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A Questionnaire Study on Energy Drinks and their Effects on Oral Health among Youth

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Abstract: Background: Energy drink (ED) consumption has increased substantially among youth, raising concerns about their acidic and sugary composition and its impact on oral health.

Objective: To assess the knowledge, attitudes, and perceptions of young adults in Chennai regarding the oral-health effects of energy drinks.

Methods: A descriptive, questionnaire-based survey was conducted among 156 participants using a pre-validated Google Forms questionnaire. Demographic data, consumption patterns, awareness levels, and perceived oral-health effects were collected. Descriptive statistics (frequencies and percentages) were used for analysis.

Results: Most respondents (52.56%) were aged 22–25 years, and 56.41% were female. While 73.72% acknowledged oral-health risks of EDs, more than 60% consumed them at least occasionally. Participants reported symptoms such as sensitivity (47.44%), dry mouth (39.74%), and enamel erosion (26.92%). Preventive awareness and professional guidance were limited.

Conclusion: Despite moderate awareness, ED consumption remains high, indicating a knowledge–behavior gap and highlighting the need for targeted preventive education.

Keywords: Energy drinks, Oral health, Dental erosion, Awareness, Youth consumption.

I. INTRODUCTION

Energy drinks have emerged as a popular beverage choice among young people, including adolescents, adults, and athletes, driven by aggressive marketing and promises of increased physical and cognitive performance.[1] However, the consumption of these drinks has been rising sharply, raising significant concerns about their impact on both general and oral health. Energy drinks typically contain high levels of sugars, caffeine, and acids, with pH values often ranging between 2.5 and 3.5, which is highly acidic. This acidic nature, combined with high sugar content, creates a favorable environment for dental erosion, enamel demineralization, caries development, and damage to dental restorative materials.[2]

Their rising popularity in India, including metropolitan cities like Chennai, reflects a shift in lifestyle patterns and increased exposure to aggressive marketing strategies that position energy drinks as harmless performance enhancers.[3] However, despite their widespread acceptance, energy drinks contain high levels of sugar, acidic flavoring agents, caffeine, taurine, and other stimulants ingredients associated with significant short- and long-term health risks, especially within the oral cavity.[4]

Young people, especially adolescents, are particularly vulnerable because their teeth enamel is still developing, and their oral hygiene practices may be inconsistent due to behavioral and developmental factors.[5] Moreover, some populations like athletes face additional risks because they tend to consume these drinks frequently to boost energy and performance, often during physical activity when saliva flow is decreased, impairing natural oral protective mechanisms. Studies have shown a worrying prevalence of dental caries, gingivitis, periodontitis, and tooth erosion among youth and athletes who regularly consume energy drinks despite maintaining standard oral hygiene.[6]

Currently available literature highlights major gaps in knowledge, with young consumers often underestimating the harmful effects while overestimating the functional benefits of these beverages. In this context, assessing youth awareness becomes critical in preventing long-term dental complications and promoting healthier lifestyle choices.[7] Therefore, the present study aims to evaluate the knowledge, attitudes, and perceptions of youth in Chennai regarding energy drink consumption and its impact on oral health.

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II. MATERIALS AND METHODS

A descriptive, questionnaire-based survey was carried out to assess the perceptions and attitudes of youth regarding energy drinks and their impact on oral health. The study included 156 participants from Chennai and utilized a pre-validated, structured questionnaire containing demographic items and multiple-choice questions to ensure thorough and reliable data collection. The survey was distributed electronically through Google Forms to facilitate easy access and broad participation. Participants were informed about the purpose of the study, assured of confidentiality, and reminded that participation was entirely voluntary in accordance with ethical guidelines. All responses were compiled in Microsoft Excel, and descriptive statistics mainly frequencies and percentages were used for data analysis. The results were displayed using tables and graphical representations to improve clarity and interpretation.

