

Patients' experiences of splitting tablets

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Abstract: Objectives: To examine what patients do when they have a prescription with a dosage where tablets must be split. Methods: Interviews were performed at 12 pharmacies across Sweden with pharmacy customers who had prescriptions with a dosage meaning that the tablets have to be divided to give the prescribed individual dose. Key findings: Of the 436 pharmacy customers interviewed, 255 (58.5%) reported they divided the tablets without tools and 162 (37.2%) used tools, the most common was a knife. Only few used a tablet splitter. Almost every third patient (31.4%) stated they had problems to divide the tablets. Conclusions: Patients' difficulties in splitting tablets are common, but seem to be overlooked. Pharmacists should be permitted to adjust dispensing to a strength corresponding to the prescribed dosage level, price policies with flat prices need to be revised to eliminate economic incentives to prescribe dosages with split tablets and a computerised decision support should be developed signalling when there is a suitable strength for the prescribed individual dose.

Keywords: Tablet Splitting, Patient Experiences, Drug Related Problem, Sweden, Community Pharmacies

1. Introduction

Adherence to medication in long term treatment is estimated to be on average about 50% [1]. Prescribing dosages where tablets have to be split can increase the problem of poor adherence because many, especially among the elderly, may have problems to divide tablets [2-5]. Of >600,000 studied prescription items dispensed during one month in Sweden, 10% of the prescriptions with tablet formulations had a dosage meaning that the prescribed tablets had to be divided, equivalent to more than 125,000 patients in Sweden having prescriptions with dosages where the tablets must be split [6]. In 80% of the cases, splitting tablets had been possible to avoid; in half of the cases there was a licensed strength corresponding to the prescribed dose and in another one-third of the cases splitting could be avoided if two tablets of lower strength had been prescribed [6].

Many tablet formulations are not suited for or intended to divide. European Pharmacopoeia accepts a dose accuracy of $\pm 15\%$ of the intended dose, but dose accuracy when splitting is often unsatisfactorily low, regardless of whether the tablets are scored or not [7-13]. It is common that tablets divide into unequal parts or pieces or crumbles [13, 14].

A pilot survey indicated about half of all patients, and 8 out of 10 patients over 65 years, have trouble splitting tablets [15]. Half of the patients used a tool to split the tablets, most commonly, a knife, while few used a tablet splitter. Of those splitting tablets without tools every 6th used their teeth to divide the tablets. Those who find it difficult to split tablets are seldom helped by using a tablet splitter [10, 16]. Most patients with prescriptions for split tablets indicated they wanted to have a strength of the tablets, which enables them to avoid dividing tablets, whether they are experiencing problems or not. This study was done with a larger patient sample to examine how patients do when they have a prescription with a dosage, which means that the tablets must be split.

2. Methods

The interviews were conducted by 12 pharmacy students, one student per pharmacy, according to a standardized interview form on weekdays (Monday - Friday) during the period 2010-02-01--28 at 12 community pharmacies throughout Sweden.

2.1. Recruitment of Patients

Interviews were performed with pharmacy customers who had prescriptions dispensed for a medication (tablets) with a dosage meaning that the tablets have to be divided to give the prescribed individual dose. In conjunction with the dispensing the pharmacy staff asked if the customer was willing to talk to the student. Customers corresponding to the inclusion criteria received written information about the survey and asked for informed consent to be interviewed. The interview was conducted directly or by arrangement at a later time by telephone with those consenting to be interviewed.

Pharmacy customers a) ≥ 18 years who collected prescription medications for themselves and b) representatives collecting medications on prescription for patients ≥ 18 years and helping the patient with the medication management were included.

Pharmacy customers a) declining informed consent to be interviewed, b) < 18 years, c) without previous experience of the medication and d) being representatives for patients but not helping them with the medication management, were excluded.

2.2. Data Management

The data from the interview questionnaire were transferred to a database (Microsoft Excel® spreadsheet). All data were recorded anonymously and no data can be traced to individual subjects. The only information recorded about the patient was birth year and gender, language spoken at home and country origin for those who spoke another language than Swedish at home. In addition, the current drug and dosage that meant that the tablets had to be divided was recorded. During three randomly selected days per pharmacy all dispensed prescriptions were reviewed and the number of pharmacy customers, with medication dosages meaning that the tablets had to be divided, was compared with the number of customers who had been asked to participate in the study.

2.3. Statistical Calculations

It was estimated that the material for the 12 included pharmacies for 20 days would correspond to a convenience sample of about 720 customers with prescriptions for split tablets being interviewed. Of these 2 out of 3 were expected to be women [15]. Differences in proportions between groups of dichotomous variables were calculated with Fisher's exact test.

2.4. Research Ethics

This study is a part of the undergraduate education for the degree Bachelor of Science in Pharmacy at the Universities in Gothenburg, Kalmar and Karlstad. It has thus not been subject to national/regional ethical committee approval in accordance with the legal framework in Sweden.

3. Results

Six hundred pharmacy customers who collected medications at the pharmacies during the study period were asked if they wanted to participate in the study. Of them, 92 patients (15.3%) declined consent to an interview, 9 patients (1.5%) who accepted to be interviewed left the pharmacy before the interview could be performed, whereas 59 patients (9.8%) had no previous experience of dividing tablets and 4 customers (0.7%) were agents not helping the patient with medication management. The check on the random days showed that 93 of a total of 401 possible prescription customers (23.2%) were asked if they wanted to participate in the study.

The material consists of 436 respondents, 299 women (68.6%) - see Table 1.

Of them, 424 collected their own medication and 12 were representatives helping the patients with their medication handling. The majority, 343 (78.7%), had had the medication for 1 year or more. There were small differences by age and gender, but significantly fewer of the patients over 85 years (28/40: 70%) gave consent and were included ($p = 0.015$, Fishers' exact test).

