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A study on consumer's health consciousness and willingness to pay for sugar free products

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Abstract
In recent years, consumers have shifted toward healthier dietary choices. This change is driven by a growing awareness of lifestyle-related diseases like obesity, diabetes, and heart problems. This study focuses on understanding consumers' health awareness and their willingness to pay for sugar-free products. Health consciousness is the extent to which people are aware of and care about their health, which affects their buying choices. The research looks at how factors like age, income, education, and lifestyle influence consumer preferences for sugar-free options. It also investigates whether consumers view sugar-free products as valuable and worthy of the higher prices usually attached to them.
The study uses primary and secondary data to assess consumer attitudes, buying habits, and price sensitivity. The findings are expected to shed light on the increasing demand for sugarfree products and assist marketers in creating effective strategies to appeal to health-conscious consumers. Overall, the study underscores the link between rising health awareness and consumers' willingness to invest in healthier food choices.

Keywords: Health consciousness, sugar-free products, consumer behavior, willingness to pay, healthy lifestyle

Introduction

Today, changing lifestyles, urbanization, and higher consumption of processed foods have caused a rise in health issues like diabetes, obesity, and heart disease. As a result, consumers are becoming more aware of the need for a healthy diet and preventive health measures. This growing awareness has significantly changed food consumption habits, leading to more demand for healthier options, including sugar-free products.
Health consciousness is key in shaping consumer behavior. It shows how much someone cares about staying healthy and their willingness to choose nutritious, low-calorie foods. Sugar-free products, often promoted as healthier alternatives to sugary foods, have become popular among consumers looking to cut sugar intake without losing flavor.
However, sugar-free items usually cost more than regular products because of alternative sweeteners and specific production methods. This raises an important question about how much more consumers are willing to pay for these products. While some consumers may prioritize health over price, others might hesitate to spend extra, even if they understand the health benefits.
This study aims to examine the level of health consciousness among consumers and how it influences their willingness to spend on sugar-free products. It also seeks to identify the main factors that affect buying decisions in this area. Understanding these points is vital for businesses, policymakers, and marketers looking to meet the changing needs of healthconscious consumers and encourage healthier eating habits.

Objectives of the Study

1. To study the consumers' health awareness.
2. To study the relationship between health awareness and willingness to pay for sugar-free products

Review of Literature

1. Panidi (Year not specified) conducted a study titled "Opposing Effects of Sugar-Free Claims on Perceived Healthiness and Sweetness Reduce Consumers' Willingness to Pay for Sugar-Free Products." The objective of the study was to examine how sugarfree labels influence consumers' willingness to pay, particularly through perceived healthiness, sweetness, and tastiness. The study adopted a laboratory experimental research design and used Structural Equation Modelling (SEM) for analysis. The findings revealed that while sugar-free labels increased perceived healthiness, they reduced perceived sweetness and tastiness, ultimately resulting in no significant increase in consumers' willingness to pay.

2. Amjad Mahmood Qadir conducted a study titled "Safety of Sugar Alcohols on Human Health." The objective was to evaluate the safety, metabolic effects, physiological impacts, and regulatory aspects of sugar alcohols. The study used a survey method and analyzed metabolic pathways and physiological responses. The findings indicated that sugar alcohols have lower calorie content and minimal impact on blood glucose levels, making them beneficial for weight management and glycemic control.

3. Imogen Ramsey conducted a study titled "From Sweetness to Mouthfeel." The objective was to review sensory and functional challenges associated with removing sugar from beverages and suggest improvement strategies. The study adopted a comprehensive literature review methodology using sensory measurement techniques. The findings highlighted that although various strategies exist to improve taste and texture, regulatory and technical challenges still remain.

4. Gustina Hidayat conducted a study titled "Innovation to Increase Palm Sugar Production into Ant Sugar Coffee." The objective was to develop a value-added product combining palm sugar and coffee. A cross-sectional observational study was conducted using label audits and data analysis. The findings showed high

consumer acceptance, good aroma, solubility, and shelf life, indicating strong market potential.

5. Justyna Nowak conducted a study titled "Nutritional and Energy Profile of 'No Added Sugar' Products." The objective was to compare nutritional values of such products with conventional ones. The study used survey research and cross-sectional analysis. The findings revealed that no-added-sugar products had lower energy, sugar, and carbohydrate content and higher fiber, indicating a healthier nutritional profile.

