

Original Research

Medication dispensing, additional therapeutic recommendations, and pricing practices for acute diarrhoea by community pharmacies in Germany: a simulated patient study

Bernhard LANGER , Christian KUNOW 

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Abstract

Background: In Germany over-the-counter medications (OTC) – which since 2004 are no longer subject to binding prices – can only be purchased in pharmacies. Pharmacy owners and their staff therefore have a special responsibility when dispensing, advising on and setting the prices of medications.

Objective: The aim of this study was to assess medication dispensing, additional therapeutic recommendations and pricing practices for acute diarrhoea in adults and to evaluate the role of the patient's approach (symptom-based versus medication-based request) in determining the outcome of these aspects.

Methods: A cross-sectional study was conducted from 1 May to 31 July 2017 in all 21 community pharmacies in a medium-sized German city. Symptom-based and medication-based scenarios related to self-medication of acute diarrhoea were developed and used by five simulated patients (SPs) in all of the pharmacies (a total of 84 visits). Differentiating between the different test scenarios in terms of the commercial and active ingredient names and also the prices of the medications dispensed, the SPs recorded on collection forms whether the scenario involved generic products or original preparations as well as whether recommendations were made during the test purchases regarding an additional intake of fluids.

Results: In each of the 84 test purchases one preparation was dispensed. However, a preparation for oral rehydration was not sold in a single test purchase. On the other hand, in 74/84 (88%) of test purchases, medications with the active ingredient loperamide were dispensed. In only 35/84 (42%) of test purchases, the patient was also recommended to ensure an 'adequate intake of fluids' in addition to being dispensed a medication. In symptom-based scenarios significantly more expensive medications were dispensed compared to the medication-based scenarios (Wilcoxon signed rank test: $z = -4.784$, $p < 0.001$, $r = 0.738$). Also within the different scenarios there were enormous price differences identified – for example, in the medication-based scenarios, even for comparable loperamide generics the cheapest preparation cost EUR 1.99 and the most expensive preparation cost EUR 4.53.

Conclusions: Oral rehydration was not dispensed and only occasionally was an adequate intake of fluids recommended. There were also enormous price differences both between and within the scenarios investigated.

Keywords

Diarrhea; Loperamide; Self Medication; Professional Practice; Pharmacies; Pharmaceutical Services; Pharmacists; Quality of Health Care; Costs and Cost Analysis; Patient Simulation; Germany

INTRODUCTION

Acute diarrhoea is one of the most common diseases worldwide, including in Germany.^{1,2} Thus, Germany with a population of about 83 million people records about 42 million cases of acute diarrhoea each year with no medical consultation in about two-thirds of cases.^{2,3} For pharmacotherapy of acute diarrhoea in Germany there are medications available that require a medical prescription. These are primarily antibiotics (such as ciprofloxacin, azithromycin and metronidazole) for the treatment of bacterially induced diarrhoea along with the active ingredient combination diphenoxylate/atropine.⁴ In addition to oral rehydration solutions, the active ingredients loperamide, racecadotril, *Lactobacillus rhamnosus* GG, *Saccharomyces boulardii*, medical charcoal,

pectin, tannin albuminate/ethacridine lactate and uzara root extract are also available as over-the-counter medications (OTC) available for self-treatment.⁵ The four preparations with the highest sales are the original preparation IMODIUM® (active ingredient: loperamide) with 23% market share, the generic Lopedium® (active ingredient: loperamide) with 18% market share, PERENTEROL® (active ingredient: *Saccharomyces boulardii*) with 18% market share and the generic Loperamid-ratiopharm® (active ingredient: loperamide) with 5% market share.⁶

Both prescription and non-prescription medicines are purchased exclusively in pharmacies in Germany.⁷ In addition to pharmacists, pharmacy technicians and pharmaceutical technical assistants are also permitted to advise on and sell medications but only under the supervision of pharmacists. So that the advice dispensed is as comprehensive as possible, the Ordinance on the Operation of Pharmacies in Germany considers pharmacies obliged to introduce a quality management system. The German Federal Chamber of Pharmacists (BAK) has drafted a range of guidelines for the implementation of such

