majority of patients perceive the community pharmacist as a healthcare provider. Within class 2 and 3 a relative large proportion of participants do not see the pharmacist as a health care provider. This seems a bit contradictory for class 3 as these patients want the pharmacist to counsel them on minor ailments. However, dispensing prescription medicines without a doctors' prescription could also be considered to improve convenience and therefore the predominant reason for participants to prefer this service.

Overall differences between the classes regarding background characteristics were relatively small. This suggests that despite the statistical significance of some of these differences, the background characteristics that were available may not reliably predict patients preferences for pharmacy services. Other background characteristics that were not recorded in this study, could be more important e.g. mobility, frailty and health literacy.

Attributes being the least preferred by patients were track & trace and online ways of communicating with the pharmacy team, both of which are currently being increasingly implemented in community pharmacies. This could be due to the study population consisting predominantly of elderly. Moreover, this study was performed before the COVID-19 pandemic. Within the Netherlands, both patients and healthcare professionals were forced to use digital ways of communicating due to the outbreak of COVID-19. This

may increase the preference of people for these forms of communication. A study focused on the amount of provision of CPS from community pharmacies during the COVID-19 pandemic showed that only a small number of community pharmacists used telepharmacy such as video calling [32].

4.1. Strengths and limitations

One of the major strengths of this study is the large amount of respondents. This allowed further subgroup analysis. Also, CBC is an efficient way to elicit preferences as it presents options in which participants have to make trade-offs. This can provide more valuable information compared to a Likert-scale questionnaire. Next to this, the study population was comprised of patients who frequently visit community pharmacies.

However, there are also some limitations. The conjoint task and especially the background information regarding the attributes and levels may have been difficult for some participants. This is probably also reflected in the relatively large number of participants with a medium or high educational level and could discourage some panel members to participate in this research.

Also, the study population contains mostly elderly people using medicines. This is not a representative sample of the general population; however the respondents do reflect the chronic users of medication that most frequently visit a community pharmacy. Also, the number of participants in this study with a migratory background is low and therefore not reflecting Dutch society and therefore also does not fully reflect patient populations of community pharmacies.

4.2. Recommendations for daily practice

This study shows that different preferences exist within patients and the general public regarding potential innovative services from community pharmacies. Community pharmacies serve a heterogeneous population, so pharmacists need to realize that patients may have different preferences and needs.

Based on the size of the different classes within this study, it can be stated that community pharmacist will predominantly serve patients that belong to either class 1 or class 4. Based on that, providing an online medication record will meet the needs of both classes. Next to this, community pharmacists should consider implementing pharmacogenetics- and POCT testing prior to minor ailment services. As the latter seems to be less appreciated than diagnostic services. However, the study population contained largely highly educated medicine using patients. Community pharmacies serving a different patient population should also consider other preferences.

5. Conclusion

Overall, the majority of participants appreciate innovative services from community pharmacies. However, these preferences may vary between individuals. This study shows that different classes of patients can be identified based on these preferences. Two out of four classes especially prefer CPS and one class preferred convenience related services. One class did not show a clear preference for either CPS or convenience related services.

Data availability

The data used in this research is not available on request.

Funding

JvdP received an unconditional grant from Saw tooth Software for using Saw tooth Software Lighthouse Studio and Saw tooth Software Hosting.

Declaration of Competing Interest

None

Acknowledgements

The authors thank AMP Research & Consultation in healthcare, especially Martijn Hendrix, for supporting the researchers in use of the patient panel.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.healthpol.2021.08.009](https://doi.org/10.1016/j.healthpol.2021.08.009).

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