
A Study of Diabetic Customers' Responses to Sugar Substitutes in Pune City

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ABSTRACT

The word diabetes is becoming very common in all walks of life these days. With long working hours, food habits, sleeping hours, less or no physical activity, etc., people are more prone to have diabetes. According to International Diabetes Federation's Diabetes Atlas, around 5 million adult deaths were caused because of diabetes in 2015. This number is expected to rise in near future, if the disease is not treated properly. Diabetic people who have sweet tooth cannot resist themselves from having sweet food, which should rather be avoided. Here comes the role of sweeteners – sugar substitutes. Now-a-days, the number of diabetics is increasing, so also the sweetener (sugar substitute) manufacturing companies. This study highlights the customers' preferences regarding the sugar substitutes and also helps to understand the impact of advertisements on the buying behavior of the customers. Present study examines the responses of diabetic patients in Pune city for which data was collected from 250 diabetic patients from Pune Municipal Corporation area. Findings revealed that advertisements of the sugar substitutes influence the buying behaviour of the customers and it was also found that large number of respondents preferred artificial sugar substitutes. The findings of the present study can help the sugar substitute manufacturing companies in production and marketing of the preferred sugar substitutes. This study will help people in knowing the availability of different sugar substitutes in the market.

Keywords

Diabetes, diabetic patients, customers, response, preference, sugar substitute (sweetener), artificial sugar substitutes, natural sugar substitutes, advertisements, buying behaviour

INTRODUCTION

Customers play an important role in the market. Marketing of any product is done by keeping in mind the customer as a priority. Marketing strategies change according to the changes in the demands of the customers. If a product fulfills the demands and expectations of the customers, then only the company producing the product can hope for customer loyalty towards the product. A good customer response is considered as an asset for an organization or a company.

BACKGROUND OF THE STUDY

Diabetes is one of the major causes of deaths across the world. Diabetes adversely affects the whole body of a person, if not treated properly and on time. Diabetic people with sweet tooth suffer because of the restrictions on sugar intake. Now-a-days, there are many sugar substitutes available in the market. People use these sugar substitutes as an alternative for sugar. Pune is one of the leading cities in Maharashtra, India. Development leads to prosperity as well as stressful lifestyle which affects health of an individual, which can lead to diseases like diabetes. It was important to know the responses of diabetic people in Pune city about the sugar substitutes (sweeteners) available in the market and if advertisements of the sugar substitutes influence the buying behaviour of the people or not.

STATEMENT OF THE PROBLEM

Now-a-days, markets are filled with various kinds of sugar substitutes (sweeteners) which are as sweet as or slightly sweeter than sugar but do not affect the blood-sugar levels drastically. Looking at the increasing figures of diabetic patients, it was, therefore, necessary to know to what extent diabetic people are using these sugar substitutes (sweeteners). As these sugar substitutes (sweeteners) are artificial as well as natural (organic), it was important to know the preferences of diabetic people regarding the type of sugar substitutes (sweeteners).

OBJECTIVES OF THE STUDY

1. To know preferences of people regarding sugar substitutes.
2. To know the impact of advertisements of sugar substitutes on buying behaviour of people.

HYPOTHESES

Hypothesis 1

H_0 : Customers do not prefer artificial sugar substitutes more than natural sugar substitutes.

H_1 : Customers prefer artificial sugar substitutes more than natural sugar substitutes.

Hypothesis 2

H_0 : Advertisements of the sugar substitutes do not influence the buying behavior of the customers.

H_1 : Advertisements of the sugar substitutes influence the buying behavior of the customers

RESEARCH METHODOLOGY

For this study, a survey was administered on the sample by using a structured questionnaire. The sample size of the study was 250. The researcher has taken the proportionate figures of diabetics from Pune Municipal Corporation area. According to the population in each region, the researcher has divided the sample and collected the data.

