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Research article

CONSUMER'S MEDICINE ADMINISTRATION BEHAVIOUR IN COMMUNITY SETTINGS

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Abstract

Medicine administration is influenced and affected by demographic, social, and practical factors such as dosage form characteristics, swallowing difficulties, posture, and patient awareness. These behaviours directly influence adherence and therapeutic success. Therefore, this study assesses the factors influencing medicine administration behaviour and purchasing practices among residents of Gandhinagar district. A cross-sectional study was conducted in two community pharmacies of Gandhinagar district, Gujarat, India. Total of 663 participants were recruited using convenience sampling. Data were collected through a structured questionnaire on demographics, and medicine administration behaviours. Descriptive statistics and chi-square tests were applied to determine associations. Most respondents (81.6%) swallowed tablets whole, 97.7% used water, and 58.4% experienced no swallowing difficulties. However, 41.6% reported problems such as throat discomfort and choking sensation. Posture and head position were significantly associated with ease of swallowing ($p < 0.05$). Demographic variables including age and education level showed associations with administration practices. Medicine administration behaviour is shaped by demographic and practical factors. Patient education on correct swallowing techniques, adequate liquid intake, and safe posture may enhance adherence. Pharmacists play a pivotal role in guiding community members toward rational medicine administration.

Keywords: Medicine administration behaviour, Consumer behaviour, Community pharmacy, Swallowing techniques, Rational drug use, Tablets, Capsules

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Introduction

Tablets and capsules are among the most commonly used portable drug formulations, offering advantages over other medication forms due to their ease of swallowing, accurate dosing, and convenient administration. Safe and effective administration of medicines is essential for therapeutic success, yet community practices often reveal errors such as insufficient liquid use, swallowing difficulties, and inappropriate posture during tablet or capsule intake. Medication use is a multi-step process that begins with purchase and continues through administration to adherence, these practices, if unaddressed, may reduce drug effectiveness and compromise safety leading to reduced medication adherence and all of which affect therapeutic outcomes.

The theory of planned behaviour (TPB) and the theory of reasoned action (TRA) suggest that individual behaviours, including medicine administration, are influenced by attitudes, subjective norms, and perceived control.[1,2] Previous studies have shown that dosage form size, shape, and patient posture directly affect swallowing ease.[3-5] In addition, demographic and socio-economic factors influence consumer choices in medicine purchasing and administration.[6,7]

Research from India[8] and globally[9-12] has highlighted the importance of pharmacist-led interventions to improve medicine use. Recent evidence also shows that older adults are particularly vulnerable to swallowing difficulties due to physiological and cognitive changes.[13-16]

Fuchs et al.[9], expressed concerns regarding the volume of liquid used to swallow compact, orally administered pharmaceuticals such as tablets and capsules. Studies indicate that the successful passage through the oesophagus is significantly influenced by both body posture and liquid volume.[12] It is advised that individuals take a sufficient amount of liquid and maintain an appropriate posture while swallowing tablets or capsules to ensure smooth passage.[17, 18] Regulatory guidelines vary across regions: the U.S. FDA[19] recommends coadministration with 240 mL of water under fasted conditions, while the European Medicines Agency (EMA)[20] specifies a minimum of 150 mL.

While several studies have explored consumer behaviour in medicine purchasing, limited evidence exists on medicine administration behaviour in our community settings. Therefore, this study was undertaken in Gandhinagar district, Gujarat, to study factors influencing medicine administration practices among consumers.

Materials and Methods

Study Design

This was a cross-sectional study conducted in two community pharmacies of Gandhinagar city, Gujarat, from October 2024 to January 2025. The study was approved by the Institutional Ethics Committee of KBIPER (Ref: KBIEC/2024-25/PD5Y/07).