III. RESULTS

Based on responses from 156 participants, the demographic distribution showed that the majority belonged to the 22–25 age group (52.56%), followed by 18–21 years (25.64%), 26–30 years (18.59%), with a small portion not indicating their age (3.21%). Females represented a slightly larger share of the sample at 56.41%, while males accounted for 42.31%, and 1.28% did not specify their gender. Most respondents were students (62.82%), while 23.72% were working professionals, 8.97% were self-employed, and 2.56% were unemployed. Regarding educational background, 64.10% held undergraduate qualifications, 20.51% postgraduate degrees, and 10.26% were pursuing other forms of education. A majority resided in urban areas (56.41%), with 33.97% from semi-urban and 7.69% from rural regions, indicating a predominantly urban-centric population. [Table 1]

Awareness regarding the impact of energy drinks on oral health was relatively high, with 73.72% acknowledging that such drinks can affect oral tissues, although 18.59% admitted they were unaware, and 7.69% were unsure. When asked about their personal consumption, 39.74% reported drinking energy beverages occasionally, 20.51% rarely, while 17.95% consumed them monthly and 10.90% weekly. A smaller proportion, 5.13%, consumed them daily, reflecting a consistent consumption habit that may predispose them to oral risks. Regarding awareness of ingredients, only 46.79% claimed to read labels and understand the content, while 34.62% did not, and 15.38% were unsure, highlighting a knowledge gap in consumer behavior. Around 63.46% believed that acidity in energy drinks contributes to enamel erosion, yet 15.38% did not agree and 16.03% were unsure. [Table 2]

A considerable proportion of participants recognized specific oral health issues associated with energy drink use. 47.44% believed these products cause tooth sensitivity, 35.26% identified dental erosion, and 9.62% indicated caries, revealing variability in understanding the type of oral damage. Similarly, 39.74% associated energy drink consumption with dry mouth, 26.92% with enamel erosion, while 21.15% were unsure. When asked about caffeine-related effects, 53.85% acknowledged that caffeine can impact oral health indirectly, whereas 25% disagreed and 17.31% were uncertain. Awareness of sugar's influence on oral disease was significant, with 73.08% recognizing that sugar content increases caries risk, though 10.26% disagreed and 13.46% remained unsure. Knowledge of enamel-softening effects was also strong, with 51.28% understanding the link between acidic drinks and enamel demineralization, although 29.49% were unsure and 12.82% did not believe the connection. [Table 3]

When asked about preventive behavior, only 28.21% reported rinsing their mouth after consuming energy drinks sometimes, 19.23% often, and 11.54% always, while 6.41% never practiced this habit, indicating inconsistent preventive practices. A small proportion (7.05%) consumed energy drinks with meals to reduce acidity exposure, while 39.1% did so occasionally, and 31.41% did so rarely. Upon assessing awareness regarding the erosive effect of energy drink pH, 61.54% believed energy drinks to be highly erosive, though 11.54% disagreed and 24.36% were unsure. When asked if they experienced any oral discomfort after consuming energy drinks, 31.41% reported experiencing symptoms such as sensitivity, mucosal dryness, or irritation, while 53.21% did not, and 13.46% were unsure of any noticeable effects. Only 43.59% of respondents reported receiving advice from a healthcare professional regarding the oral risks of energy drinks, while nearly half (49.36%) had never received any guidance. [Table 4]

A strong majority expressed concern about the long-term consequences of energy drink consumption on oral health, with 58.33% feeling very concerned, and 26.28% somewhat concerned. Only 8.97% expressed minimal or no concern. Attitudes toward awareness showed that 58.97% considered raising public awareness about oral effects of energy drinks very important, while 30.13% believed it was somewhat important. Regarding preventive strategies, 53.85% felt that reducing the frequency of consumption is the most effective preventive measure, followed by visiting a dentist regularly (18.59%), brushing after consumption (16.67%), and drinking through a straw (8.33%), reflecting varied perceptions of protective strategies against dental erosion. [Table 4]

