PREFERENCE OF DOSAGE FORM AMONG PEOPLE OF KARACHI, PAKISTAN: A CROSS SECTIONAL STUDY

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Abstract

As need of Dosage form is essential not only to treat diseases but also improves patient compliance the most widely available dosage forms are tablets and capsules. Patient have poor compliance to these Dosage forms as they faced problems of dysphagia and vomiting due to bitter taste. Geriatrics and Pediatric populations suffered a lot due to these problems however adult, geriatric and pediatrics prefer liquid Dosage form but one of the major drawback is its bad taste and dose inaccuracy. Pharmaceutical scientist to cope such problem formulated dispersible tablets and medicated lollipops to enhance all age's patient's comfort. The basic aim of this study is to highlight the problems faced by the general populations regarding dosage forms and to highlight the risk of dose ineffectiveness which occurs due to splitting, crushing, chewing or by taking the solid dosage forms such as tablets or capsules with milk or other beverages. A questionnaire based survey were prepared through Google form and link of the questionnaire were send to the people through Whatsapp. Data were analyzed by using SPSS version 25. A total of n= (123) participants respond the survey. Results showed that syrups are the most preferable dosage form for pediatrics and geriatrics however their bitter taste was intolerable, stability issues arises a lot in liquid dosage form as antibiotics are more prone to bacterial growth and hydrolysis. As injectables provides hundred percent bioavailability of the drug but patients feel pain at the site of injection and chances of side effects occurs which cannot be minimized as intravenous route is irreversible. However the popularity for dispersible tablets and medicated lollipops are increasing day by day as it increase patient compliance and provides pleasant feel in the mouth. This study also highlighted the importance of pharmacist to guide patients regarding dosage form intake without crushing, chewing and split the tablets, switching towards another dosage form and while taking the drug with milk or beverages. Although there are still the needs of dosage forms that increase patient comfort with minimal side effects and stability issues.

Index Terms- Dosage forms; Preference; Geriatrics; Pediatrics; Dysphagia

1. INTRODUCTION

As tablets and capsules are the most widely used dosage forms because they are cheap and release active pharmaceutical ingredient in more appropriate way but their acceptability among pediatric and geriatric patient is low. (1). At present time several endeavors are devoted to pediatric pharmaceutical advancement to ensure high-quality medications for children and their acceptability by them (2). As major focus of pharmaceutical industries are their standard patient while developing the new product special consideration needed when developing the dosage form for pediatric and geriatric patient (3).As pediatrics ranges from neonates to adolescence(0-16 years) commonly dosage forms that can be taken by these population are tablets, powders, solutions, suspension and syrups (4). Elegance and palatability these are the factors that need to be considered while giving dosage form to pediatric population children usually resist to take bitter medications (5). The most suitable dosage form for younger newborns and for children's who has difficulty in swallowing is liquid oral dosage form which are not only palatable but the dose can be easily adjusted as per requirement (6). As there are many issues with liquid dosage form as their stability, taste masking difficulty and the presence of these excipients benzyl alcohol and propylene glycol are not suitable for neonates and children (7) and liquid dosage are expensive per unit dose(8). The most widely available dosage forms around the world are for adult population's (9). The lack of pediatric-specific formulations are due to less clinical data on pediatric patients, clinical studies conducted mostly with adult patient(10). For many years children's have been described as

therapeutic orphans(11) .Solid dosage forms like tablets need to be crushed and mixing of contents of capsule in juice and food results in inappropriate dosing and bioavailability (12). As orally disintegrating tablets are the formulation approach that can increase the bioavailability of the drug and provide rapid onset of action as the drug dissolve in saliva and its taste and favour added in the formulation enhances the acceptability of the dug by patients (13) another approach is the formulation of flexible granules or pellets or powder formulation that can be swallowed directly or either mixed with small amount of water (12). In the last few years efforts have been made to developed child friendly dosage form which includes multiparticulates and dispersible formulations (14). Oral liquids, mini-tablets, chewable tablets and orodispersible are pediatric specific drug delivery systems. The acceptability of such dosage forms within the pediatric population, with small flexible solid oral dosage forms including mini- tablets found to be at top(15). The main aim of this study is to identify the preferable dosage form among people and children's, geriatrics in Karachi, Pakistan and the problems faces by them.