Study Population& Sampling

Gandhinagar is the capital city of Gujarat, India. It has diverse population size of over 15 lakhs.[21] Using a convenience sampling method, the minimum required sample size was calculated 385.[22] However, data was collected from a total of 682 participants to enhance the reliability and generalizability of the study. Study participants were selected based on eligibility criteria; Inclusion criteria: Consumers aged 18 years or above; taking at least one medicine that are ingested orally, i.e., tablet or capsule; those willing to sign a consent form. Exclusion criteria: Those with dysphagia and related signs and symptoms, severe GERD, mouth or throat ulcer, inflammation, or infection.

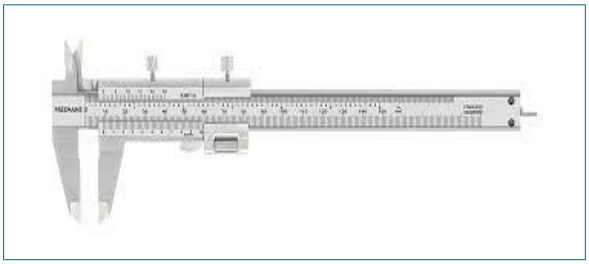
Study Tool

A structured, pre-validated questionnaire was used to collect data on demographic and administration behaviours (tablet swallowing, liquid intake, posture, head position, etc.). From literature and practice, 12 factors were selected that influence administration behaviour. For each factor, one question with appropriate options were assigned: medicine consumption method, amount of preferred liquid, medicine form, shape and size, swallowability, taste, body and head posture, etc., the questions were both open ended and close ended, participants were provided with trichotomous (three options) options and best possible options to answer. The questions were designed to gather the data about respondents' medicine administration practices, preferences, and impact of external factors on medicine administration related decisions. An overview of the factors, nature of questions and option used in the study is in **Table 1**.

Tablet and capsule sizes were measured using a vernier calliper (**Fig. 1**) directly on intact blister packs. Dimensions (length, width, thickness) were recorded by measuring the blister cavity and then subtracting the thickness of the blister material. This provided approximate tablet/capsule sizes without damaging the packaging. As an alternative, blister cavity measurements were taken directly.

For assessing the amount of fluids used for administration, participants were shown a standardized volumetric glass to aid accurate self-reporting of the amount used for administration. This approach minimized recall bias, reduced variability, and ensured reliable, quantifiable data for statistical analysis.

Fig. 1: Vernier Callipers Scale



Statistical Analysis

All data collected were analysed using MS Excel Version 21, Window 11, Microsoft New York, and SPSS version 20.0 with the expert help of statistician. Data is presented as number, percentage, means, and standard deviations. Chi-square test was applied to assess associations between variables at 95% confidence interval, p value<0.05 significant.

Table 1: Nature of Questions: Factor, Question and Option

Sr. No.	Factor	Question stem	Option
1.	Medicine Taking Method	You take tablet(s)/capsule(s) as _____	Whole, Split, Crushed, As recommended
2.	Preferred Liquid	What type of liquid do you usually use to take tablets/capsules?	Water, Juice, Milk, Others
3.	Amount of Liquid	Amount of liquid you take with your tablets and/or capsules: ____(ml)	_____ml
4.	Medicine Form	What type of medicine do you take?	Tablets, Capsules
5.	Tablet/Capsule Size	What is the size of the tablet(s)/ capsule(s) you are taking?	Very Small, Small, Medium, Large, Very Large
6.	Tablet/Capsule Shape	What is the shape of the tablet(s) /capsule(s) you are taking?	Round, Rectangle, Oval, Oblong, Other
7.	Ease of Swallowing	You find it _____to swallow tablet(s) or capsule(s).	Very Easy, Easy, Neutral, Difficult, Very Difficult
8.	Challenges in Swallowing	If you experience difficulty swallowing, please describe any challenges you face:	Choking, Coughing, Nausea, Fear, Discomfort, Reflux, Sticking Sensation, Others
9.	Body Posture	In which body posture you used to take tablet/capsule?	Standing, Sitting, Supine, Inclined, Lateral
10.	Head Position	What is your head position when taking tablet/capsule?	Natural, Inclined, Declined, Lateral
11.	Taste	Do you notice any taste while swallowing tablet(s)/capsule(s)?	Yes, No
12.	Description of Taste	If yes, how would you describe the taste	Bitter, Sweet, Sour, Others

Results & Discussion

Demographic Characteristics

Out of 682 participants, 19 participants' responses were incomplete or missing, and were not included in the data analysis, and therefore, the final results of 663 participants considered for analysis and outcomes. The mean age of the respondents was 48.3 (15.8) years and the majority of the participants (n=248) were in the age group of 31 to 50 years. Educationally, 44.6% of the respondents were graduates. The **Table 2** presents the demographic characteristics of the study participants (n=663).