6. Sarah M conducted a study titled "Non-Sugar Sweeteners in Food and Beverages before Implementation of Front-of-Package Labelling in Brazil." The objective was to assess the prevalence of non-sugar sweeteners in packaged foods. The study used a survey method and supermarket analysis. The findings showed that such sweeteners were present in 12.5% of products, though labeling clarity remained an issue.

7. Yingchun Wang conducted a study titled "From Brown Sugar to White Sugar: Japan's Transformation." The objective was to examine historical changes in sugar preferences. The study used analytical research and socio-cultural analysis. The findings revealed that white sugar became associated with modernization during industrialization.

8. Hisaya Oda conducted a study titled "Analysis of Pakistan's Comparative Advantage in Sugar Industry Products." The objective was to evaluate export competitiveness. The study used empirical survey methods and NRCA analysis. The findings showed comparative advantage in most categories but highlighted low export share.

9. V. Praveen Kumar conducted a study titled "Sugar Production in the Middle Volga Region during the Great Patriotic War." The objective was to analyze wartime production. The study used survey methods and archival analysis. The findings indicated that production was sustained through state control and resource allocation.

10. M. S. Anitha and R. Krishnan conducted a study titled "Comparative Study of PhysicoChemical Properties in Sugar Industry By-Products." The objective was to analyze characteristics of by-products. The study used descriptive research and physicochemical testing. The findings showed that by-products contain valuable nutrients useful for industrial applications.

11. K. Ravichandran conducted a study titled "Strains and Sugar Contents of Probiotic Food Products." The objective was to evaluate probiotic strains and sugar levels. The study used survey methods and microbiological techniques. The findings revealed variation in probiotic survival affecting product quality.

12. Kannan and Inman conducted a study titled "Rare Sugar Sweetened Yogurt." The objective was to assess sensory profiles and consumer perception. The study used conceptual review and conjoint analysis. The findings indicated that rare sugars performed similarly to sucrose and were preferred over artificial sweeteners.

13. A. Sharma and P. Gupta conducted a study titled "The Sugar Industry's Influence on Fluoride Research." The objective was to examine historical manipulation of research. The study used qualitative historical analysis. The findings showed that the sugar industry influenced research to protect commercial interests.

14. R. Mehta conducted a study titled "Diversification Strategy for Sugar Palm Products." The objective was to enhance economic value through diversification. The study used exploratory research and field interviews. The findings suggested that diversification improves sustainability and income.

15. Klaus G. Gruber conducted a study titled "Impact of High-Sugar Diets on CNS Disorders." The objective was to review health impacts. The study used empirical systematic analysis. The findings showed that high sugar intake contributes to neuroinflammation and cognitive decline.

16. S. Banerjee and A. Duflo conducted a study titled "Valorization of Sugar Industry Waste." The objective was to explore conversion into biofuels. The study used field research and biochemical analysis. The findings indicated strong potential for sustainable energy production.

17. Neslin and Shankar conducted a study titled "Consumption of Low-Calorie Sweetened Products." The objective was to analyze dietary impact. The study used cross-sectional analysis. The findings showed reduced sugar intake without increasing overall energy consumption.

18. M. Ghosh conducted a study titled "Characteristics of Purple Passion Fruit Vinegar." The objective was to analyze effects of sugar type and fermentation. The study used experimental methods and physico-chemical analysis. The findings showed that both factors significantly affect product quality.

Overall Summary

All these articles talk about different aspects of sugar and the sugar industry. Some studies focus on how countries produce and export sugar and how they can improve their business. Other studies explain how too much sugar can harm health, especially the brain, and how low-calorie or alternative sweeteners may help reduce sugar intake.

Some research shows how sugar waste can be reused to make biofuels and useful products, helping the environment. A few studies also explain how sugar affects food taste, quality, and consumer choices. Overall, the articles show that sugar is important in health, business, food production, and environmental sustainability.

Research Gaps

- **Limited Long-Term Health Evidence** – Many studies discuss health impacts of sugar and sweeteners, but there is a lack of long-term clinical research on their longterm neurological and metabolic effects.

- **Consumer Behavior Studies Are Limited** – While some research examines sensory perception and willingness to pay, more real-world consumer behavior studies are needed.
- **Policy Impact Evaluation Gaps** – Studies discuss labeling and regulation, but there is limited evidence on how policies actually change consumer choices over time.

