



Awareness on Concentration of Saccharides in Drugs among College Students - A Questionnaire Based Survey

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Authors' contributions

This work was carried out in collaboration among all authors. Author SB designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors VVP and RG managed the literature search and analyses of the study. All authors read and approved the final manuscript.

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ABSTRACT

Sugar is used in medicine for coating, adding volume or texture, and flavouring the medicine. It can also act as a preservative and antioxidant. Sucrose is often used in medications to impart a more pleasant taste to often unpalatable chemicals. Sucrose can be found in many medicinal forms such as chewable tablets, syrups and lozenges. The aim of the study is to create awareness on concentration of sugar in medicines among college students. A survey was administered through survey planet link with sample size 100. The questionnaire consisted of 14 questions based on awareness on concentration of sugar. In the present study majority of the participants felt addition of sweeteners in syrups and tablets should be decreased. Adults and children who are administered to long term medicines are prone to caries and other health

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problems. Chronically ill children are exposed to a greater sugar load from oral medications than healthy children leading to a greater risk of developing caries as a side effect of the treatment. Awareness may be created on the concentration of sugar in medicines and its deleterious effect on health.

Keywords: Sugar; sucrose; dental caries; online survey; survey planet.

1. INTRODUCTION

The pharmaceutical industry uses sugar, mainly sucrose in large quantities in their tablets and syrups. These sucrose is a cheap and good taste carrier substance. This application of sugar is reflected in an expression such as 'an apothecary without sugar'. In ancient times the medicines used to be sweetened with honey later replaced by sugar. Only a minute fraction of people, few physicians, dentists, pharmacists and only a few patients were aware of the quantities of hidden sugar in medicines. The medicines where sugar is present are antacid tablets, vitamin tablets, cough and antibiotic syrups, cough drops and lozenges. Cough syrups and throat lozenges as well as vitamin tablets are used mainly for paediatric use and have a mean content of 50% approx and syrups have sucrose 55% which ranges from 10% to 80%. There is an abundant use of non prescribed medicine for self medication. This should be a concern as they consume medicines according to leaflet instructions which instruct them to have frequently in small quantities. The oral microorganisms are thus provided with required sugar which leads to dental plaque [1].

The role of sweeteners in pediatric medications is generally related to compliance. Medication compliance in pediatric patients ranges from 11% to 93% and oral medications with poor palatability may lead to non-compliance which may have a direct influence on the success and efficacy of the treatment. To overcome the palatability issues, drug manufacturers add sweeteners and flavoring agents to mask the original taste and smell of their formulations [2]. Natural sweeteners include monosaccharide carbohydrates like glucose and fructose, disaccharide carbohydrates like sucrose and lactose, and polyols carbohydrates also known as sugar alcohols like sorbitol, xylitol, mannitol, lactitol, and maltitol [3]. Artificial sweeteners include saccharin, cyclamate, aspartame, and sucralose. They are referred to as high-intensity sweeteners because they sweeten with little

volume however these artificial or nonnutritive sweeteners offer no energy [4].

Chronically ill children are exposed to a greater sugar load from oral medications than healthy children leading to a greater risk of developing caries as a side effect of the treatment for their medical condition. The association between sugar-based syrups and dental caries has been reported, especially if medications are administered at bedtime where studies report a reduced protective buffering and cleansing effects of saliva due to a fall in the salivary flow rate [5]. As a drug class, analgesics and antibiotics were most likely to contain sweeteners with a high cariogenic potential. Psychotropic and respiratory preparations, on the other hand, were less likely to contain sweeteners with high cariogenic potential [6]. In a study the children in Tubarao, South Brazil and their liquid oral medicines are being assessed. Pre-prepared questionnaire was circulated among pharmacists in order to know the most sold and most prescribed paediatric medicine. These medicines were analysed and it was found that more than 70% of medicines contained sugar in their ingredients [7]. Cariogenicity which are often seen to be as drug associated effects because the sugar content of the medications may be negligible compared to overall dietary intake. In this study it is found that over 50 liquid oral medicines prescribed sugar in varying amounts about 4 grams per dose is found. These patients may be at increased risk of caries and associated oral health consequences [8]. Syrups and chewable tablets are commonly used in elderly people. These medicines may threaten their dental health if they contain acidogenic sugars and are consumed in the long term. Three surveys were conducted to know the numbers of prescription and quantities prescribed [9]. Most paediatric medicines are prescribed in a liquid form that includes sugar in the formulation. By clinical and experimental basis it shows a significant association between intake of sucrose based medication and increased occurrence of dental caries. The medical and dental professionals should be aware of problems related to sucrose based

medications [5]. In absence of sugar, little decay is found when sugar is consumed for a prolonged period then caries increase its occurrence [10]. Previous studies on cancer biology, nano materials, herbal products [11,12,13,14,15] have motivated me to pursue this current research which is useful to our community. The aim of the study is to create awareness of sugar level in drugs among college students. To know how many people are aware of this hidden sugars in medicines and to create awareness on the consequences of consuming them.