The study on medicine administration behaviour revealed that the majority of participants (81.6%) reported swallowing tablets and capsules whole, indicating this as the most common method of intake. The prevalence of the swallowing difficulties among the consumers recruited in two community pharmacies described nearly 5.1% herein.

It has been observed in practice that for patient who have difficulty in swallowing or needs to provide calculated precise dose of tablets, crushing and splitting a tablet or open capsules to administer have been observed. Consequences can be positive or negative based on nature and medicine advised to administer. If not advised, then consequences can be adverse.

Table 2: Demographic distribution of participants (N = 663)

Variable	Category	N (%)
Gender	Male	352 (53.1)
	Female	311 (46.9)
Age group	18–30 years	214 (32.3)
	31–50 years	248 (37.4)
	>50 years	201 (30.3)
Education level	Secondary	143 (21.6)
	Graduate	296 (44.6)
	Postgraduate	224 (33.8)
Income in Rs	Below10,000/-	45 (6.79)
	10,000-20,000/-	223(33.64)
	20,000-40,000/-	245 (37.0)
	40,000-50,000/-	91 (13.73)
	Above50,000/-	59 (8.9)

Use of different liquid as vehicle is reported in our study. Almost all participants (97.7%) used water as the medium for swallowing, while a small proportion (2.3%) relied on alternative liquids, reflecting water as the preferred and safest choice. Temperature and composition of vehicle may alter bioavailability.

More than half of the participants (58.4%) did not experience any difficulty during swallowing, suggesting a generally smooth administration process. Swallowing is a coordinated neuromuscular process with oral, pharyngeal and oesophageal phases which ensured safe passage of content from mouth to the stomach. Any disruption in these phases or physical or mechanical factors can leads to swallowing difficulty.

Tablets and capsules are vary in size as tablets of D tools are bigger in size and B or BB tooling are of smaller in size while capsule size vary 000 to 5 in size. Such tools and preparation links to dose, dose size, and size of unit dosage form. It is characterised by shape, size and dose. In present study most of medicines are large in size consist of 32.6%.

Regarding the amount of vehicle used to administer, about 50 to 60% of all respondents reported that they take their tablet or capsule with less than 100 ml fluid which is less than usually recommended in the summary product characteristics, package inserts and requirement. A significant proportion of respondent took medicine with just sip or gulp of water and 0.3% without any fluid. Concerning to the body positions i.e. posture, most of respondent swallow tablets and capsules either standing or sitting position i.e. upright position. Keeping head forefront natural or inclined. Just 1 respondent reported to change the head and position as on convenience. Majority of the respondent had no taste perception while 15 % reported taste of medicine.

Furthermore, statistical analysis (Chi-Square Test) demonstrated that the association between demographic factors and medicine administration ($p < 0.05$), underscoring the importance of administration practices in facilitating safe and effective medicine administration. Tablet and capsule are different in formulation and administration. A statistical significant result has been obtained between Size of formulation with amount of vehicle consumed (χ^2: 61.10, $P<0.00001$); observed highly significant.

Frequency distribution and Correlation between demographic variables and Medicine Administration Behaviour for each factor is shown in the **Table 3** and **Table 4**.

The objective to carry out this study was to study: behavioural aspects of consumers to administration and factors influencing administration behaviour of solid dosage forms. These data were collected through a self-prepared questionnaire from consumers aged 18 and older in two community pharmacies of Gandhinagar district, Gujarat, India.