Table 1. Population and Sample size

Sr. No.		Region	Population	Diabetics	Sample
1		Maharashtra	11,23,74,333	46,00,000	-
2		Pune (PMC area)	29,26,699	1,19,803	250
	2.1	Bibwewadi, Dhankawadi, Yewalewadi	8,60,530	35,225	74
	2.2	Aundh	1,81,124	7,414	15
	2.3	Shivajinagar	1,71,678	7,028	15
	2.4	Kothrud and Warje	4,42,730	18,123	38
	2.5	Pune station and Camp	6,56,931	26,891	56
	2.6	Pune Central	6,13,706	25,122	52
		Total	29,26,699	1,19,803	250

WORKING DEFINITIONS

Customer Response: A customer response is a positive or negative feedback about a product or service he/she has used. Customer response helps the company or a manufacturer to focus on the quality improvement

of the product or service. A customer response can benefit a company as well as the customer. The company gets the benefit as it gets the necessary feedback to make corrections or improvements in the product or service according to the will of the customer. The customers are benefitted because they can voice their opinions about the product or service and make the company modify the product as per their requirement.

Sugar Substitute (Sweetener): It is a food additive which provides sweet taste like sugar but contains less food energy.

Artificial sugar substitute: It is a non-caloric synthetic substitute for sugar which is often intensely sweeter than sugar.

Natural sugar substitute: It is a sugar substitute which is derived from plant extract.

For this research study, following sugar substitutes are taken into account:

Artificial sugar substitutes: Sugar Free, Splenda, Equal.

Natural sugar substitutes: Stevia, Jaggery.

Diabetes: Diabetes occurs when the body cannot produce enough insulin or cannot use the produced insulin. Insulin is a hormone required to transport the glucose from bloodstream to body cells for production of energy. The lack of or ineffective production of insulin in the body means glucose remains circulated in the blood causing raised blood glucose level. There are three main types of diabetes as Type 1 diabetes, Type 2 diabetes and Gestational diabetes.

Advertisement: Advertisements are the messages paid for by those who send them and intended to inform or influence people who receive them.- Advertisement Association of U.K.

REVIEW OF LITERATURE

(Czinkota, Marketing Management, 2002) The author has stated the buying procedure through which a customer goes before actual buying. The first part being the need generation. This need can be generated through various internal and external factors. The next stage is information gathering. This information gathering is done through media sources or friends and family members. Internet marketing is also considered in this process. The customer then compares various brands by selecting alternative products through filtering and makes the final purchasing decision of the product which meets his/her expectations. The author has also narrated the Cognitive Dissonance Theory where post purchase behaviour of the customer is described in detailed manner.

(Ashok Birbal Jain, A to Z Diabetes Care, 2004) This book is a simple guide to know the details about diabetes. The book explains causes, treatments and other necessary information related to diabetes. The author has guided the diabetic patients about the recent advancements about diabetes. Also the patients are given knowledge about health complications that may occur because of diabetes, the proper diet plan necessary for diabetic patients etc. This book has covered the major aspects of diabetic management.

(Rao, 2014), stated that, along with the large number of diabetics, India also has around 77 million pre-diabetics. Even children are getting diagnosed with diabetes because of the changing lifestyle, consumption of junk food i.e. changing eating habits, physical inactivity, etc. But now, awareness among people regarding diabetes has increased. People are trying to lower down the sugar intake now. New trend of low-caloric sweeteners is increasing. Increasing awareness among the diabetic population about the use of sweeteners, endorsements by famous personalities along with the production of safe and superior quality sweeteners will surely increase the demand for alternative sweeteners in India.

DATA ANALYSIS

Data was collected from 250 diabetic patients from Pune city through a structured questionnaire. The analysis was done through graphical representation. The hypotheses were tested through SPSS. Data was analyzed through following questions:

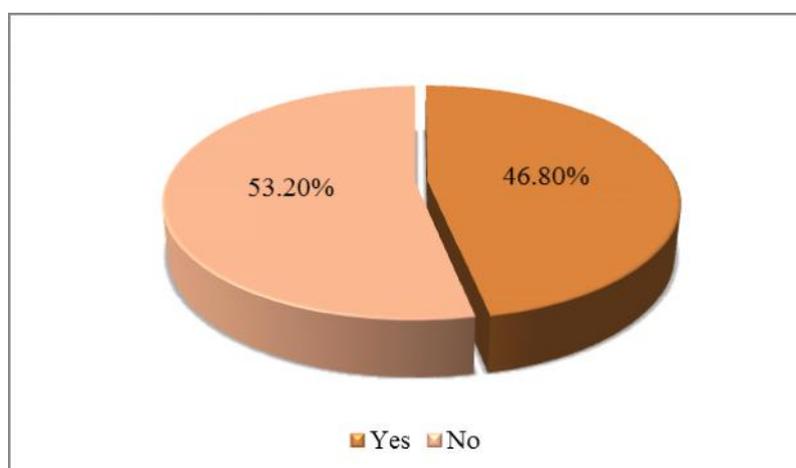
1. Use of the sugar substitute (Sweetener):