Bernhard LANGER. BSc, MSc, PhD, Professor. Department of Health, Nursing, Management, University of Applied Sciences Neubrandenburg, Neubrandenburg (Germany). langer@hs-nb.de
Christian KUNOW. BSc, MA, Research Associate. Department of Health, Nursing, Management, University of Applied Sciences Neubrandenburg, Neubrandenburg (Germany). christiankunow@googlemail.com

systems, including the guideline 'Information and advice as part of self-medication using the example of self-diagnosed diarrhoea'.⁸

If the diarrhoea is self-medicated using OTC preparations, good advice should be provided by the pharmacies because acute diarrhoea can be a symptom of a wide range of diseases.^{9,10} An important prerequisite for that is an appropriate assessment of the patient. However, good advice is an important criterion not only in regards to the patients.¹¹ In terms of competition between the pharmacies it also plays an important role. In particular, the removal of resale price maintenance in 2004 exacerbated the competitive situation in German pharmacies.¹² Good advice can therefore provide an important competitive advantage.¹³ According to Hepler and Strand and the shift in the role of the pharmacist, good advice covers aspects such as safety, clinical effectiveness and cost-effectiveness of medications.¹⁴ On one hand, according to the guidelines published by the BAK this includes whether relevant questions (for example, how long the symptoms have been present) are asked during the consultation or whether relevant information (for example, regarding the dosage) is provided after dispensing the medication.⁸ In this regard, the simulated patient (SP) studies available to date for Germany on acute diarrhoea in adults – analogous to the international literature – have identified serious deficiencies.¹⁵⁻²¹ On the other hand, this also includes the following aspects, which have not yet been investigated in Germany for this indication:

- Whether, and if so, which medications are dispensed as well as whether they appear indicated in regards to the test scenarios presented.
- Whether, and if so, how the additional information on 'adequate intake of fluids' for patients that is specified in the BAK guidelines is implemented by the pharmacies.⁸
- The economic aspects of providing good advice, because dispensing comparably expensive medications (without appropriate additional benefits) constitutes poor advice from the customer's perspective. This practice can be considered unethical and a poor business practice as it does not facilitate the building of good relationships that would create repeat customers.
- Whether the issues indicated differ based on the patient's approach (medication-based versus symptom-based query) because to date it has only been reported anecdotally that more expensive medications were dispensed more often in symptom-based scenarios than in medication-based scenarios.¹⁹

To close these gaps in the research, it was the primary aim of this study to investigate the dispensing and additional therapeutic recommendation practices of community pharmacies for acute diarrhoea and the costs charged to the patients. The secondary objective was to evaluate the role of the patient's approach in determining the aspects indicated above.

METHODS

Design

A cross-sectional study design was chosen in accordance with the 'STROBE Statement – Checklist of items that should be included in reports of cross-sectional studies' using the SP method as a form of participatory observation.^{22,23} An SP here is an individual who visits a pharmacy with the aim of evaluating the quality of advice dispensed. Scenarios developed prior to the test purchase that define in particular which indications (for example, acute diarrhoea) will be investigated and which information will be given to the pharmacy personnel by the SP are used for this purpose. After leaving the pharmacy, the SP evaluates the quality of advice dispensed by the pharmacy personnel using an assessment form that was also developed prior to the test purchase. The drawbacks of this method specifically include the relatively high collection costs as well as any variation in the evaluations (both between different SPs and between different test purchases made by the same SP). The main benefit, however, is that a realistic (advisory) situation can be portrayed.²⁴ In a comparison of many data collection methods, the superiority of the SP method has been demonstrated, making it no wonder that this method has frequently been used internationally in pharmacy practice-based research.²⁵⁻²⁷

Setting and participation

Because of time constraints of the SPs, the test purchases were carried out over summer between 1 May 2017 and 31 July 2017 in the city of Neubrandenburg (31 December 2017: 64,259 residents; Federal State of Mecklenburg-Vorpommern) on different days of the week and at different times.²⁸ In the municipal area of Neubrandenburg there were 21 community pharmacies on the reference date of 1 May 2017.²⁹ Each of these 21 pharmacies was visited four times with one different scenario each time, yielding a total of 84 test purchases. To carry out the test purchases, a total of EUR 353.01 was required which was financed from the primary author's own resources.