2. MATERIALS AND METHODS

A self structured questionnaire consisting of 14 questions was prepared based on awareness of sugar level in drugs and was circulated among college students. The sample size of the study was 100 and results were tabulated accordingly.

The survey was administered to participants through an online survey planet link. Participants were explained about the study in detail. The study was approved by the Institutional Review board, Saveetha Dental College. The data was collected and statistically analysed. Output variables were represented by pie charts.

3. RESULTS AND DISCUSSION

The result of this survey reflects the awareness of sugar level in drugs among college students. The graph representing Figs. 1 to 13 are the responses from the participants participated in the survey. In the present study it shows that 30% of participants were aware that addition of sweeteners in syrups and tablets should be decreased and 72% preferred that it should remain the same. 65% of the participants were aware of the sugar free tablets and the remaining 35% were unaware of the sugar free tablets.

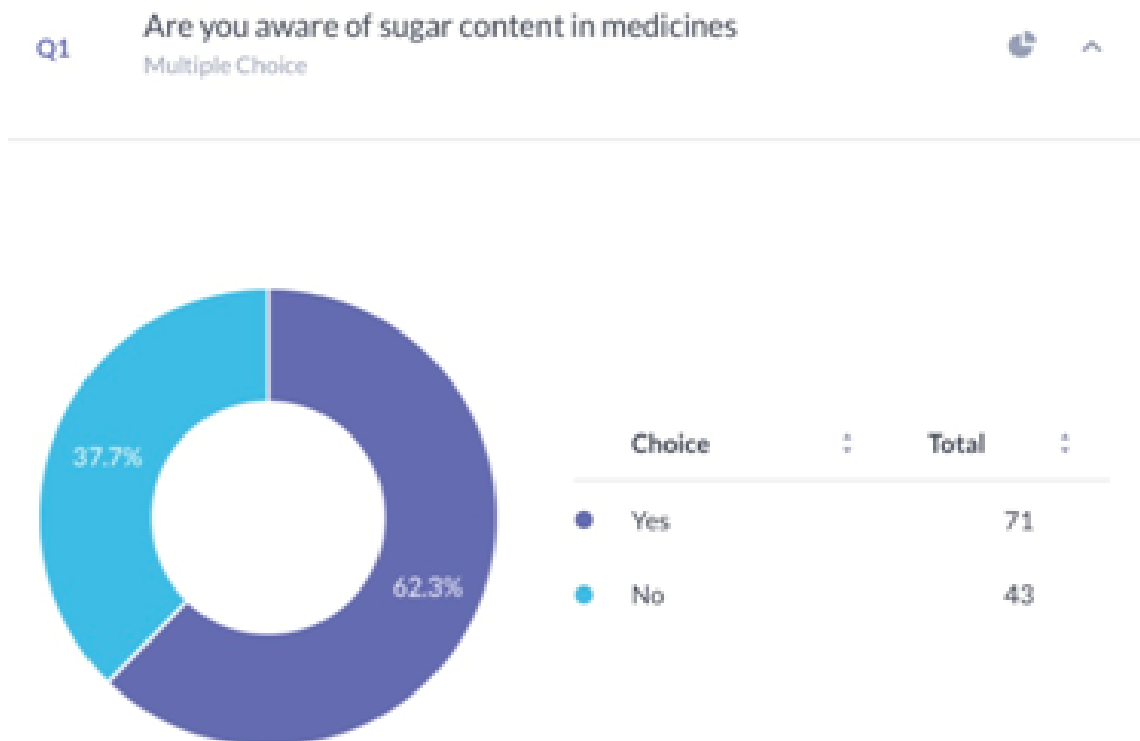


Fig. 1. This pie chart represents the percentage distribution of the respondents on their awareness of sugar content in medicines. Majority of the participants were aware (62.3%) and the remaining were unaware (37.7%)