2. Methodology and Data Collection

This study was conducted in Karachi, Pakistan. A Questionnaires were prepared by using Google form platform link of which was circulated to the participants through mail and Whatsapp. Data collected period were May 2022-January 2023. Language of the questionnaire were English. The study participants included were male, females, children and geriatrics. Guardian and Parents were allowed to fill the survey form on behalf of their children's and Geriatric patients that was not able to fill the form by themselves.

3. Statistical Technique

Data were analyzed by using Spss software version 25

4. Results

Total of n= (123) responses were recorded. Participants included were of different gender and age wise. Respondent age below 5 n= (1), respondent age between 13-18 years n= (18) were females, n= (03) males. Age between 15-25 years were n= (02) females. Age between 18-29 years were n= (44) females and n= (31) males. Participants between 26-45 years n= (2) were females. Participants with age 30-45 years were n= (11) females and n= (06 males). Responded with age between 45-60 years were n= (1) female and n= (4) males. Results from the survey showed that majority of the respondent n= (101) (85.6%) prefer oral administration of drug over parenteral which was preferred by n= (23) (19.5%) participants. The preference of dosage form among responded were included n= (85) (69.1%) Tablets, n= (27) (22.9%) capsules, n= (48) (40.7%) syrups, n= (15) (12.7%) suspension, n= (6) (5.1%) Emulsion, n= (8) (6.5%) preferred granular powders Dosage form. Opinion of participants were collected regarding the preference of Dosage form for pediatrics most of the participants n= (99) (84.6%) were considered syrups as their choice of Dosage form, n= (12) (10.3%) tablets for pediatrics, n= (4) (3.4%) considered capsules, n= (10) (8.5%) preferred oral dispersible tablets for pediatrics, n= (8) (6.8%) for oral powders, n= (1) (0.9%) preferred suspension and only n= (1) (0.9%) considered injectable. For geriatric point of view respondent preferred n= (72) (62.6%) syrups, n= (26) (22.6%) for tablets, n= (16) (13.9%) capsules, n= (23) (20%) preferred oral dispersible tablets for geriatrics, n= (19) (16.5%) consider powder as dosage form and only n= (3) (2.4%) preferred injectable. Respondent were asked to elaborate the common problems they face while taking solid Dosage forms such as tablets and capsules n= (107) (86.9%) faced Dysphagia while taking tablets and capsules as dosage form, n= (7) (6.1%) faced problem of cough while taking solid Dosage form, n= (49) (42.6%) feels bad taste and only n= (33) (28.7%) feels vomiting. Problems highlighted by respondent while taking liquid dosage form n= (121) (98.3%) compliant bitter taste of the drug, n= (19) (16.5%) feels uncomfortable feeling, n= (12) (10.4%) feels irritation, n= (8) (7%) feels coughing. Common problems that were faces by participants while taking injectable or parenteral administration n= (92) (74%) feels irritation in vein, n= (48) (40.7%), n= (7) (6.3%) embolism, n= (69) (62.2%) pain at the site of injection while taking intramuscular injection. Participants also responded about the modification they usually do when they were taking undesirable dosage form n= (60) (48.7%) were split the tablets in to pieces, n= (25)

(22.3%) were dissolve tablets in water, n= (10) (8.9%) chewed the tablets, n= (18) (16.1%) take the tablets with milk to mask bitter taste. Participants n= (75) (67%) believed that water dispersible tablets are more attractive than syrups and capsules. n= (71) (61.7%) participants were aware regarding medicated lollipop that can be given to the pediatrics to treat Diarrhea and cough. Participants n= (92) (74.7%) never asked the doctor to change the dosage form of their choice and only n= (22) (19.3%) asked the doctor for prescribing the Dosage form of their choice while n= (91) (80.5%) preferred Pharmacist to discuss about the change of Dosage form while n= (22) (19.5%) don't consult pharmacist.