It was important to know if the diabetic respondent used a sweetener or not. From this study, the actual users of sweeteners could be found out.

Table 2. Use of Sweetener

Use of the Sweetener	No. of Respondents	Percentage
Yes	117	46.80
No	133	53.20
Total	250	100

Diagram 1. Use of Sweetener



It was observed from table 2 and diagram 1 that number of diabetic respondents who used sugar substitute was less (46.80%) than the number of respondents who did not use sugar substitutes (53.20%).

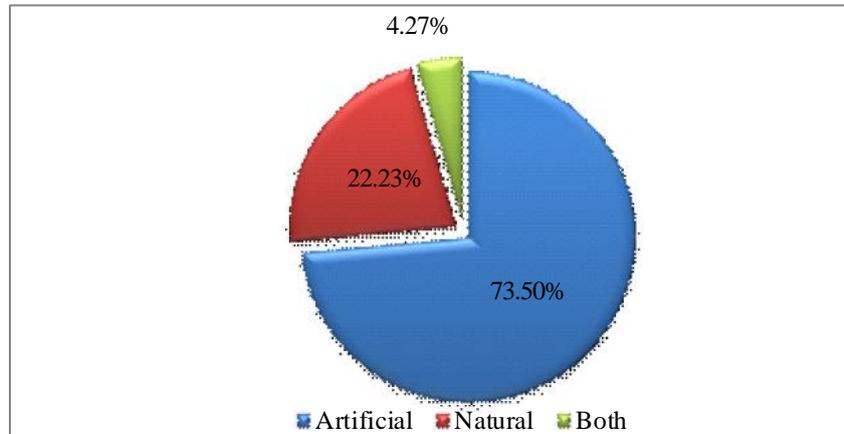
2. Type of Sugar Substitute used:

This is a part of market research study. There are two types of sugar substitute (sweetener) – Artificial sugar substitute and Natural sugar substitute. It was important to know the type of the sugar substitute the respondent used as it gave us the idea of the most preferred type of the sweetener.

Table 3. Type of Sugar Substitute used

Type of the Sugar Substitute	No. of Respondents	Percentage
Artificial	86	73.50
Natural	26	22.23
Both	5	4.27
Total	117	100

Diagram 2.Type of Sugar Substitute used



It was seen from table 3 and diagram 2 that maximum respondents (73.50%) used artificial sugar substitutes followed by natural (22.23%). A meager percentage (4.27) of respondents used both artificial and natural type of sugar substitutes. This study was important, since it actually helped to know the preferred type of sugar substitute used by the respondents.

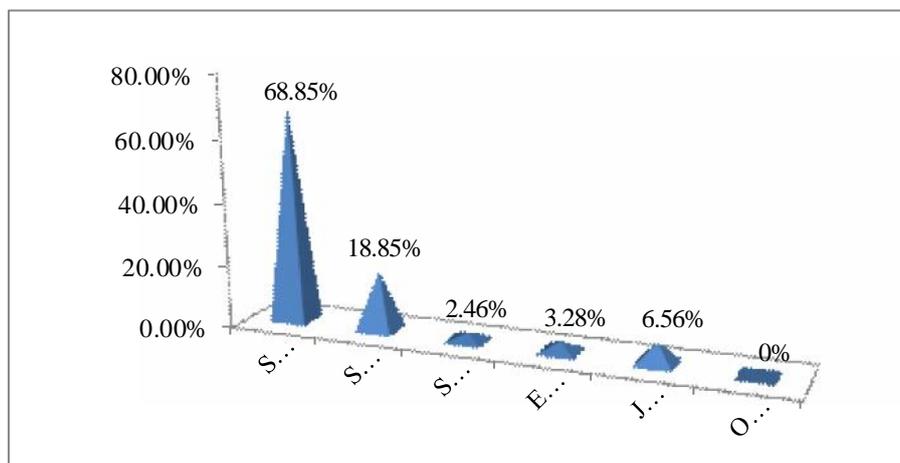
3. Name of the Sugar Substitute used:

It is a part of market research study. It was important to know which sugar substitute was most preferred. This gave us the idea about the probable market share of a particular sugar substitute. As there were some respondents who used more than 1 sugar substitutes, n is 122.