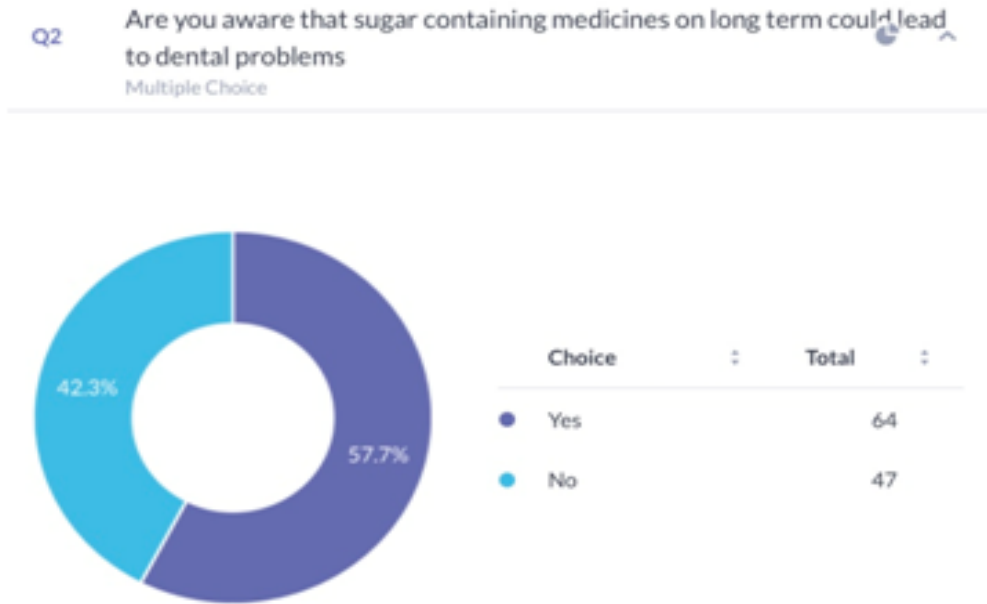


Fig. 2. This pie chart represents the percentage distribution of the respondents on their awareness on consumption of sugar containing medicines that lead to dental problems. Majority of the participants were aware (57.7%) and remaining were unaware (42.3%)

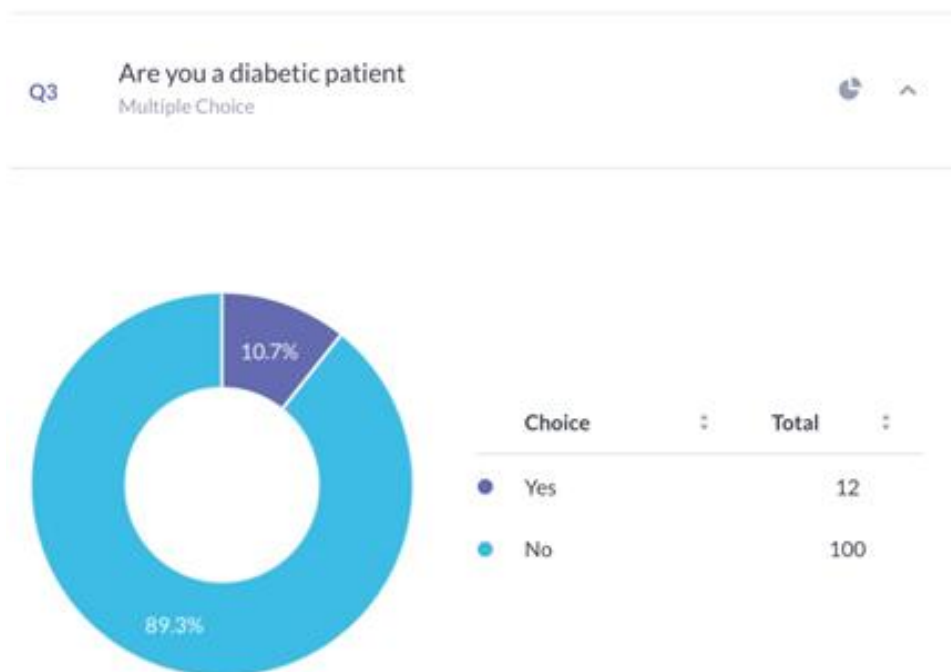


Fig. 3. This pie chart represents the percentage distribution of respondents who are diabetic patients. Majority of the patients were not diabetic (89.3%) and the remaining (10.7%) were diabetic patients