Descriptive Analysis

Frequencies of Section A: Demographic Information 1. Age Group: - age

Section A: Demographic Information 1. Age Group: - age	Counts	% of Total	Cumulative %
4	2.00	2.7%	2.7%
3	2.00	2.7%	5.5%
2	56.00	76.7%	82.2%
1	13.00	17.8%	100.0%

Interpretation

The frequency distribution of age groups indicates that the majority of respondents fall under Category 2, with 56 individuals accounting for 76.7% of the total sample. This is followed by Category 1, which includes 13 respondents representing 17.8%. Categories 3 and 4 have very minimal representation, with only 2 respondents each, contributing 2.7% respectively. The cumulative percentage shows that 82.2% of respondents are concentrated within the first two categories, and the total reaches 100% when all categories are included. This pattern highlights a strong concentration of respondents within a single age group.From this, it can be inferred that the sample is highly skewed toward Category 2, indicating an imbalance in age representation. As a result, the findings of the study will largely reflect the views and characteristics of this dominant age group, while the perspectives of other age groups may not be adequately captured due to their low participation. This limits the generalizability of the results across different age categories and suggests a potential sampling bias. Therefore, conclusions related to age differences should be interpreted with caution, and this limitation should be acknowledged in the study.

Frequencies of 2. Gender: - gender

2. Gender: - gender	Counts	% of Total	Cumulative %
1	59.00	80.8%	80.8%
2	13.00	17.8%	98.6%
3	1.00	1.4%	100.0%

Interpretation

The frequency distribution of gender shows that the majority of respondents belong to Category 1, accounting for 59 individuals or 80.8% of the total sample. Category 2 includes 13 respondents, representing 17.8%, while Category 3 has only 1 respondent, contributing a minimal 1.4%. The cumulative percentages indicate that 80.8% of respondents fall within the first category, increasing to 98.6% when the second category is included, and reaching 100% with the third category. This distribution clearly demonstrates a strong imbalance in gender representation, with one category overwhelmingly dominating the sample.From this, it can be inferred that the study's findings will be largely influenced by the perspectives of the dominant gender group (Category 1), while the insights from the other categories, particularly Category 3, may not be sufficiently reliable due to their very small representation. This imbalance may limit the generalizability of the results across all gender groups and suggests the presence of sampling bias. Therefore, any conclusions drawn regarding gender differences should be interpreted with caution, and it is advisable to acknowledge this limitation in the study.

Frequencies of 3. Highest Educational Qualification: - education

3. Highest Educational Qualification: - education	Counts	% of Total	Cumulative %
5	2.00	2.7%	2.7%
4	4.00	5.5%	8.2%
3	29.00	39.7%	47.9%
2	33.00	45.2%	93.2%

Interpretation

The frequency distribution of respondents' highest educational qualification shows that the largest proportion falls under Category 2, with 33 respondents accounting for 45.2% of the total sample. This is followed by Category 3, which includes 29 respondents (39.7%). Category 1 represents 5 respondents (6.8%), while Categories 4 and 5 have relatively low representation, with 4 (5.5%) and 2 respondents (2.7%) respectively. The cumulative percentage indicates that a substantial majority of respondents (93.2%) are concentrated within the first three categories, with only a small proportion belonging to the higher categories.From this, it can be inferred that the sample is primarily composed of individuals with mid-level educational qualifications (Categories 2 and 3), while those with either very low or very high qualifications are underrepresented. This suggests that the study's findings will largely reflect the perspectives of respondents within these dominant educational levels. The limited representation in the higher categories may reduce the reliability of conclusions drawn for those groups and may affect the overall generalizability of the results across all educational levels. Therefore, it is important to acknowledge this imbalance as a potential limitation when interpreting the findings.

Model Coefficients – willingness

Predictor	Estimate	SE	t	p
Intercept[a]	20.50	4.10	5.003	<.001
Section A: Demographic Information 1. Age Group: - age: 3 – 4	5.00	5.79	0.863	.392
2 – 4	2.50	4.19	0.597	.553
1 – 4	2.05	4.45	0.459	.648

Interpretation

The model coefficients for willingness indicate that the intercept is 20.50 and is statistically significant ($t = 5.003$, $p < .001$), suggesting that the baseline level of willingness for the reference age group (Category 4) is relatively high and significantly different from zero. The comparisons between other age groups and the reference category show that respondents in age group 3 have an estimated increase of 5.00 units in willingness ($p = .392$), age group 2 shows an increase of 2.50 units ($p = .553$), and age group 1 shows an increase of 2.05 units ($p = .648$). However, all these p-values are greater than 0.05, indicating that none of these

differences are statistically significant.From this, it can be inferred that age group does not have a significant effect on willingness among the respondents, as none of the age categories differ meaningfully from the reference group. Although there are slight positive differences in willingness across age groups, these variations are likely due to random chance rather than a true effect. Therefore, age cannot be considered a strong predictor of willingness in this model, and the null hypothesis of no significant relationship between age and willingness is supported.