Table 4.Name of the Sugar Substitute used

Name of the Sugar Substitute	No. of Respondents	Percentage
Sugar free	84	68.85
Stevia	23	18.85
Splenda	3	2.46
Equal	4	3.28
Jaggery	8	6.56
Other	0	0
Total	122	100

Diagram 3.Name of the Sugar Substitute used



It was observed from table 4 and diagram 3 that Sugar free was the most commonly used sweetener (68.85%) as it is the most known sugar substitute among respondents. Stevia (18.85%), Jaggery (6.56%), Equal (3.28%) and Splenda (2.46%) were the other sugar substitutes used by the respondents. This showed that Sugar Free has covered a large area in the market of the sugar substitutes.

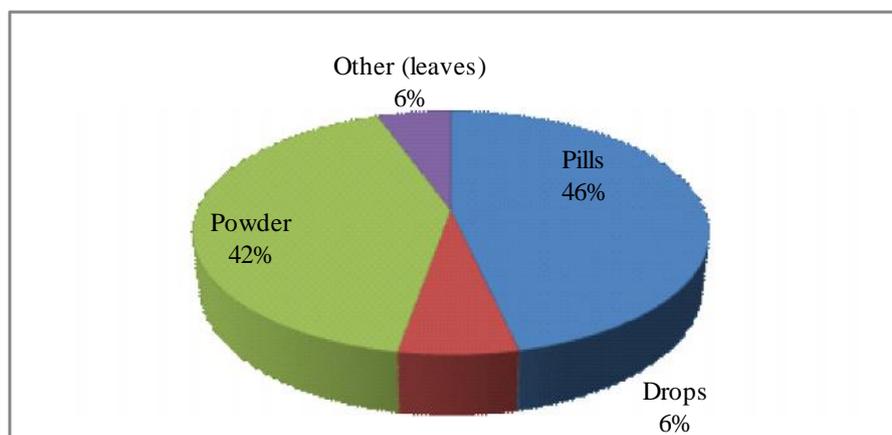
4. Form in which Sugar Substitute (Sweetener) is used:

It is a part of market analysis of sugar substitute market. Sugar substitutes are available in various forms such as pills/ tablets, drops (liquid), powder, etc. It was important to know the preference of respondents towards the form of sweeteners. This question was responded by 117 diabetic respondents who used the sugar substitute; but some respondents used other forms of sugar substitutes apart from the actually mentioned below and hence n is 127.

Table 5. Form of Sugar Substitute

Form of Sugar Substitute	No. of Respondents	Percentage
Pills	59	46.46
Drops	8	6.30
Powder	53	41.73
Other	7	5.51
Total	127	100

Diagram 4. Form of Sugar Substitute



It was observed from table 5 and diagram 4 that majority of the respondents either used pills (46.46%) or powder form (41.73%) as sweetener. Very few respondents used drops (6.30%) and other form in terms of leaves (5.51%) as sweeteners.

5. Reason for choosing the Sugar Substitute (Sweetener):

This is a part of customer response analysis. It was important to know the reason behind customer's choice regarding a particular sweetener, which could help the manufacturers to get the idea of the driving forces behind the buying behaviour of the customers. This question was responded by 117 respondents who used the sugar substitutes; but the reasons behind their choice are multiple; hence n is 182.