This study highlights that medicine administration behaviours in community settings are influenced by both demographic and practical factors. A notable proportion of participants reported swallowing difficulties, consistent with earlier findings by Stagemannet al.[10] and Hummleret al.[16], who demonstrated the impact of dosage form size and patient characteristics on swallowability.

Water as a vehicle was reported by nearly all participants, aligning with Fuchs et al.[9], who showed that sufficient fluid is essential for oesophageal transit. Incorrect posture was identified as a significant contributor to swallowing difficulty, echoing the results of Channer et al.[3] and Osmanoglouet al.[18]

Most of the respondents took their medication as whole or as recommended by their doctor which align with the studies conducted by Hens et al., 2017 that provide us with data regarding safety and efficacy for oral medicines where drugs are orally administered with a standard volume of water. However, in real- life, people will often make use of other drinks or other amounts of drinks to take their medication, mostly with a half glass of liquid or even just a sip to swallow the tablet and/or capsule. The impact of these “real-life” conditions on oral drug behaviour may contribute to inter-subject variability.[12] In the present study, nearly all respondents indicated to take their medication with water, and a small fraction opted milk (2%).

A study from Gallo et al., reported a positive association of successful tablet/capsule deglutition with the volume of water being used. Even if 150 mL or 240 mL are recommended by EMA or the U.S. Food & Drug Agency, respectively.[19,20] However, on an average, when observed in real life setting participants used less than 150mL of water, i.e. an average of 108 mL, to swallow the different tablets. Thus, participants used considerably less water for the deglutition than is generally recommended. In accordance with previous findings[16], we observed that tablet/capsule shape and size were related to the occurrence of swallowing difficulties. The influence of size seemed to be of major importance compared to the one of shape. These findings support the result of this study when observed in older participants. Most of the participants even consumed more amount of vehicle to administer even. Either too little or too more is associated needs corrections. As an explanation, insufficient amount of vehicle could be the reason form complaints while administering the medicine or as a consequences of an existing disease.

Table 3: Responses of medicine consumers

Sr no.	Question and responses	Frequency n (%)
1.	**You take tablet(s)/capsule(s) as _____?(n=663)**	
	As recommended by doctor	87(13.1)
	Crush	3(0.5)
	Split it in half	2(0.3)
	Whole	541(81.6)
	Whole, As recommended by doctor	26(4)
	Split it in half, as recommended by doctor	1(0.1)
	Whole, crush	2(0.3)
	Whole, split it in half	1(0.1)
2.	**What type of liquid do you usually use to take tablets/capsules?(n=663)**	
	Water	648(97.7)
	Milk	7(1.0)
	Water, Milk	6(0.9)
	Water, without water	1(0.1)
	No Liq.Taken	1(0.1)
3.	**Amount of liquid you take with your tablets or capsules:_____(ml)(n=663)**	
	No liquid	2(0.3)
	One sip(10-25)	15(2.3)
	Few sips(25-50)	83(12.5)
	50-99	282(42.5)
	100-149	172(26)
	150-199	87(13.1)
	200-249	20(3.0)
	250-300	3(0.4)
4.	**What type of medicine do you take?(n=663)**	
	Tablets	531(80.1)
	Capsules	60(9.0)
	Both	12(1.8)
5.	**What is the size of the tablet(s)/ capsule(s) you are taking?(n=663)**	
	V. Small	180(27.1)
	Small	98(14.8)
	Medium	111(16.7)
	Large	216(32.6)
	V. Large	58(8.7)
6.	**What is the shape of the tablet(s) /capsule(s) you are taking?(n=663)**	
	Oblong	233(35.1)
	Oval	46(6.9)
	Round	383(57.8)
7.	**You find it___to swallow tablet(s) or capsule(s).(n=663)**	
	Very Easy	81(12.2)
	Easy	387(58.4)
	Neutral	161(24.3)
	Difficult	32(4.8)
	Very Difficult	2(0.3)

Table 3: Responses of medicine consumers (Continue)