Q4 Addition of sugars in tablets and syrups affect which age group the most
Multiple Choice

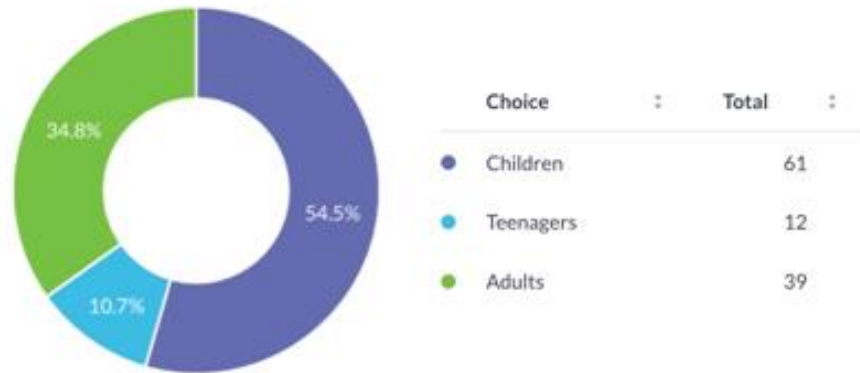


Fig. 4. This pie chart shows the percentage distribution of the respondents on their awareness on which age group gets affected the most. Majority of the participants opted for children (54.5%), adults (34.8%) and teenagers (10.7%)

Q5 Do you think there is presence of sugar in supplementary tablets
Multiple Choice

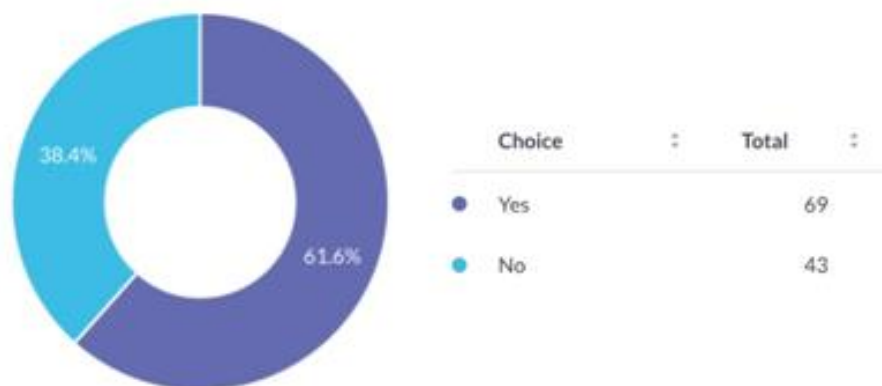


Fig. 5. This pie chart shows the percentage distribution of respondents on their awareness of the presence of sugar in supplementary tablets. Majority of the participants are aware (61.6%) and the remaining were unaware (38.4%)