Table 6.Reason for choosing the Sugar Substitute

Reasons	No. of Respondents	Percentage
Personal choice	62	34.07
Suggestion by friend	15	8.24
Suggestion by family	28	15.38
Doctor's advice	29	15.93
Easy availability of the product	13	7.14
Brand name	35	19.23
Total	182	100

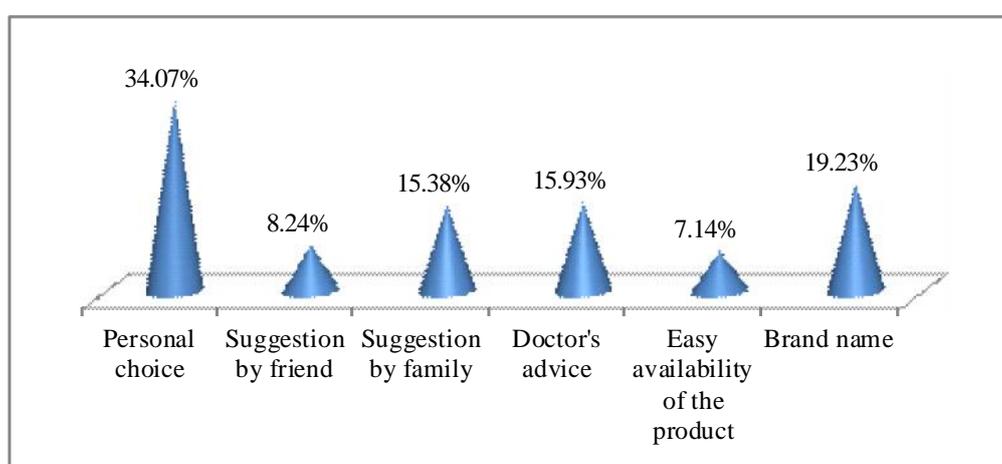
Diagram 5.Reason for choosing the Sugar Substitute


Table 6 and diagram 5 revealed that maximum respondents (34.07%) chose the sugar substitute because of their personal choice. This was followed by selection through brand name (19.23%), doctor's advice (15.93%) and suggestion by family members (15.38%). Less percentage of respondents who chose the sugar substitute either through suggestion by friends (8.24%) or easy availability of the product (7.14%) was observed.

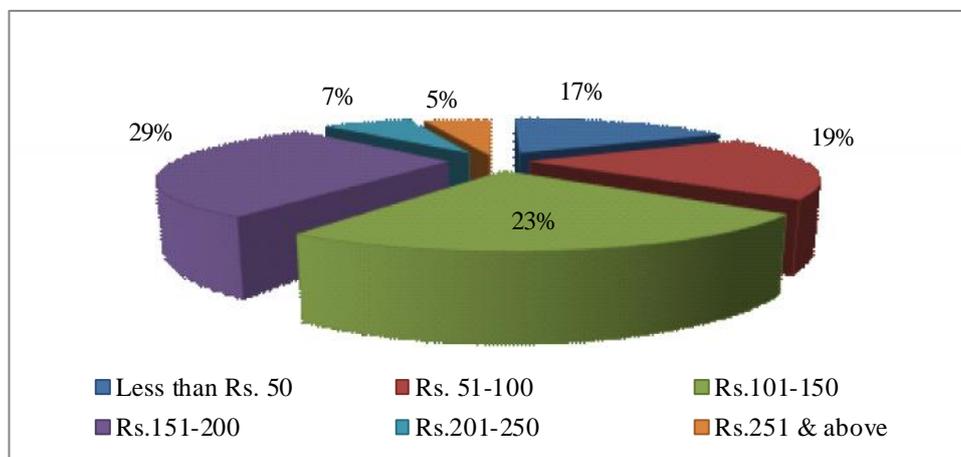
6. Monthly spending on Sugar Substitute (Sweetener):

It is a part of financial profile of the customer which in turn can influence the buying behaviour of the respondents. It was important to know how much amount the respondents spent every month on the sugar substitute as it helps the manufacturers to set the prices of the future sugar substitutes.