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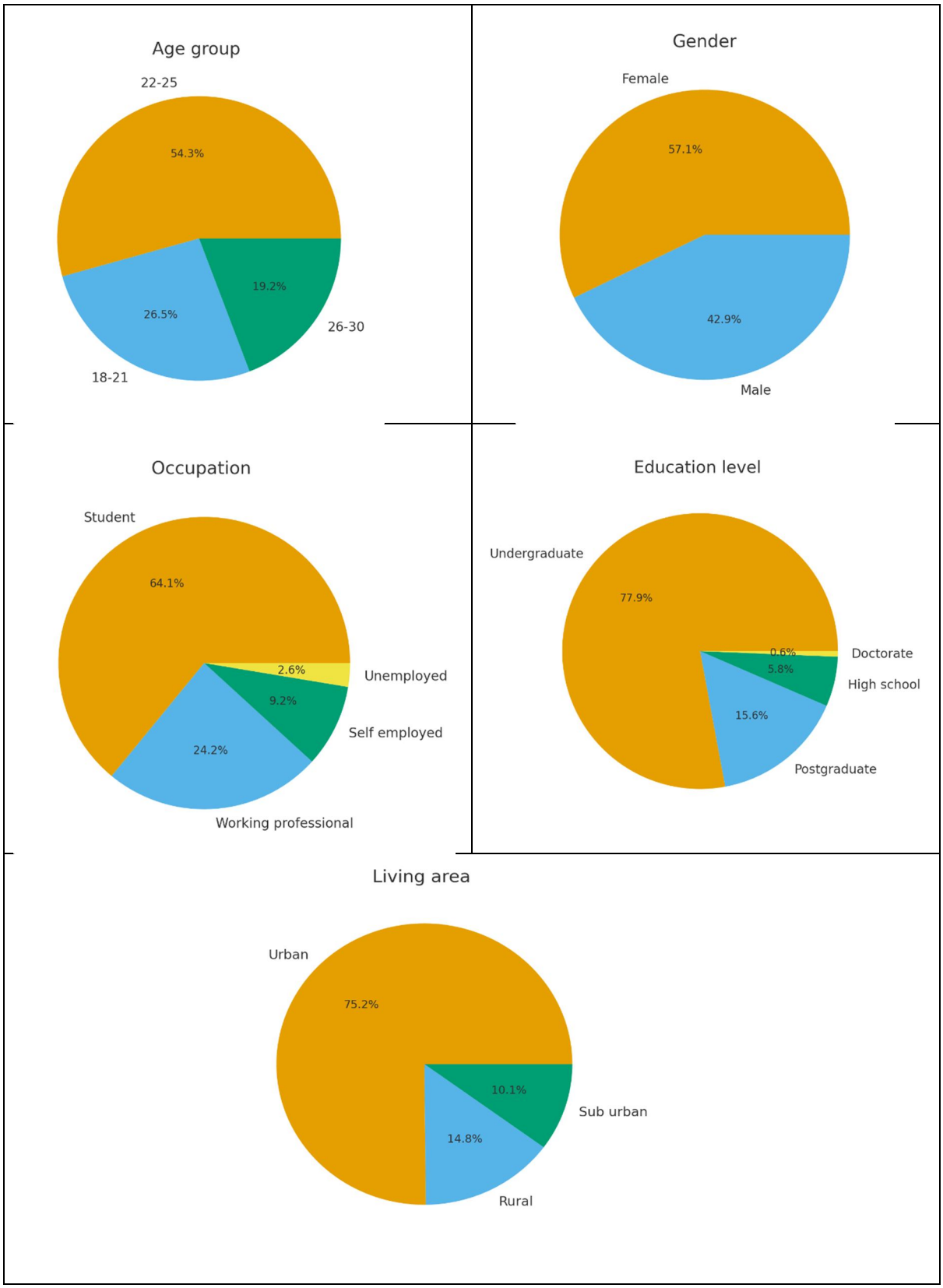