Scenarios

Two of the test scenarios were designed as medication-based scenarios (test scenarios 1 and 3: request for the active ingredient loperamide without explicitly requesting a specific brand or generic preparation) while the two other test scenarios were symptom-based (test scenarios 2 and 4: request for a medication to treat acute diarrhoea without explicitly requesting a specific active ingredient). The particular scenarios were also differentiated by different user groups (test scenarios 1 and 2: purchase for the 74-year-old grandmother with the underlying conditions diabetes and hypertension; test scenarios 3 and 4: purchase for the 30-year-old partner with no underlying conditions). Each of the four test scenarios otherwise had an identical design in terms of the information provided in response to questions from the pharmacy staff (Table 1).

Data collection

To avoid the Hawthorne effect and to ensure the most realistic possible consultation situation, the test purchases took place without first informing the pharmacies included

Table 1. Simulated patient scenarios
Scenario 1
The SP enters the pharmacy and asks for a pack of loperamide. If the pharmacist offers a substitute preparation, the SP is willing to accept it. This is regardless of whether a medication with a different active substance or a homeopathic preparation is offered.
If the pharmacist asks, the following information is supplied:
<ul style="list-style-type: none"> - Preparation is for the SP's 74-year-old grandmother - Acute diarrhoea present for 24 h and has occurred several times up to now - No vomiting, no blood in the stool, no fever - Has not yet visited a doctor - Underlying conditions: Diabetes and high blood pressure
Scenario 2
The SP enters the pharmacy and asks for a preparation to treat diarrhoea. The SP does not have any particular product in mind.
If the pharmacist asks, the following information is supplied:
<ul style="list-style-type: none"> - Preparation is for the SP's 74-year-old grandmother - Acute diarrhoea present for 24 h and has occurred several times up to now - No vomiting, no blood in the stool, no fever - Has not yet visited a doctor - Underlying conditions: Diabetes and high blood pressure
Scenario 3
The SP enters the pharmacy and asks for a pack of loperamide. If the pharmacist offers a substitute preparation, the SP is willing to accept it. This is regardless of whether a medication with a different active substance or a homeopathic preparation is offered.
If the pharmacist asks, the following information is supplied:
<ul style="list-style-type: none"> - Preparation is for the SP's 30-year-old partner - Acute diarrhoea present for 24 h and has occurred several times up to now - No vomiting, no blood in the stool, no fever - Has not yet visited a doctor - No underlying conditions
Scenario 4
The SP enters the pharmacy and asks for a preparation to treat diarrhoea. The SP does not have any particular product in mind.
If the pharmacist asks, the following information is supplied:
<ul style="list-style-type: none"> - Preparation is for the SP's 30-year-old partner - Acute diarrhoea present for 24 h and has occurred several times up to now - No vomiting, no blood in the stool, no fever - Has not yet visited a doctor - No underlying conditions

in the investigation in accordance with other national and international studies.^{19-21,30-33}

Three female and two male Master students from the Department of Health, Nursing, Management of the Neubrandenburg University of Applied Sciences acted as SPs. They were selected on the basis of their participation in a 3-semester student research project, the results of which are in part incorporated in this publication.

The test purchases for each scenario were always carried out over a two-week period. There was one week between the individual scenarios (with 21 test purchases for each). The pharmacies to be tested were distributed randomly among the particular SPs so that each SP was allocated to a total of 16–18 test purchases overall (SP 1: 16 test purchases; SP 2: 17 test purchases; SP 3: 16 test purchases; SP 4: 17 test purchases; SP 5: 18 test purchases). The allocation was subsequently checked to ensure that no pharmacy was visited repeatedly by a SP to minimise the risk of discovery. A summary was generated to indicate which SPs visited which pharmacies with which scenario and at what time point.