Sr no.	Question and responses	Frequency n (%)
8.	**If you experience difficulty swallowing, please describe any challenges you face: (n=34)**	
	Chocking sensation	3 (0.5)
	Coughing sensation	2 (0.3)
	Discomfort in throat	12 (1.8)
	Feels like sticking in chest	2 (0.3)
	Nausea feeling	2 (0.3)
	Reflux	1 (0.1)
	Regurgitation	1 (0.1)
	Vomiting	1 (0.1)
	Chocking sensation, Coughing sensation	1 (0.1)
	Coughing sensation, Feels like sticking in chest	1 (0.1)
	Coughing sensation, Nausea felling	1 (0.1)
	Discomfort in throat, Feels like sticking in chest	1 (0.1)
	Fear of swallowing, Discomfort in throat	1 (0.1)
	Nausea feeling, Discomfort in throat	1 (0.1)
	Vomiting, Discomfort in throat	1 (0.1)
	Vomiting, Fear of swallowing, Discomfort in throat	1 (0.1)
	Fear of swallowing, Reflux	1 (0.1)
9.	**In which body posture you used to take tablet/capsule? (n=663)**	
	Sitting position	309 (46.6)
	Standing position	290 (43.7)
	Sitting, Inclined	3 (0.5)
	Standing, Sitting	60 (9.0)
	Inclined Position	1 (0.1)
10.	**What is your head position when taking tablet/capsule? (n=663)**	
	Declined	19 (2.9)
	Inclined	349 (52.6)
	Natural	285(43)
	Natural, Inclined	9 (1.4)
	Titled or lateral	1 (0.1)
11.	**Do you notice any taste while swallowing tablet(s) / capsule(s)? (n=663)**	
	No	319 (48.1)
	Don’t know	245(37)
	Yes	99(14.9)
12.	**How would you describe the taste of medicine? (n=663)**	
	No taste (n=564) from above Q11.options No & Don’t know)	564 (85.0)
	Bitter	86 (13)
	Sweet	7 (1.0)
	Sour	4 (0.6)
	Metallic	2 (0.3)

Most of the participants even consumed more amount of vehicle to administer even. Either too little or too more is associated needs corrections. As an explanation, insufficient amount of vehicle could be the reason form complaints while administering the medicine or as a consequences of an existing disease.

The volume of vehicle is influenced by the size, type and taste of medicine. Most of time, consumer estimates amount of vehicle based on size and nature of formulation: as size increased amount of vehicle increases or as medicine is bitter in taste amount can increased.

Drug Induced esophageal damage was previously considered to affect mainly patients with gastrointestinal motility disorders. However, it was later discovered that the condition developed by individuals regardless of their swallowing function capability. The volume of swallowed liquid together with swallowing body position help to determine the likelihood of esophageal transit, passage or damage development if any. Various studies confirm that the passage of tablets or capsules to the stomach occurs more swiftly when subjects stand upright regardless of the liquid bolus amount.

Table 4: Correlation between demographic variables and Medicine Administration Behaviour