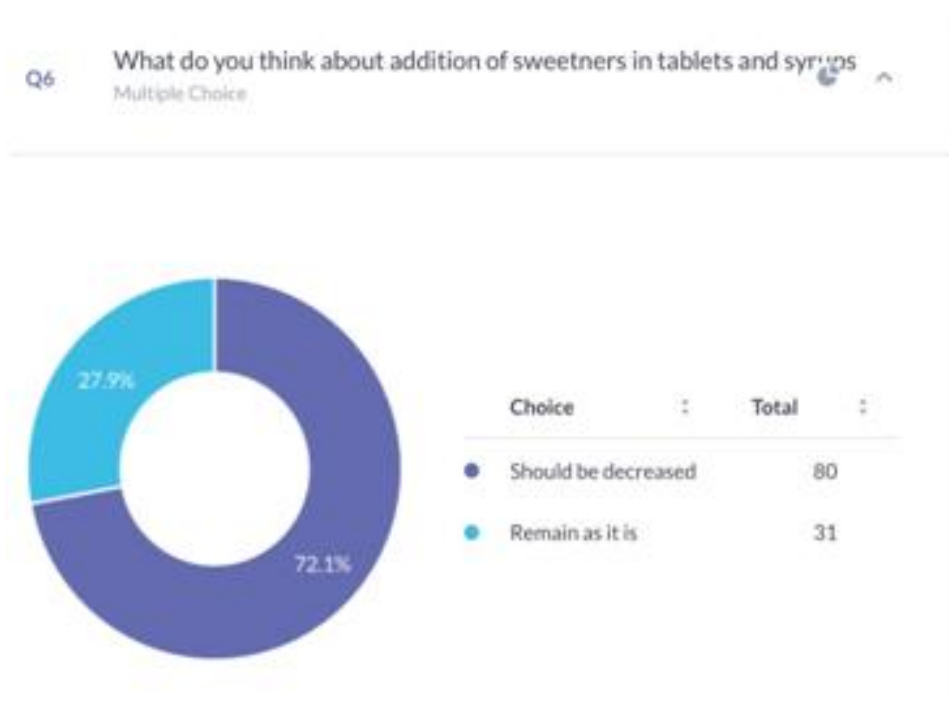


Fig. 6. This pie chart shows the percentage distribution of the respondents on their thoughts about addition of sugars in medicines. Majority of the participants feel it should be decreased (72.1%) and the remaining feel it should remain it is (27.9%)

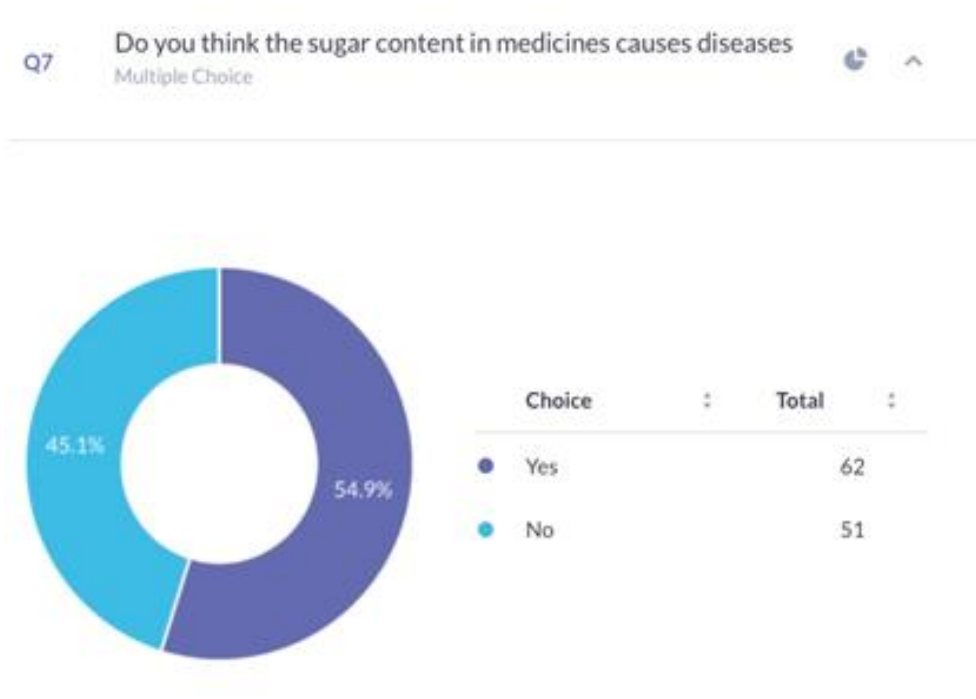


Fig. 7. This pie chart represents the percentage distribution of respondents on their awareness of sugar content in medicines causing diseases. Majority of the participants approved (54.9%) and remaining disapproved (45.1%)



Fig. 8. This pie chart represents the percentage distribution of the respondents on their awareness of sugar free tablets. Majority of the participants were aware (65.2%) and the remaining were unaware (34.8%)