Table 1: Demographic Details

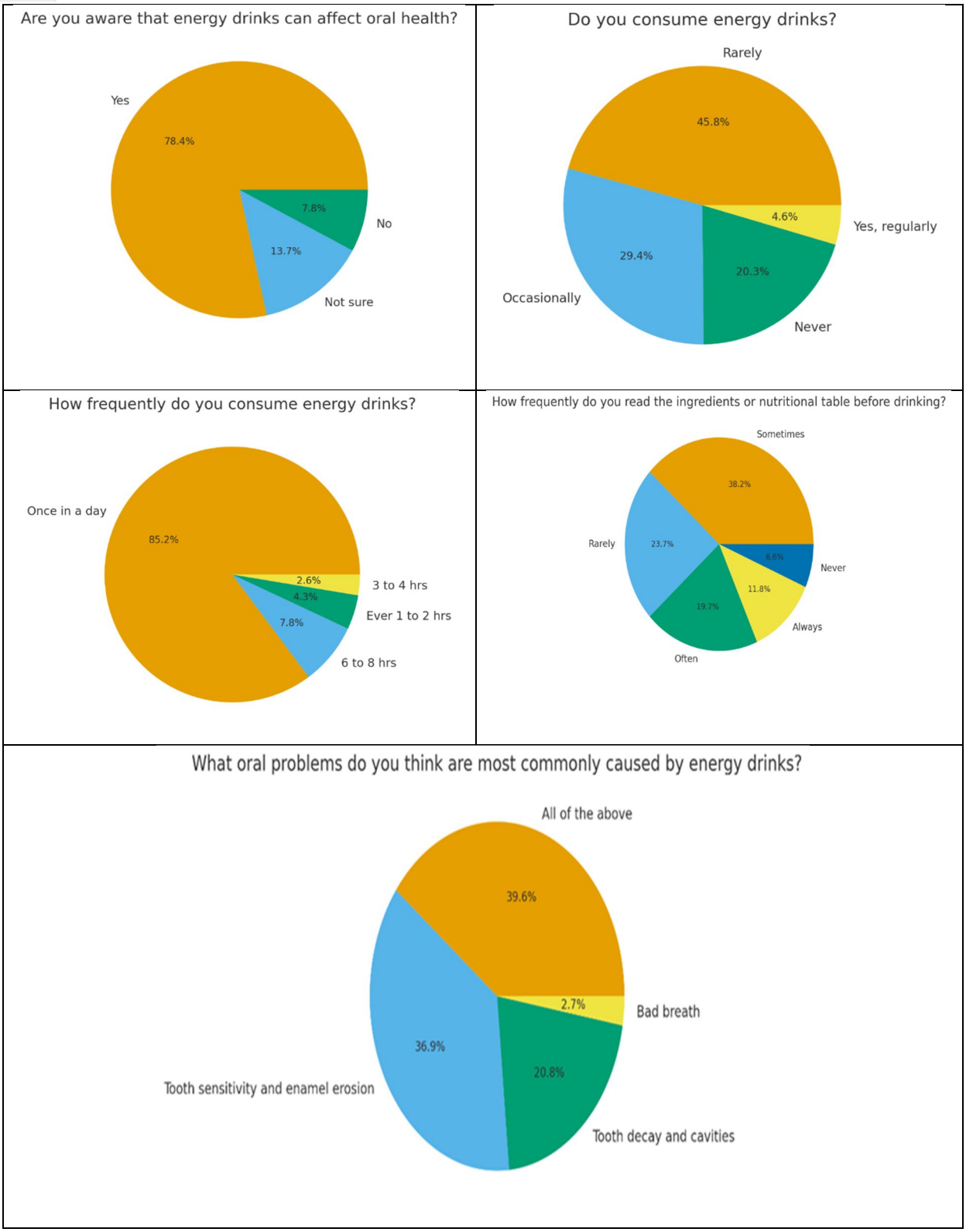

Table 2: Consumer Insights: Energy Drinks