Table 7.Monthly spending on a Sugar Substitute

Monthly spending (Rs.)	No. of Respondents	Percentage
Less than 50	20	17.09
51 - 100	22	18.80
101 - 150	27	23.08
151 - 200	34	29.06
201 - 250	8	6.84
251 & above	6	5.13
Total	117	100

Diagram 6.Monthly spending on a Sugar Substitute



Price of the product has a greater impact on the buying preference of the customer. Preference to spend a specific amount on a particular product is decided well in advance by the customer. Table 7 and diagram 6 showed that respondents were spending maximum (29.06%) in the range of Rs.151 – 200. This was followed by spending in the range of Rs.101 – 150 (23.08%), Rs.51 – 100 (18.80%), while 17.09% respondents were spending less than Rs.50. A small percentage of people (6.84%) and (5.13%) were spending more than Rs.200 for buying sugar substitutes.

7. Level of satisfaction with the use of Sugar Substitute (Sweeteners):

This is a part of the customer response analysis. It was important to know the satisfaction level of the customer regarding the use of sugar substitutes.

Table 8.Level of satisfaction

Level of satisfaction	No. of Respondents	Percentage
Highly satisfied	4	3.42
Satisfied	91	77.78
Neutral	19	16.24
Dissatisfied	3	2.56
Highly dissatisfied	0	0
Total	117	100

Diagram 7. Level of satisfaction

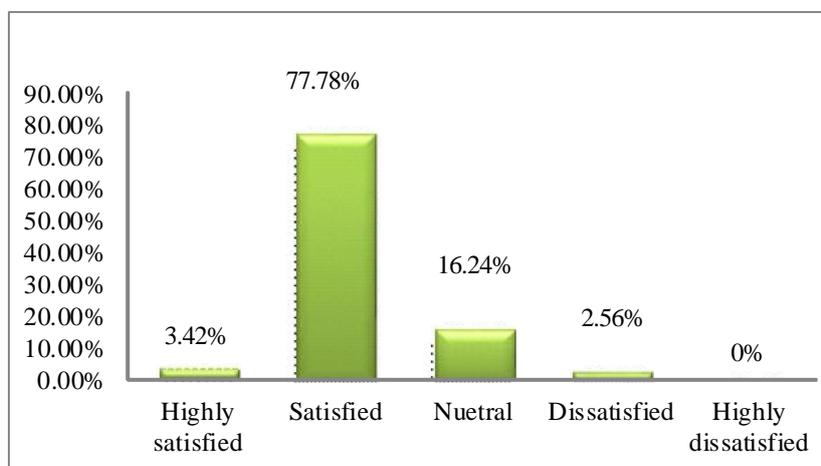


Table 8 and diagram 7 showed that maximum users (77.78%) of the sugar substitute were satisfied with its expected result. About 16.24% respondents were neutral towards the satisfaction level. A small percentage of respondents (3.42%) and (2.56%) were highly satisfied and dissatisfied respectively as far as the level of satisfaction with the use of the sugar substitute was concerned.

8. Duration of the use of the Sugar Substitute (Sweetener):

It is a part of customer behaviour study. It was important to know the duration for which the respondents were using the sugar substitute.

Table 9. Duration of using Sugar Substitute

Duration of use of Sugar Substitute	No. of Respondents	Percentage
Less than 6 months	2	1.71
6 month - 1 year	3	2.56
1 year - 1.5 year	11	9.40
1.5 year - 2 years	23	19.66
2 years & above	78	66.67
Total	117	100