Figure 1:

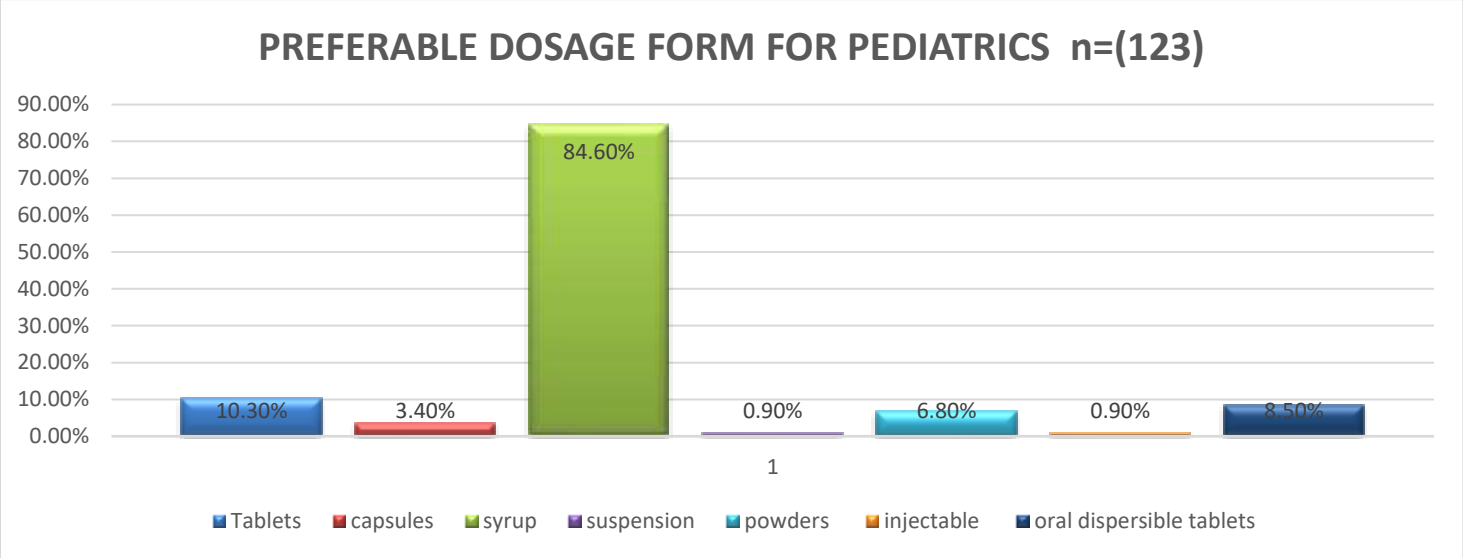


Figure 2:

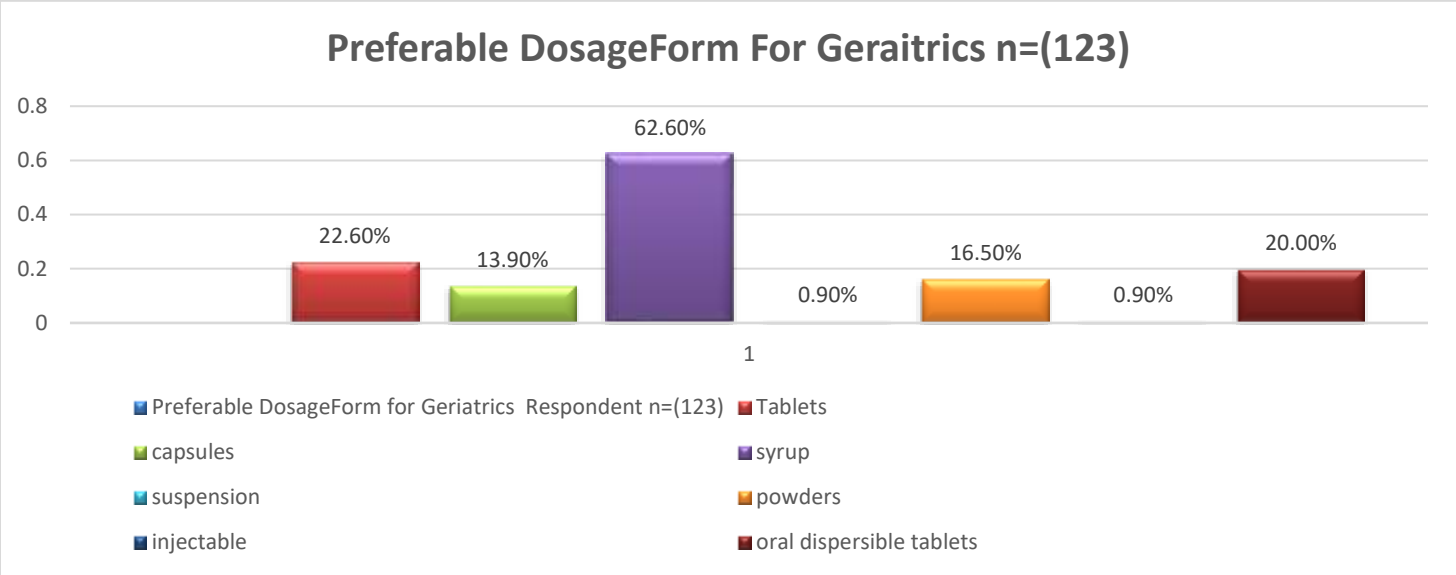


Figure 3:

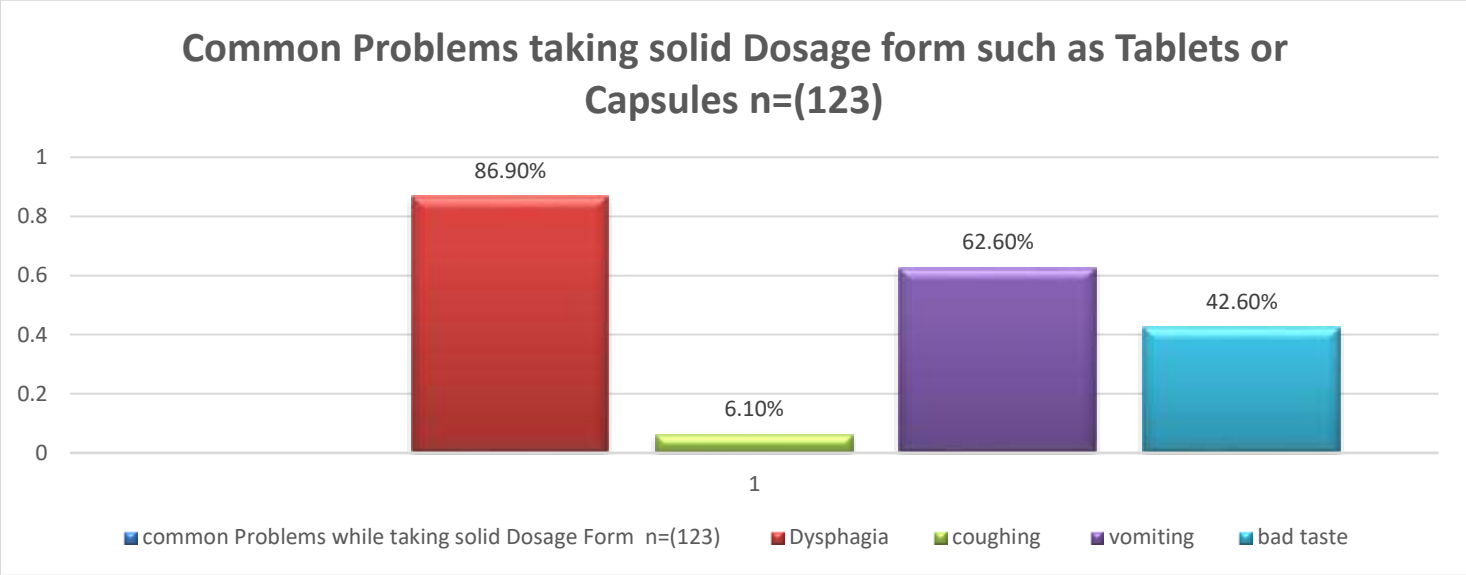


Figure 4:

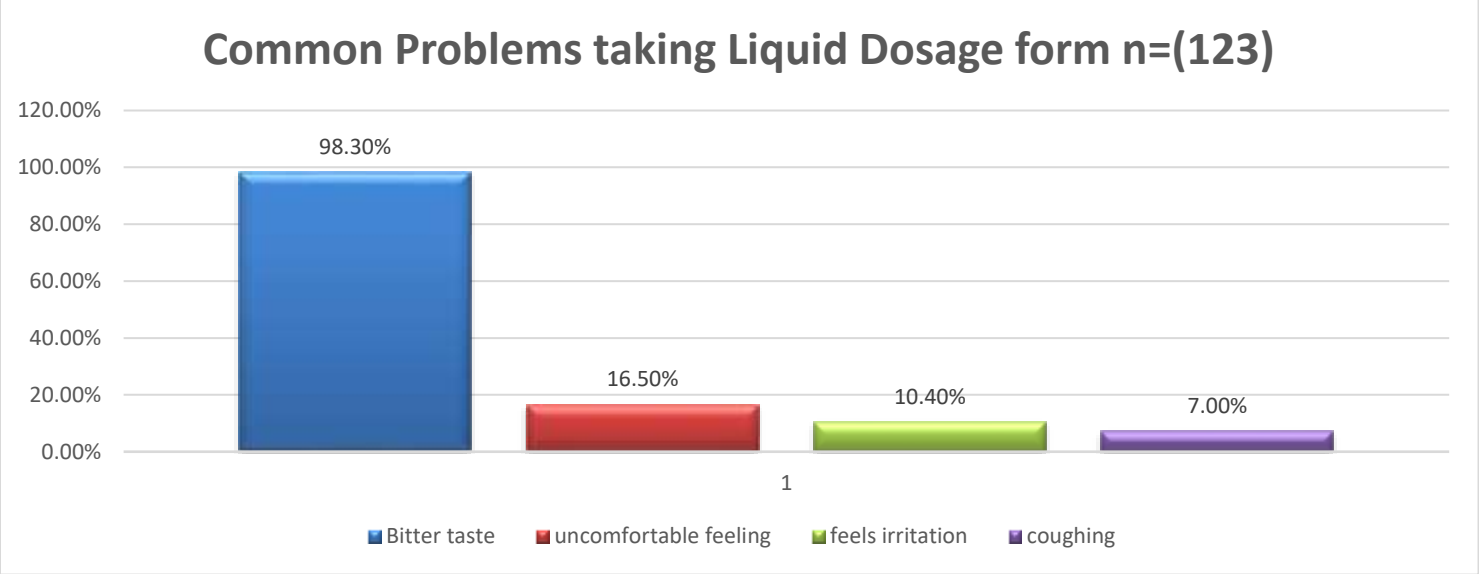


Figure 5:

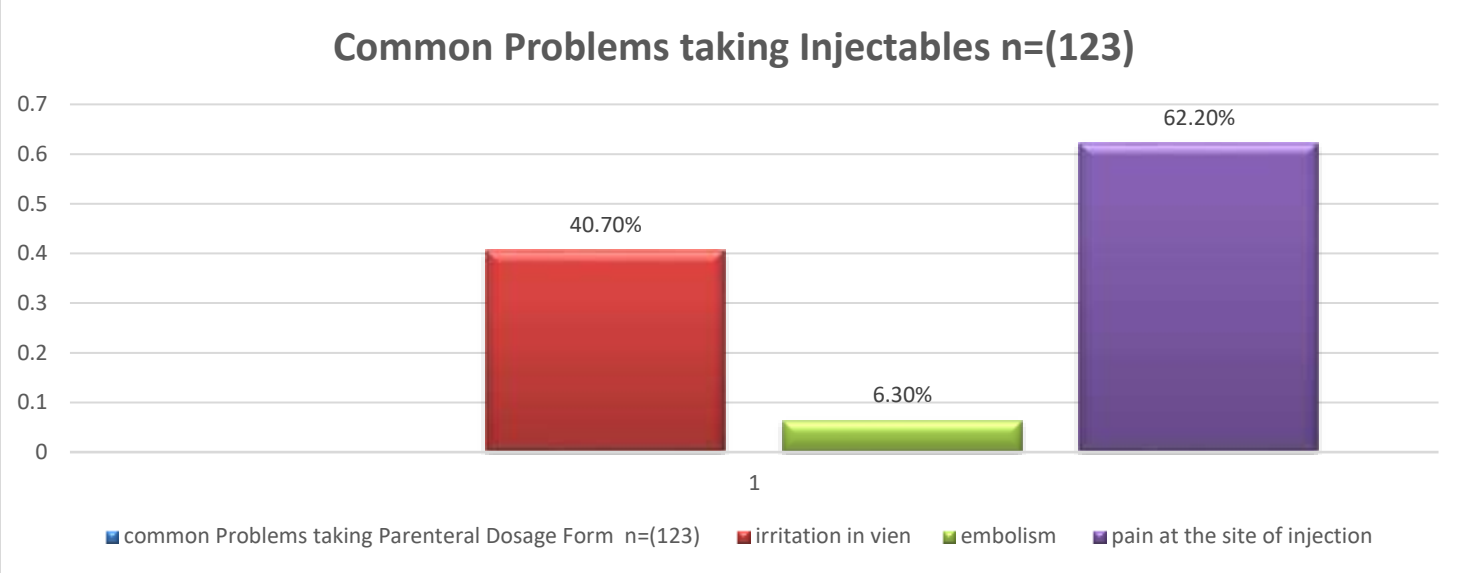
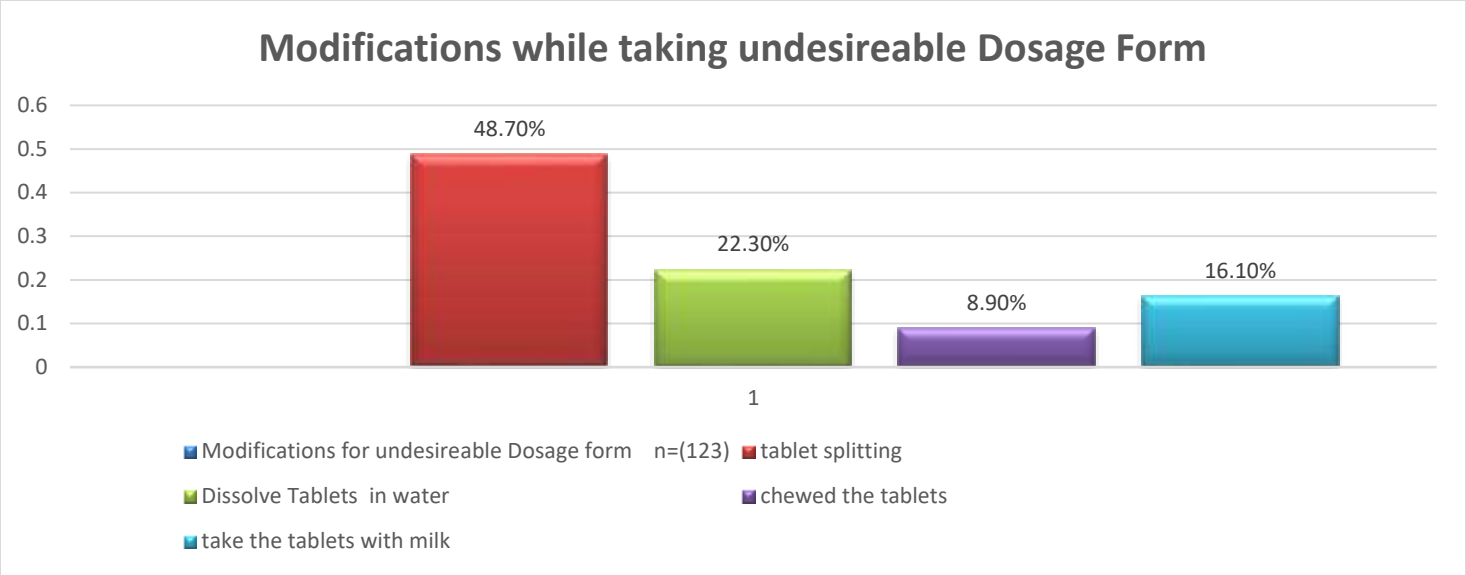