The SPs noted on the collection forms firstly as open-ended questions the commercial and active ingredient names as well as the prices of the medication dispensed differentiated by the test scenarios. Secondly, in the form of closed questions, the SPs recorded the medication category (brand vs. generic medication) of the dispensed preparation, the recommendations regarding additional intake of fluid (yes vs. no) as well as pharmacy and

pharmacy staff characteristics such as the gender (female vs. male) of the particular pharmacy staff who provided the advice and the busyness of the particular pharmacy (staff < customers vs. staff > customers) at the time of the test purchase. Furthermore, during the test purchases the SPs also attempted to identify the professional group (pharmacist vs. non-pharmacist vs. not able to be determined) of the particular pharmacy staff who advised them using the name tag worn, the information on the sales receipt and by means of a telephone survey conducted once the study was completed (so as not to endanger the covert study design). Whether relevant questions (for example, about the medical history) were asked during the consultation and whether relevant information (for example, about any side effects) was provided after dispensing the medication by the pharmacy staff was also documented for each scenario but these issues were not the objectives of this study and are therefore published elsewhere.²¹

Before the data collection was started, each SP first familiarised themselves with the theoretical principles of the methodology as well as the contents of the collection form. A pilot study with 20 test purchases (five SPs × four visits) was then carried out by the SPs outside Neubrandenburg to train the SPs in the use of the methodology and to verify the functionality of the collection form and the four test scenarios. No changes to the test scenarios and the collection form were required after testing the scenarios.

Table 2. Pharmacy and pharmacy staff characteristics by patient's approach

Characteristics; n (%)	Medication-based test purchases (n=42)	Symptom-based test purchases (n=42)	P value
Staff gender			0.125#
Female	40 (95)	35 (83)	
Male	2 (5)	7 (17)	
Staff position			0.211*
Pharmacist	12 (29)	10 (24)	
Non-pharmacist	27 (64)	26 (62)	
Not able to be determined	3 (7)	6 (14)	
Pharmacy busyness			0.388#
Staff < customers	9 (21)	5 (12)	
Staff ≥ customers	33 (79)	37 (88)	

#McNemar Test; *McNemar-Bowker-Test; significant P values are indicated by characters in bold

The SPs made their request to the pharmacy staff who first approached them. The SPs only provided additional information when asked by the dispenser to ensure that the information provided by the SPs is consistent. The collection forms were filled out by the SPs immediately after visiting the pharmacies to minimise distortions in the study results due to faulty recall by the SPs.

Data management and analysis

Data were double entered into and analysed using SPSS software (IBM, Armonk, NY, USA) version 25 for Windows. This study is part of a larger research project. Unlike previously published research results, differentiating by different user groups does not play a role due to the objectives of this study, and for this reason the scenarios were only differentiated by the patient's approach.¹⁹⁻²¹ This means that in the analysis the test purchases were differentiated into 42 medication-based (test scenarios 1 and 3) or 42 symptom-based (test scenarios 2 and 4) test purchases. Because the 74-year-old grandmother with diabetes and hypertension in scenarios 1 and 2 was clinically at greater risk of harm from dehydration, a subanalysis of an additional intake of fluids was conducted and therefore the test purchases were differentiated into 21 medication-based (test scenario 1) or 21 symptom-based (test scenario 2) test purchases. Categorical variables were reported as frequencies and percentages, whereas continuous variables were expressed as median, interquartile range [IQR], min and max. The application of the Shapiro-Wilk tests indicated that the data do not have a normal distribution. Due to the repeated measurements (4 test purchases in the same pharmacy), the samples are also related. Therefore, the McNemar test and the McNemar-Bowker-Test were performed on categorical variables and the Wilcoxon signed rank test was used to assess differences in the continuous variables between the groups. A p-value of less than 0.05 was considered to be statistically significant. The effect size of the Wilcoxon signed rank test was measured using the Pearson correlation coefficient *r*, whereby according to Cohen, from 0.10 onwards there is a small effect, from 0.30 onwards there is a medium effect and from 0.50 onwards there is a large effect.³⁴

Research ethics approval

The study was approved by the ethics committee of the Neubrandenburg University of Applied Sciences. Due to the covert study design, neither the pharmacies nor the Federal Chamber of Pharmacists were informed about the study in advance. Following the 'Guideline for the use of mystery

research in market and social research, the information obtained was recorded in such a way that the pharmacies involved could not be identified and the results were reported anonymously.³⁵ This ensures that participating pharmacists are not at any risk of criminal or civil liability nor does their participation harm their employability or reputation. Recruited students provided their verbal informed consent to act as SPs.