Stem / Variable		Age	Gender	Education	Income
Medicine Consumption Method	Pearson Chi-Sq.	**77.956**	5.804	**30.434**	10.715
	Sig.(2-sided)	**0.000**	0.122	**0.010**	0.553
	df	**21**	3	**15**	12
Preferred Liquid	Pearson Chi-Sq.	**42.060**	0.754	16.134	3.686
	Sig.(2-sided)	**0.000**	0.686	0.096	0.884
	df	**14**	2	10	8
Amount of Liquid	Pearson Chi-Sq.	**71.969**	**1020.426**	35.968	22.564
	Sig.(2-sided)	**0.018**	**0.000**	0.423	0.755
	df	**49**	**14**	35	28
Medicine Form	Pearson Chi-Sq.	22.842	**226.357**	2.776	**15.962**
	Sig.(2-sided)	0.063	**0.000**	0.596	**0.003**
	df	14	**4**	4	**4**
Tablet/Capsule Size	Pearson Chi-Sq.	**46.650**	**349.813**	**340.083**	7.326
	Sig.(2-sided)	**0.015**	**0.000**	**0.000**	0.966
	df	**28**	**8**	**16**	16
Tablet/Capsule Shape	Pearson Chi-Sq.	**71.619**	**334.283**	5.301	**79.778**
	Sig.(2-sided)	**0.000**	**0.000**	0.258	**0.000**
	df	**4**	**4**	4	**4**
Ease of Swallowing	Pearson Chi-Sq.	**51.104**	**350.250**	**34.389**	17.941
	Sig.(2-sided)	**0.005**	**0.000**	**0.024**	0.327
	df	**28**	**8**	**20**	16
Challenges in Swallowing	Pearson Chi-Sq.	19.678	**26.972**	15.522	8.209
	Sig.(2-sided)	1.000	**0.042**	1.000	1.000
	df	56	**16**	40	32
Body Posture	Pearson Chi-Sq.	**185.434**	1.414	**100.708**	13.008
	Sig.(2-sided)	**0.000**	0.493	**0.000**	0.112
	df	**14**	2	**10**	8
Head Position	Pearson Chi-Sq.	**46.511**	4.518	**24.798**	19.362
	Sig.(2-sided)	**0.001**	0.211	**0.053**	0.080
	df	**21**	3	**15**	12
Taste	Pearson Chi-Sq.	**17.427**	**9.668**	5.696	9.192
	Sig.(2-sided)	**0.015**	**0.002**	0.337	0.056
	df	**7**	**1**	5	4
Description of Taste	Pearson Chi-Sq.	14.650	2.243	15.203	5.908
	Sig.(2-sided)	0.840	0.524	0.437	0.921
	df	21	3	15	12

The research findings by Osmanoglou et al., 2004, aligns with findings of this study.[18] The correlation analysis (Table 3) further revealed an important insight into how demographic factors: age, gender, education, and income related to various aspect of consumers medicine administration behaviour that relate to various aspects of consumer purchasing behavior, that shows in also in study by Sarwinskaet al.[15] who documented similar trends in older adults in Germany. Notably, demographic correlations further emphasized that age, gender, and education influence medicine administration behaviours, supporting previous evidence that physiological changes with aging, health literacy, and social support play critical roles in adherence.[23,24] Moreover, formulation factors; size, shape, numbers and surface coating affected swallowing behavior in healthy subjects.[25] Taken together, these findings reinforce the need for healthcare professionals to proactively screen for swallowing difficulties, educate patients about safe administration, and consider alternative dosage forms when prescribing. A multidisciplinary, patient-centred approach that integrates clinical assessment, pharmaceutical formulation, and caregiver involvement is essential to minimize risks, improve adherence, and optimize therapeutic outcomes in community populations. Additionally, the findings emphasise the role of community pharmacists in patient counselling. Education on swallowing techniques, head positioning, and adequate water intake can minimise administration errors and improve adherence.

There are certain limitations of this study: the participants were recruited via two pharmacies, limiting the ability to extrapolate finding more generally. Nevertheless, the information is valuable. The number of people approached in the pharmacy was not recorded, so it is not possible to calculate response rate. Researcher were refrain to ask and evaluate any head or neck issue or bed ridden condition that may lead to an underestimation or bias of the study due to missing information. Not included modified form of dosage form within the tablets and capsule.

Conclusion

In conclusion, swallowing and administration behaviour are influenced by demographic, economic, and practical factors. Respondents administered Tablets and capsules with little amount of liquid with different body and head position lead to complaints while swallowing the medicines. It is recommended that package inserts or patient medicine information leaflet of medicine should provide information about the medicine administration with precise volume of liquid and position in which medicine should administered. Health care professional should be more assertive. Pharmacist intervention is vital to improve consumer behaviour, correct swallowing techniques, posture awareness, and rational medicine use. Strengthening public education in these areas may enhance adherence and ensured successful passage of tablets or capsule through oesophagus for therapeutic outcomes.

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Conflicts of Interest

The authors declare no conflicts of interest.

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