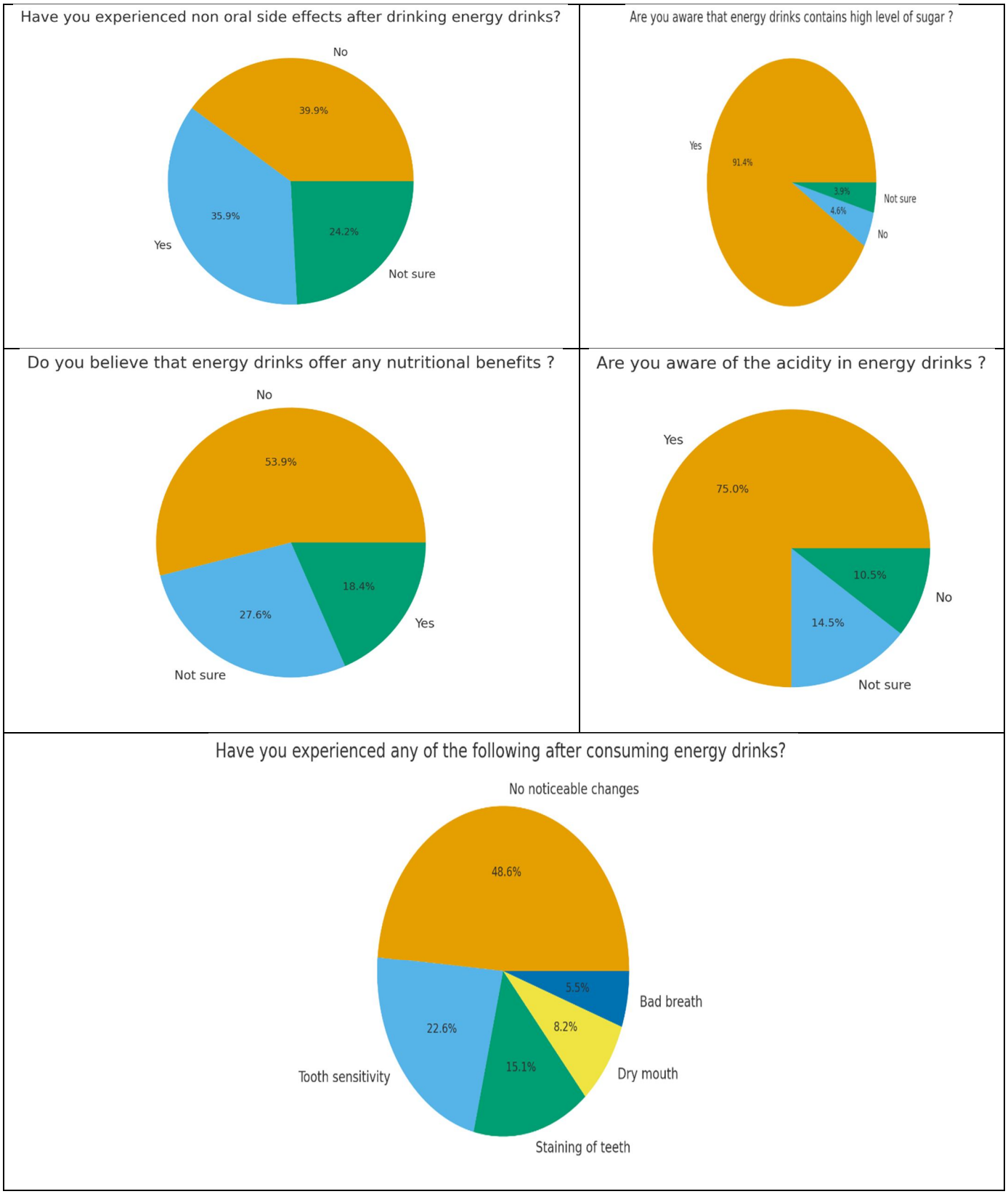

Table 3: Specific Oral Health Knowledge Regarding Energy Drink Effects