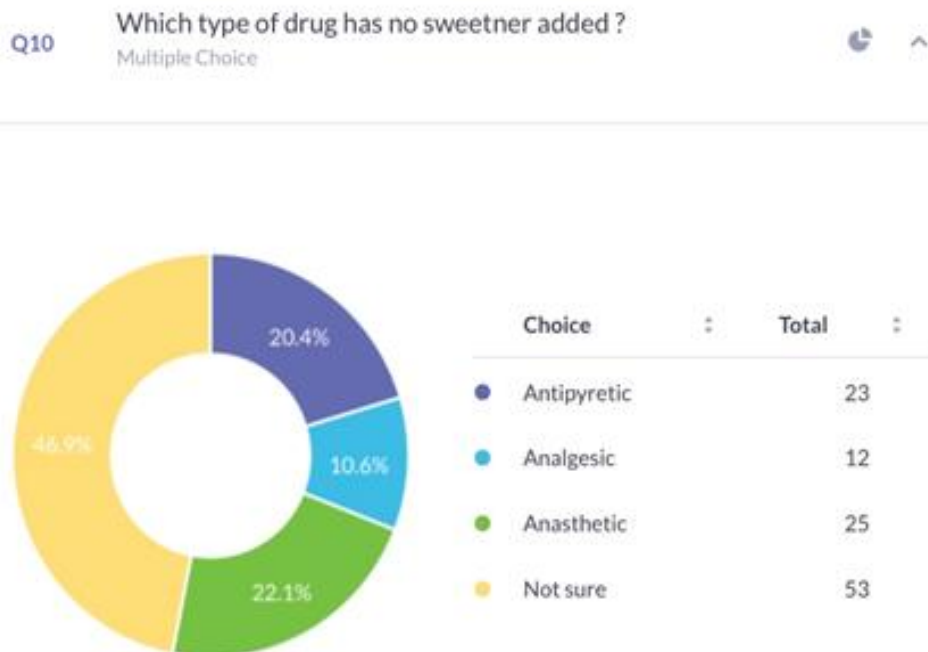


Fig. 9. This pie chart represents the percentage distribution of the respondents of awareness on which of the following drugs has no sweeteners. Majority of the participants were not sure (46.9%), anesthetic (22.1%), analgesic (10.6%) and antipyretic (20.4%)

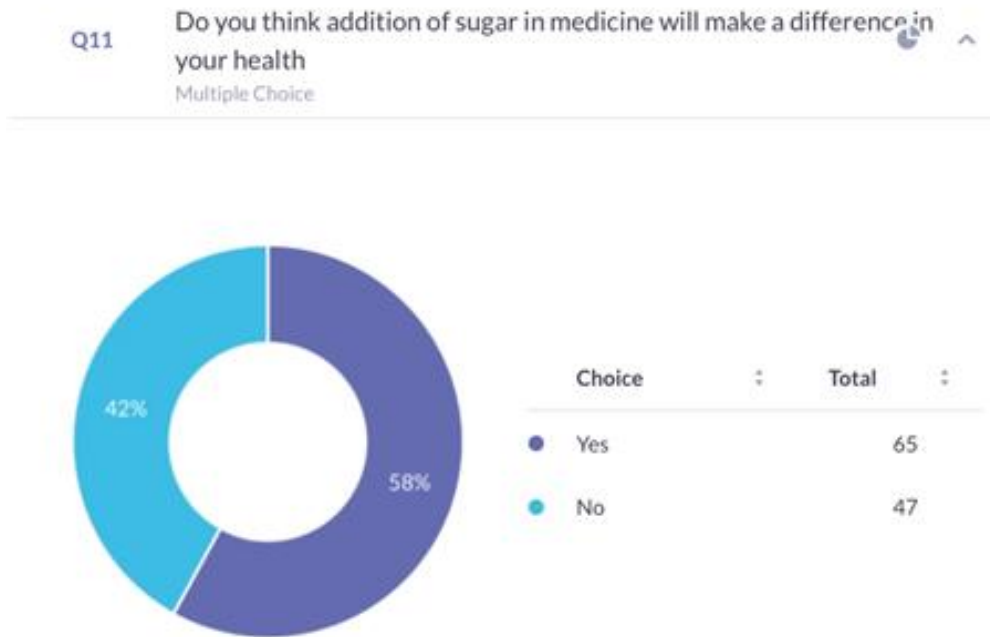


Fig. 10. This pie chart represents the percentage distribution of respondents on their awareness of sugar making difference in health. Majority of the participants were aware (58%) and the remaining were unaware (42%)



Fig. 11. This pie chart represents the percentage distribution of respondents on their awareness on diseases and side effects. Majority of the participants were aware (50.5%) and the remaining were unaware (49.5%)