Figure 6:



5. Discussion

As cautious and most suited drug administration is oral route as it not only reduces the cost of need of health care professional. It increase the patient compliance and is most suitable for repeated and long term use (16). In this study most of the participant's preferred oral route than parenteral route of administration. As for many years the most agreeable dosage form in oral route is syrup and suspension (17) .In this survey majority of the respondent preferred this dosage form as this liquid dosage form is most agreeable choice for pediatrics and geriatrics as well as shown in **figure 1 and 2** . Most of the population including adults, geriatrics and pediatrics taking medication in the form of tablets and capsules however the common problems faced by the general population regarding tablets and capsules is Dysphagia(18). In our study majority of the participants complain about difficulty in swallowing while taking solid dosage form than syrup or liquid dosage form as shown in **figure 3**. Elderly patients due to hand shaking and difficulty in swallowing and children's are uneasy and uncooperative to take tablets or capsules due to their underdeveloped muscular and nervous system (19). Another problem that highlighted in reading liquid dosage form possess bad taste, portability and refrigeration issues (20). In this study majority of the participant complain about the bad taste of liquid Dosage form as shown in **figure 4**. In this study majority of the participants donot prefer parenteral route as this route produces pain at the site of injection, this route drug is irreversible produces side effects in case of dose negligence, produces risk of embolism (21) **figure 5.** It is most ordinary to use whole tablets but it can be divided in two half's that can be given to elder and young patient to reduce their swallowing discomfort and to achieve the lowest dose (22). The uneven breakage of the tablet can lead to the dose non-uniformity that requires to produce clinically significant therapeutic activity in this study respondent break the tablets in to half's without being aware of dose uniformity. A recent study shows that Pilomet tablets splitting device can split the tablets more accurately than by hand or using kitchen Knife (23). Crushing or chewing the tablets imparts their therapeutic inefficiency as in case of enteric coated tablets chewed or crushed or chewed by the patient can result in their degradation by the acidic pH of the stomach (24) in this study fewer participants responded that they crush or chew the tablet to prevent dysphagia. Many patients take different beverages and milk to cover drug bitter taste and improve swallowing of tablets (25) however these beverages and milk can lead to the ineffectiveness of the

drug such as tetracycline it has been observed that patient unable to take drug intact open the capsule content or split the tablets before administration which is a wrong practice (26) as shown in **figure 6**. Recent advances has been made in the pharmaceuticals in the production of orodispersible tablets or water dispersible tablets which disperses in the mouth or water to be taken by the patient without difficulty in swallowing which improves patient compliance with pleasant mouth feel (27). In this study majority of the participants appreciated dispersible formulations than syrup as they provide dose accuracy and pleasant mouth feel which is difficult to achieve from liquid Dosage form. As syrups due to their bitter taste and undergoes first pass extensive liver metabolism and requires frequent dosing which result in resistance of taking medicines from pediatrics (28). These challenges can be overcome by formulating medicated lollipops as these lollipops are sugary base, sweet and colored available to treat fever, cough, diarrhea and bacterial infection these medicated lollipops increases the bioavailability by avoiding fist pass metabolism of the drug(29). In this study majority of the respondent were aware to utilize this dosage form to treat diarrhea for their children's during travelling. The basic aim of this study is to highlight the importance of Dosage forms, problems faced by the population to different dosage forms and enhancing the knowledge that tablet splitting, crushing is not suitable. People either adult, geriatric and pediatrics guardians must discuss the doctor or Pharmacist regarding switching to the other dosage form or while taking it with any beverages or milk.

6. Conclusion:

Dosage forms are designed to enhance patient comfort tablets and capsules are not liked by the geriatrics and pediatrics due to bad taste and fear of lodging in the throat however these dosage form provides dose accuracy as compared to syrups or liquid dosage forms which is preferred by these populations due to no dysphagia. Injectables are more painful and increase patient discomforts however recent advancement in dispersible tablets and medicated lollipops increases patient confidence in case of repeated doses. However further advancement in pharmaceutical dosage forms needed to meet patient requirements.

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