RESULTS

All the 84 test purchases planned were carried out. Pharmacy and pharmacy staff characteristics were not significantly different by patient's approach (Table 2).

A total of 84 medications (1 preparation per test purchase) were sold by the pharmacies. In 74/84 (88%) of test purchases, medications with the active ingredient loperamide were dispensed and these were sold significantly more often in medication-based scenarios than in the symptom-based scenarios ($p=0.002$). Aside from this, only a few preparations with the active ingredients racecadotril, *Saccharomyces boulardii*, medical charcoal and the combination of active ingredients tannin albuminate/ethacridine lactate were dispensed but these preparations did not show any significant differences in terms of the patient's approach. Generic formulations made up 61/84 (73%) of dispensed medications and only included loperamide. Generics were sold significantly more often in the medication-based scenarios than in the symptom-based scenarios ($p<0.001$). For 35/84 (42%) of test purchases, in addition to dispensing a medication, it was recommended to the patient to pay attention to an 'adequate intake of fluid', whereby such a recommendation was made significantly more often in symptom-based scenarios than in medication-based scenarios ($p=0.011$). For the 74-year-old grandmother with diabetes and hypertension such a recommendation was also given more often in symptom-based scenarios than in medication-based scenarios, whereby this difference was not significant ($p=0.267$) (Table 3).

In terms of the medication prices, there were significant differences seen when comparing the medication-based scenarios and the symptom-based scenarios (Wilcoxon signed rank test: $z=-4.784$, $p<0.001$, $r=0.738$). In the medication-based test scenarios considerably cheaper preparations were dispensed with a median score of EUR 2.36 (IQR EUR 1.94) compared to the symptom-based test scenarios with a median score of EUR 5.28 (IQR EUR 2.60). In the medication-based test scenarios the cheapest

Table 3. Medications dispensed and additional therapeutic recommendations by patient's approach

Active ingredients dispensed [n (%)]	Medication-based test purchases (n=42)	Symptom-based test purchases (n=42)	p-value
Loperamide	42 (100)	32 (76)	0.002#
Racecadotril	0 (0)	4 (10)	0.125#
Saccharomyces boulardii	0 (0)	3 (7)	0.250#
Medical charcoal	0 (0)	2 (5)	0.500#
Tannin albuminate/ethacridine lactate	0 (0)	1 (2)	1.000#
Of which total generics	42 (100)	19 (45)	<0.001#
Additional recommendation 'adequate intake of fluid'	11 (26)	24 (57)	0.011#
	Medication-based test purchases (n=21)	Symptom-based test purchases (n=21)	
Of which for the 74-year-old grandmother with diabetes and hypertension	6 (29)	11 (52)	0.267#

#McNemar Test; significant P values are indicated with characters in bold

preparation cost EUR 1.99 (loperamide generic, 10 units hard capsules, 2 mg) and the most expensive preparation cost EUR 4.53 (loperamide generic, 10 units hard capsules, 2 mg). In the symptom-based test scenarios the cheapest preparation cost EUR 2.28 (loperamide generic, 10 units hard capsules, 2 mg) and the most expensive preparation cost EUR 10.98 (IMODIUM® akut lingual, 12 units, quick dissolve tablets, 2 mg). Referring only to hard capsules and across the four different scenarios and all 84 interactions, preparations with the active ingredient loperamide cost EUR 1.99 in the cheapest case for a pack of loperamide generic (10 units hard capsules, 2 mg) while up to EUR 5.28 had to be paid for a pack of the comparable original preparation IMODIUM® akut (12 units hard capsules, 2 mg).

DISCUSSION

The treatment of first choice for acute diarrhoea in adults is oral rehydration.³⁶ However, in this study – analogous to a comparable SP study conducted in Turkey – not a single preparation of this type was dispensed.¹⁵ Very low dispensing quotas of preparations for oral rehydration of about 1%, about 4% and about 12% respectively were also seen in comparable SP studies from Iraq, Qatar and Pakistan.¹⁶⁻¹⁸ This contrasts with a study from Trinidad and Tobago based on self-assessment in which about 64% of the pharmacists surveyed nevertheless indicated that they recommended oral rehydration for acute diarrhoea in adults.³⁷ Such differences are not surprising, and the international literature specifically investigated possible differences between SP results and the results based on self-assessment also shows similar discrepancies for indications other than acute diarrhoea in adults.³⁸⁻⁴¹ Quite obviously, the pharmacy staff are lacking less in basic knowledge than its daily implementation in direct customer contact.³⁹