Table 1. Age and gender distribution of included patients.

Patients Age	Gender		Total	%
	Women	Men		
18-24	3	2	5	1,1
25-44	31	13	44	10,1
45-64	97	60	157	36,0
65-74	75	32	107	24,5
75-84	72	23	95	21,8
85+	21	7	28	6,4
Total	299	137	436	100,0

Two hundred and fifty five patients (58.5%) reported they divided the tablets without tools and 162 patients (37.2%) used tools - see Table 2.

Table 2. Actions patients take to comply with the prescribed dosage

Action	Gender		Total
	Women	Men	
Use no tool	170	85	255
Break the tablets by hand	152	80	232
Use the teeth and bite	14	5	19
Other	2		2
No answer	2		2
Use a tool	113	49	162
Use a knife	72	33	105
Use a tablet splitter	27	12	39
Use other tool	13	4	17
No answer	1		1
Other way	2	1	3
Do not divide the tablets	11		11
Gets help to divide the tablets	3	2	5
Total	299	137	436

Eleven patients, all women, reported that they did not divide the tablets but took a higher dose (whole tablet). Almost every third patient, 137 (31.4%), stated they had problems to split the tablets. There were no statistically

significant differences with regard to age ($\chi^2=2.261$; $p=0.133$) or gender ($\chi^2=0.43$; $p=0.512$). Two problems were common - that the tablets were hard and difficult to divide and that the tablets broke into several pieces or crumbled.

Only 7 (12.2%) patients reported that they had received an instruction on how to split the tablets, 20 patients had been told that there's a tablet splitter, and 21 that the tablets were scored. More than half of the patients, 229 (52.5%), said they would prefer not to split the tablets; they wanted a strength on tablets appropriate to the prescribed dose or they would rather take several tablets of a lower strength, while 57 (13.1%) rather divided tablets than to take more tablets of a lower strength.

4. Discussion

Prescribing of medications meaning that tablets have to be divided to fit to the individual dosage is common. However, in many cases a suitable strength for the prescribed individual dose is available. A significant share of the patients had trouble dividing tablets, in line with findings in previous studies [3-5, 14, 15], and only few patients used tablet splitter while several patients divided the tablets by biting them apart [14]. More than half of the patients reported that they do not want to split tablets.

There are conflicting data on the impact of tablet splitting on patient adherence to prescribed therapy and medication errors [17-23]. Most studies are with selected patient groups and tablet splitting is often accompanied by an economic incentive (the out-of-pocket co-payment for the patient may be decreased substantially). However, Denneboom et al found that problems to divide tablets was the second most common clinically relevant risk factor for non-adherence among patients >75 years [3]. As elderly patients use many medications it is reasonable to assume that every addition to regimen complexity will increase the risk for non-adherence and medication errors as well as adverse drug reactions [24].

The prevalence of prescriptions with a dosage meaning that tablets have to be divided has been 10% to >35% [5, 6, 14, 18, 25, 26], and the prevalence of elderly patients with at least one prescription requiring tablet splitting varies from 35 to 67% [3, 25]. However, for 45-80% of the prescriptions with tablet splitting, alternatives (tablets with half or quarter strength, or oral solution) have been available [5, 6].

Only patients with at least one prior dispensing were included in the study and the majority of the medications were intended for continuous use. Nearly 3 out of 4 patients had had the prescription for more than one year, i.e. had received renewals of the prescriptions. A renewal of a previous prescription in the Electronic Medical Record is very convenient and simple compared to a change of the prescription. Physicians may have limited overview of available strengths; new strengths may have been licensed after the prescription was originally issued, but not noticed by the prescriber. However, Quinzler et al showed that

computerised decision support can immediately reduce the frequency of prescribing with splitting tablets [27].

Patients' difficulties in splitting tablets are common [2, 4, 5, 14], but seem to be overlooked by pharmacists. However, difficulties in splitting tablets are simple to identify and in many instances easy to solve. Pharmacists should be encouraged to ask patients how they manage to adhere to the prescribed treatment. If a patient has difficulty in splitting tablets, there may be a licensed strength or other administration formula to fit the dosage, or it may be possible to adjust the dosing schedule without compromising the efficacy before suggesting that the patient use a tablet splitter, followed by adequate instruction in its use.

Our results imply that at least 115,000 patients on continuous medication in Sweden have a dosage involving split tablets, similar to previous calculations [6], and more than 35,000 patients on continuous medication in Sweden, having difficulties in splitting the tablets which may result in non-adherence to the prescribed treatment.

There are several limitations to the study. Barely one of 4 customers who collected prescription medications with a dosage meaning that the tablets must be divided was asked to participate in the survey. There are several reasons - many customers did not meet inclusion criteria (representatives not involved in the patient's medication management collected the medications or the first time the patient had a prescription with split tablets); - the pharmacy staff may have forgotten or failed to ask the customer or - the customers declined participation already at dispensing but this was not recorded.

5. Conclusions

For patients' with prescriptions for medications where tablets have to be divided for the individual dose, difficulties in splitting tablets are common. Most patients did not want to split tablets but wanted a tablet strength corresponding to the prescribed dose. The results suggest that (a) pharmacists should be permitted to adjust dispensing to a strength that fits with the prescribed dosage level, (b) price policies with flat prices need to be revised to eliminate economic incentives to prescribe dosages with split tablets and (c) a computerised decision support with automatic signalling for dosages where tablets have to be divided when there is a suitable strength for the prescribed individual dose and for tablets not approved or suitable for splitting. A decrease in the use of split tablets may result in both an increased ability for patients to comply with the prescribed therapy and a decrease in changes in clinical effect and adverse drug reactions due to unpredicted pharmacokinetic differences in the preparations.

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