Diagram 8. Duration of using Sugar Substitute

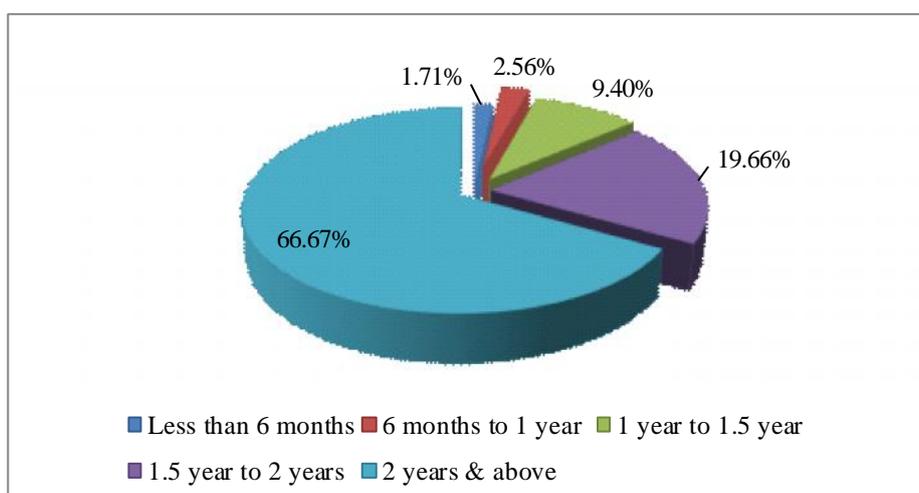


Table 9 and diagram 8 revealed that maximum respondents (66.67%) were using sugar substitutes for more than 2 years. About 19.66% respondents were using sugar substitutes between one and half years and two years, followed by 9.40% (1 year - 1.5 year), 2.56% (6 month - 1 year) and only 1.71% respondents were using sugar substitute for less than 6 months.

9. Choice to switch to other easily available Sugar Substitutes in the market with lesser price and similar results:

It is a part of the loyalty analysis of the customers. Frequent switching to the alternative products in the market shows less loyalty and vice versa.

Table 10.Switch to other Sugar Substitute

Switch to other Sugar Substitute	No. of Respondents	Percentage
Yes	23	19.65
No	94	80.35
Total	117	100

Diagram 9.Switch to other Sugar Substitute

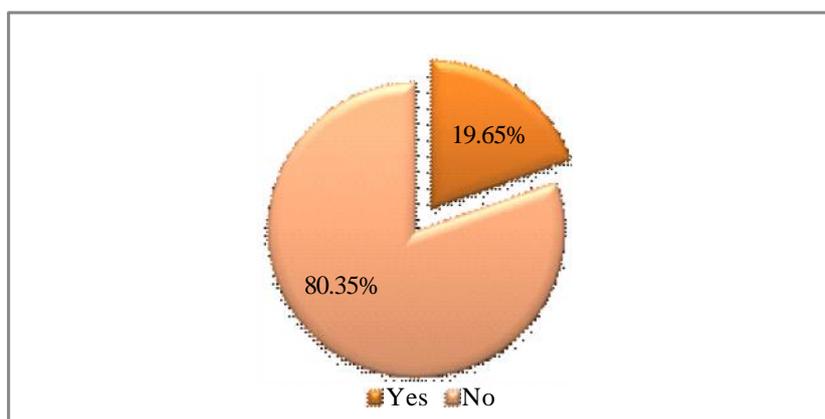


Table 10 and diagram 9 showed that maximum respondents (80.35%) were sticking to the same product and only 19.65% respondents were in the habit of switching to other sugar substitutes.

10. Impact of Sugar Substitute Advertisements on the Buying Behaviour of Customers:

It is a part of the customer response analysis. Advertisement is a medium through which a particular product is marketed. It was important to know that, to what extent the advertisements affect the buying behaviour of the customers.

Table 11.Impact of Ads on Buying Behavior

Impact of Ads on Buying Behavior	No. of Respondents	Percentage
Strongly agree	4	1.60
Agree	108	43.20
Neutral	96	38.40
Disagree	32	12.80
Strongly disagree	10	4
Total	250	100