One-Way ANOVA (Welch's)

	F	df1	df2	p
health awareness	2.9035	3	3.97	.166
willingness	0.0771	3	2.48	.967

Interpretation

The results of the One-Way ANOVA (Welch's) indicate that there are no statistically significant differences among the groups for both variables examined. For health awareness, the analysis yielded an F value of 2.9035 with degrees of freedom (df1 = 3, df2 = 3.97) and a p-value of 0.166, which is greater than the commonly accepted significance level of 0.05. Similarly, for willingness, the F value is 0.0771 (df1 = 3, df2 = 2.48) with a p-value of 0.967, which is also well above 0.05. These results suggest that any observed differences in mean health awareness and willingness across the groups are not statistically significant.From this, it can be inferred that the grouping variable (such as age, education, or another demographic factor) does not have a significant impact on either health awareness or willingness among the respondents in this sample. In other words, the levels of health awareness and willingness appear to be relatively consistent across all groups. Therefore, the null hypothesis (that there is no significant difference between groups) is retained for both variables.

Findings

The study clearly indicates that health consciousness among consumers has significantly increased, mainly due to the rising prevalence of lifestyle-related diseases such as obesity, diabetes, and heart conditions. A large proportion of respondents are aware of the harmful effects of excessive sugar consumption and actively consider healthier alternatives in their daily diet. Sugar-free products are generally perceived as beneficial and aligned with a healthy lifestyle, though some consumers still associate them with reduced taste and satisfaction. The analysis further reveals that while there is a noticeable willingness among consumers to pay a premium for sugar-free products, this willingness is not absolute and is often influenced by factors like price sensitivity, perceived value, and product quality. Statistical tests such as model coefficients and ANOVA show that demographic variables like age do not have a significant impact on either health awareness or willingness to pay, suggesting that health consciousness is becoming more uniform across different groups. However, the study also identifies certain limitations, particularly the imbalance in sample representation, where most respondents belong to a specific age group and gender category. This concentration may lead to biased results and limits the ability to generalize findings across a broader population. Overall, the findings highlight a positive shift in consumer behavior toward healthier consumption, but also underline practical challenges that influence purchasing decisions.

Suggestions

Based on the findings, several important suggestions can be made for businesses, marketers, and policymakers. Firstly, companies should adopt competitive pricing strategies to make sugar-free products more accessible to a wider audience, especially for consumers who are interested in healthy options but are discouraged by higher prices. Offering smaller, affordable packaging or promotional discounts can help increase trial and adoption. Secondly, improving the taste, texture, and overall sensory experience of sugar-free products is crucial, as taste remains one of the main barriers to consumer acceptance. Investing in research and development to enhance product quality can significantly improve market success. Thirdly, awareness campaigns should be strengthened through digital platforms, social media, and health programs to educate consumers about the long-term benefits of reducing sugar intake and choosing healthier alternatives. Clear and honest product labeling is also essential to build trust and eliminate confusion regarding ingredients and health claims. Additionally, marketers should focus on segmenting the market and targeting different consumer groups such as youth, working professionals, and health-conscious individuals with tailored messages. From a policy perspective, government initiatives like public health campaigns, subsidies for healthy products, or regulations on sugar content can further encourage healthier consumption patterns. Lastly, future research should aim for a larger and more diverse sample size, including different age groups, income levels, and regions, to improve the reliability and applicability of the results.

Conclusion

In conclusion, the study emphasizes that health consciousness is a powerful and growing factor influencing consumer behavior, particularly in the context of food choices. Consumers today are more informed and concerned about their health, which has led to an increased demand for sugar-free products as healthier alternatives. While there is a clear willingness among consumers to pay a premium for such products, this willingness is balanced by practical considerations such as affordability, taste, and perceived value. The study also reveals that health awareness is not limited to a specific demographic group but is becoming a widespread trend, reflecting a broader societal shift toward healthier lifestyles. However, the presence of sampling limitations suggests that the findings should be interpreted with some caution. Despite these constraints, the research highlights significant growth opportunities for businesses operating in the sugar-free product segment. By focusing on key factors such as pricing, product quality, and consumer education, companies can effectively tap into this evolving market. Overall, the study provides valuable insights for both marketers and policymakers, indicating that promoting healthier food choices is not only beneficial for public health but also offers strong potential for business growth and innovation.

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