An additional intake of fluids, analogous to the BAK guidelines, was recommended considerably more often in this study with 42% of all test purchases but this value still indicates there is an enormous potential for improvement.⁸ The significantly more common recommendation of an additional intake of fluids in symptom-based test scenarios of 57% is not surprising and differences in the advice given were also seen in the national and international literature between medication-based and symptom-based queries.^{19,20,42} In the comparable symptom-based SP study from Iraq, however, a somewhat lower value of 44% was

reported for the recommendation for fluid intake compared to this study.¹⁶

Along with oral rehydration, loperamide is the agent of choice to control faecal incontinence and frequent bowel movements but it should not be used in diarrhoea with bloody stool.^{10,36} As the results of this study have shown, preparations with the active ingredient loperamide were by far the most commonly dispensed. In the cases with a medication-based request, loperamide was always sold, which is no great wonder given that it was explicitly requested by the SPs. Although there were significant differences between the medication-based and the symptom-based requests, a considerable proportion of preparations (76%) that were issued contained the active ingredient loperamide for symptom-based requests as well.^{20,42} Studies from Trinidad and Tobago as well as the United Kingdom suggest that the desire for the patients to stop the diarrhoea is a key reason for the frequent dispensing of such preparations.^{37,43} In the SP study from Qatar, which also investigated the dispensing of medications for acute diarrhoea in adults using a symptom-based scenario, loperamide was again the most commonly dispensed active ingredient.¹⁷ However, the proportion of about 38% was considerably lower than in this study. Even lower proportions for loperamide or general peristalsis inhibitors (antimotility agents) of about 21%, 6% and 2% respectively are seen for comparable scenarios in the SP studies from Turkey, Iraq, and Pakistan.^{15,16,18} Because only loperamide generics were sold in the medication-based scenarios, the pharmacy staff quite obviously equate the request from patients for 'loperamide' with the desire for a generic product since many generics contain the word 'loperamide' (for example, 'Loperamid akut' from 1A Pharma®) in their trade names while the original preparation IMODIUM® does not. The significantly lower rate for dispensing generics in the symptom-based scenarios – in which no active ingredient was explicitly specified – may therefore be due less to possible scepticism on behalf of the pharmacy personnel regarding the quality of generics as reported in the international literature because in the medication-based scenarios generics were dispensed in all cases by the same pharmacies.^{44,45} Rather, it can be presumed that dispensing more expensive original preparations results from a deliberate profit maximisation by the pharmacies.^{46,47} In this study, for example, the cheapest loperamide generic (10 units hard capsules, 2 mg) cost 62% less than the comparable original preparation (12 units hard capsules, 2 mg). Even taking into account the 2

additional hard capsules in the original preparation, there are still enormous price differences. Estimates by the US Food and Drug Authority (FDA) typically assume a saving potential with generics of up to 85%.⁴⁸ Similar values are reported in studies from Malaysia and Kenya with savings of up to 90% or even over 90%.^{49,50} The large difference in prices for loperamide generic products and the comparable original preparation IMODIUM® akut reported in this study are also a reason for the considerable price differences between the medication-based and the symptom-based scenarios.

Furthermore, in the symptom-based scenarios only a few other active ingredients were dispensed apart from loperamide and these are likewise much more expensive than loperamide generics. Although the active ingredients *Saccharomyces boulardii* and racecadotril, which were dispensed in very small quantities, are therapeutic alternatives to loperamide, they do come at substantially higher prices.^{36,51,52} Medical charcoal and the combination of active ingredients tannin albuminate/ethacridine lactate are not alternatives to loperamide for treating acute diarrhoea from a therapeutic perspective and likewise have considerably higher costs.^{5,36} The opioid diphenoxylate/atropine, which requires a prescription in Germany due to its potential for abuse, was correctly not dispensed at all for the treatment of acute diarrhoea in this study, unlike a comparable SP study from Iraq.^{16,53} Likewise, antibiotics that require a prescription were not dispensed at all, whereas in SP studies in Saudi Arabia and Jordan for acute diarrhoea an antibiotic was unlawfully sold without a prescription in 97% and 83% of test purchases respectively.^{54,55}