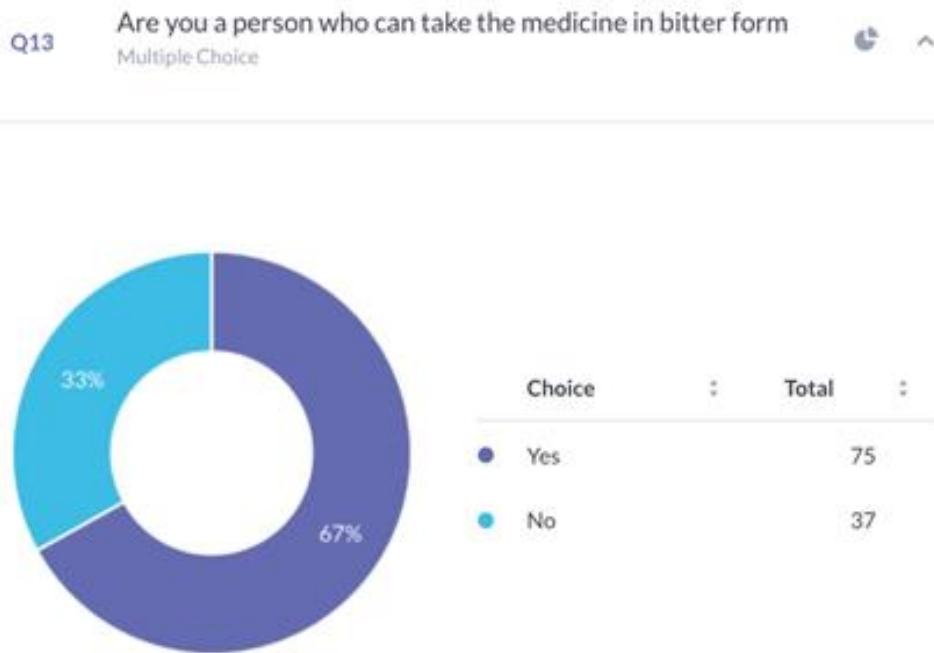


Fig. 12. This pie chart represents the percentage distribution of respondents who can take bitter medicine. Majority of the participants approved (67%) and remaining disapproved (33%)

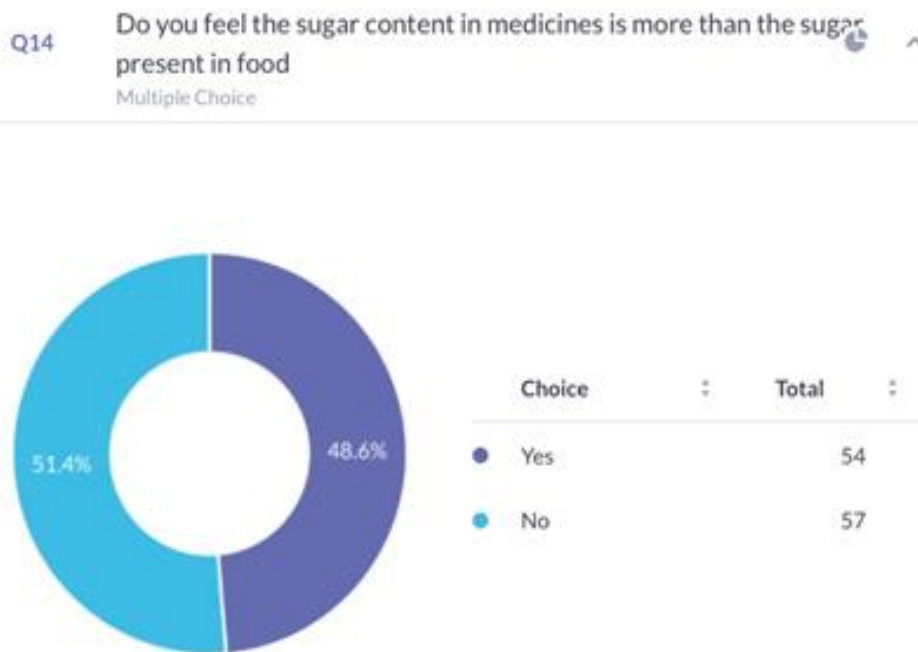


Fig. 13. This pie chart represents the percentage distribution of respondents on their awareness of sugar content in food less than sugar content in medicines. Majority of the participants were unaware (51.45%) and the remaining were aware (48.6%)

4. CONCLUSION

Any pharmaceutical formulation with a pleasing taste would definitely be preferred and would translate into better compliance and therapeutic value for the patient and more business and profits for the company. Awareness of added sugar within the formulations virtually will guide to determine the dosage of medicinal syrups for long term treatment in elderly, in diabetic and overweight patients and even in the kids. It has been widely added to antibiotics and other paediatric medicines to be able to improve palatability. It is thus especially the ones chronically ill, who acquire an extra sugar load from liquid medicinal drugs than healthy youngsters do and consequently have excessive caries prevalence.

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline participant consent and ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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