Diagram 10. Impact of Ads on Buying Behavior

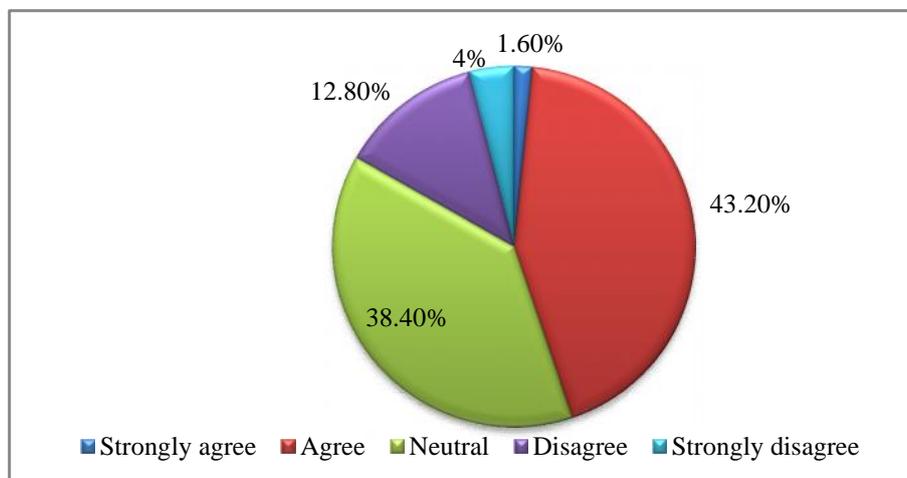


Table 11 and diagram 10 revealed that out of the 250 respondents 43.20% and 38.40% were in agreement and neutral towards the impact of advertisements on the buying behaviour of the customers respectively. About 12.80% respondents disagreed while 4% strongly disagreed and only 1.60% strongly agreed the statement. It was observed that advertisements influenced the customers to buy a particular product.

) **Hypothesis 1**

H_0 : Customers do not prefer artificial sugar substitutes more than natural sugar substitutes.

H_1 : Customers prefer artificial sugar substitutes more than natural sugar substitutes.

Table 12. Use of sugar substitute

Type	Artificial	Natural	Both	Total
No. of respondents	86	26	5	117

The above table shows that the preference given to artificial sugar substitute is 86, which is more than natural sugar substitute preference 26. Hence, research scholar **fails to accept H_0 , H_1 is accepted.**

) **Hypothesis 2**

H_0 : Advertisements of the sugar substitutes do not influence the buying behavior of the customers.

H_1 : Advertisements of the sugar substitutes influence the buying behavior of the customers

The Question was responded on Likert Scale by the 250 respondents relating to this hypothesis where response 1 was Strongly disagree, 2 was Disagree, 3 was Neutral, 4 was Agree and 5 was Strongly agree.

Table 13. Impact of advertisements

	Observed	Expected	Residual
Strongly Disagree	10	50	-40
Disagree	32	50	-18
Neutral	96	50	46
Agree	108	50	58
Strongly Agree	4	50	-46
Total	250	250	

Table 14. Test Statistics

Mean	Standard Deviation	Chi-Square	Df	Critical Value
3.256	0.849322905	190.4	4	4.348509216

The above table shows that the value of t^{cl} is 190.4, which is more than its critical value i.e. 4.34. Hence, researcher **fails to accept H_0 , H_1 is accepted.**

RESEARCH FINDINGS

1. There was not much difference in the number of diabetics who used the sugar substitute and who did not use sugar substitute.
2. It was observed that, among the users of the sugar substitute, maximum diabetic respondents preferred artificial sugar substitute. Percentage of diabetic respondents who used natural sugar substitute was very less.
3. As per the analysis, 'Sugar Free' was the most preferred sugar substitute (Sweetener).
4. Pills and powder were the most common forms used by the respondents as sugar substitutes.
5. It was found that maximum diabetic respondents were using the sugar substitute because of the personal choice.
6. Maximum respondents preferred to spend upto Rs.200 per month for the sugar substitutes.
7. More than 75% respondents were satisfied with the use of sugar substitutes.
8. Maximum respondents were using sugar substitutes for more than 2 years.
9. Among the users of the sugar substitutes, maximum respondents did not switch to any other sugar substitute with lesser price and similar results.
10. Maximum respondents were either in agreement or neutral towards the impact of advertisements of the sugar substitutes (Sweeteners) on the buying behaviour.

CONCLUSION

It can be concluded that customers preferred artificial sugar substitutes more than natural sugar substitutes and therefore, it can be said that in the present scenario, the artificial sugar substitute market has got more demand and advertisements of the sugar substitutes influenced the buying behaviour of the customers.

SUGGESTIONS

1. Target oriented advertisements: The manufacturers of the natural sugar substitutes can use print media, radio advertising, telemarketing and social media as various medium of marketing for attracting the customers towards natural sugar substitutes.
2. Need of Research and Development: The manufacturers of sugar substitute can conduct market research regarding the purchasing power of the customers, since the prices of the product have a greater impact on the buying behaviour of the customers.
3. Manufacturing companies can conduct short term and long term surveys about the customer responses and preferences. This will help the producers to know the expectations of the customers and make the product available to them accordingly.

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