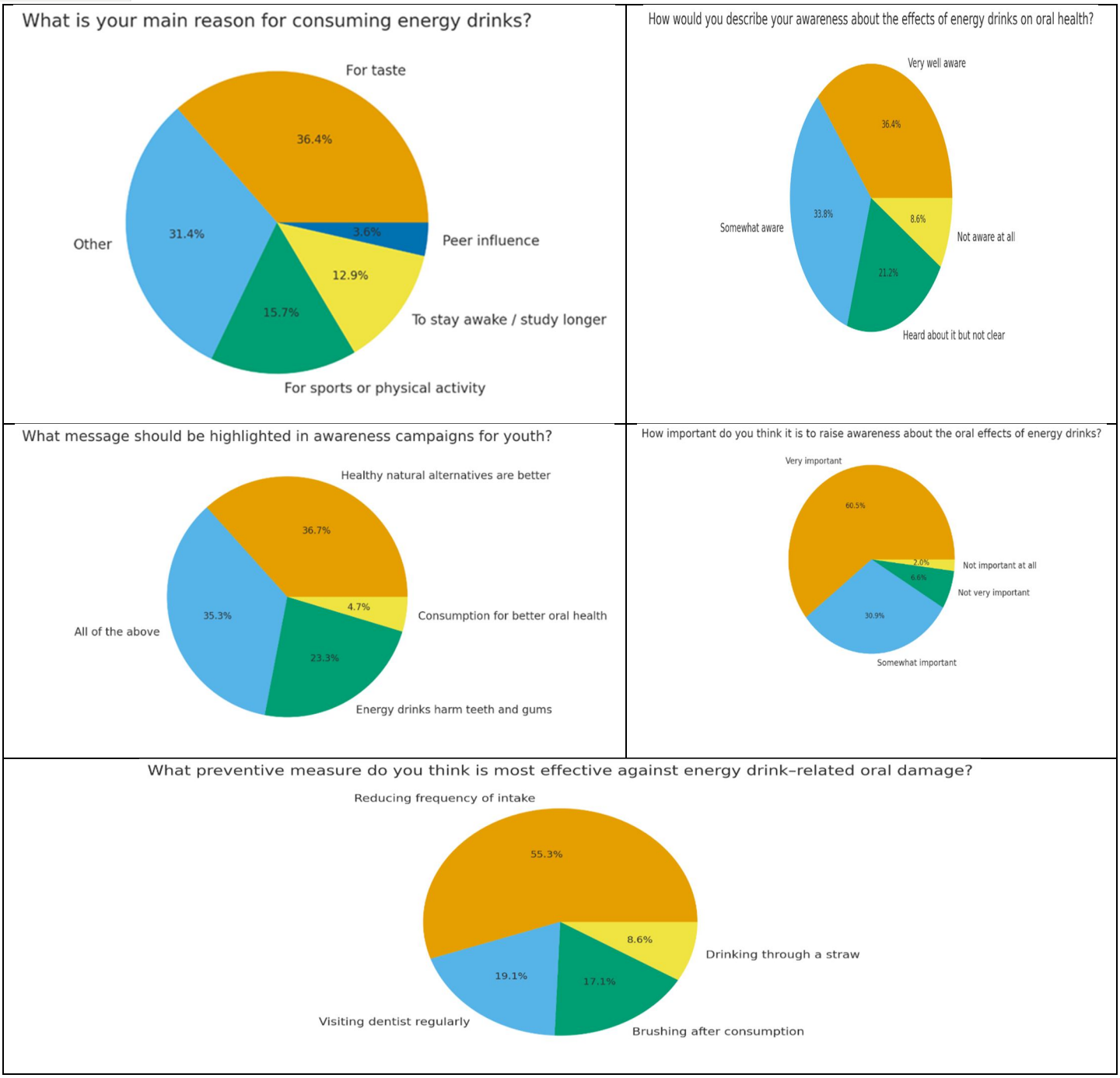

Table 4: Preventive Behaviors and Attitudes Towards Oral Health Risks of Energy Drinks