What was noticeable were the enormous price differences within the medication-based scenarios for comparable loperamide generics – between pharmacies that are located in the same city and in some cases are located only a few hundred metres away from each other. The cheapest preparation cost 56% less than the most expensive. Drastic price differences for comparable generics are not an exclusively German phenomenon. Thus a few recent US studies – likewise for pharmacies in close proximity and even for different indications (heart failure, erectile dysfunction, benign prostatic hyperplasia) – in some cases revealed considerably more drastic price differences for comparable generic preparations.⁵⁶⁻⁵⁹

As reported in the international literature, the cost of medicines is a perceived or actual barrier to accessing treatment.^{50,60-63} Therefore, in light of the enormous price differences, patients should be informed by public campaigns and community sensitisation to compare prices more thoroughly in future and to also be able to access this information.^{58,59,64} The success of such measures would, however, be rather limited in view of the lack of transparency of market conditions in Germany. There is no obligation for price labelling for OTC medications and prices are not stated by the pharmacy staff as a rule during the consultation.⁶⁵⁻⁶⁷ Therefore, patients usually do not have any price information during the consultation. They usually receive price information from the pharmacy staff only at the time of purchase, when the purchase decision has already been made and a purchase withdrawal for cost

reasons is a major emotional barrier. The government is therefore prompted to ensure greater price transparency for OTC medications for all pharmacies. Innovative and up-to-date voluntary pharmacy concepts in which customers can inform themselves about OTC medications and their prices using interactive touch screens or cards in the sales area are possible options.^{68,69}

Strengths and limitations

The study presented here investigated in Germany for the first time which preparations for self-medication of acute diarrhoea in adults are dispensed and whether these medications appear indicated in regards to the test scenarios presented. As far as the authors are aware, it may well be the first SP study worldwide that investigates possible price differences for dispensed medications depending on the patient's approach (symptom-based versus medication-based request). Another strength is that the SP method used means that the prices currently paid by patients in the pharmacies are used in the studies rather than the prices that are recorded in the official standard price list (Lauer-Taxe). The method is also well suited to reflect real interactions between providers and consumers because they reduce the observation bias of studies based on self-assessment, especially as only very few SP studies in the pharmacy setting exist to date in Germany.²¹ Furthermore, the different patient approaches (symptom-based versus medication-based request) were each used twice in all 21 pharmacies (42 test purchases for each), which may increase the accuracy of the study results.

Some of the limitations of this study are that the investigation was carried out only in a medium-sized German city and only referred to the indication acute diarrhoea in adults. The individual pharmacies also did not receive any feedback about the study results, which prevents the pharmacies initiating appropriate measures for improvement. Furthermore, audio recordings must be omitted for data privacy reasons because all pharmacies would have to be informed about this in advance, which would jeopardise the covert study design. On the other hand, data collected was not subject to interpretation but could be verified at any time after the test purchases (for example, the prices of the medications using the sales receipt), thus minimising the risk of recall bias. For greater quality assurance, future SP studies could always carry out and evaluate test purchases by a second observer. Although the comparison between the symptom-based and product-based requests was carried out in the same pharmacies, it could not be ensured that the same pharmacy staff was always encountered for the four test purchases in each pharmacy. On the other hand, this aspect should not play a role because the owner of the pharmacy should ensure that the staff members providing advice deliver a consistent level of advice. Possible reasons that the dispensing and recommendation behaviour of the pharmacy staff was not, in many cases, in accordance with the guidelines should be identified in future studies using a survey or interviews because this could not be determined by the SP approach used.

CONCLUSIONS

Oral rehydration was not dispensed and only occasionally was an adequate intake of fluids recommended. Further relevant education (pharmacists) and training (pharmacy technicians) as well as ongoing appropriate continuing education are needed. There were also enormous price differences both between and within the scenarios investigated. Political measures to improve price transparency of OTC medications should therefore be implemented. Along with this, patients should be encouraged by public campaigns and community sensitisation to compare prices more thoroughly.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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