IV. DISCUSSION

The findings of our study, which revealed high levels of energy drink (ED) consumption alongside moderate awareness of their oral health consequences, are consistent with global research highlighting a similar disconnect between usage patterns and oral-health literacy. In our participant group, although 73.72% were aware that energy drinks can affect oral health, more than 60% still consumed them at least occasionally, demonstrating a behaviour–awareness gap. This aligns closely with Douglas et al., who reported 87.8% lifetime prevalence and 80.1% current consumption, despite only 26.5% of respondents displaying good knowledge of ED-related risks. Similar to the positive attitude toward ED use reported by Douglas et al. (51.7%), many participants in our study continued ED consumption even after acknowledging oral risks, suggesting that awareness alone may not be sufficient to change behaviour.[7]

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In comparing oral-health outcomes, our findings reinforce the concerns raised in multiple studies. Although our study did not clinically assess dental erosion or caries, a substantial percentage of participants reported symptoms such as sensitivity (47.44%), perceived enamel erosion (26.92%), and dry mouth (39.74%), echoing clinical evidence from Khan et al., who documented high rates of dental caries (63.5%), gingivitis (46.1%), and erosive tooth wear (21.2%) among athletes.[8] Similarly, Yildirim (2023) and Lara (2018) demonstrated that the low pH of EDs (2.5–3.5) significantly contributes to enamel erosion, with 56.6% of young basketball players showing erosive lesions associated with acidic beverage intake. These clinical findings support our participants' self-reported symptoms, indicating that even non-athlete young adults face comparable risk due to frequent ED consumption.[9,10]

The cariogenic potential of EDs noted in our study where 73.08% recognized sugar content as a contributor to caries matches the conclusions of Kozhabek (2024), who emphasized the role of high sugar content in promoting bacterial growth and caries development. Furthermore, the awareness deficiencies observed in our participants parallel the findings of Kozhabek, who found that many young adults incorrectly perceive EDs solely as performance enhancers, underestimating their oral-health implications.[11]

Erdemir et al.'s observations on the damaging effects of acidic drinks on restorative materials and enamel surface integrity further reinforce our study's outcomes, where more than 60% of respondents believed EDs could soften enamel and contribute to long-term damage. Both our findings and Erdemir's recommendation strongly emphasize moderation, highlighting the need for dental professionals to counsel young populations about ED overconsumption.[12]

Importantly, our findings also mirror behavioural and psychosocial patterns identified in epidemiological studies. Ajibo et al. demonstrated strong associations between ED consumption and substance use, poor sleep, low academic performance, and psychological impacts many of which were echoed indirectly in our cohort, where a notable proportion reported using EDs for alertness, exam preparation, or fatigue. These patterns reinforce the view that ED consumption often coexists with broader lifestyle risk factors that could exacerbate oral-health decline.[13]

Among athlete populations, Jemâa et al. found that 41.8% of ED-consuming athletes reported oral problems higher than non-consumers while 65.2% were aware of the harmful effects yet still consumed EDs for performance enhancement. This parallels our study, where despite high awareness, consumption remained widespread. Additionally, the desire for preventive guidance reported by 73.8% of Jemâa's participants is comparable to the strong support within our cohort for awareness programs, with 58.97% stating that raising awareness about ED-related oral impacts is "very important."[14]

Collectively, these comparisons highlight that the patterns observed in our study are not isolated but reflect a global trend: high ED consumption, suboptimal awareness, significant oral-health risks, and a critical need for structured public health interventions. Similar to the conclusions drawn across the literature, the convergence of our findings with international evidence highlights an urgent need for targeted oral-health education, behaviour-modification strategies, and regulatory efforts aimed at young adults and athletes who are disproportionately vulnerable to ED-related oral harm.[15-18]

V. CONCLUSION

The findings of our study highlight that although a majority of young adults are aware that energy drinks can harm oral health, their consumption patterns remain high, reflecting a significant gap between knowledge and behavior. Self-reported symptoms such as sensitivity, dry mouth, and perceived enamel changes parallel global evidence linking energy drinks to dental erosion and caries. Comparisons with previous studies further confirm that limited awareness, appealing marketing, and lifestyle factors contribute to widespread misuse among youth. These results highlight the urgent need for targeted oral-health education, behavioral interventions, and public health initiatives to reduce the growing oral-health burden associated with frequent energy drink consumption.

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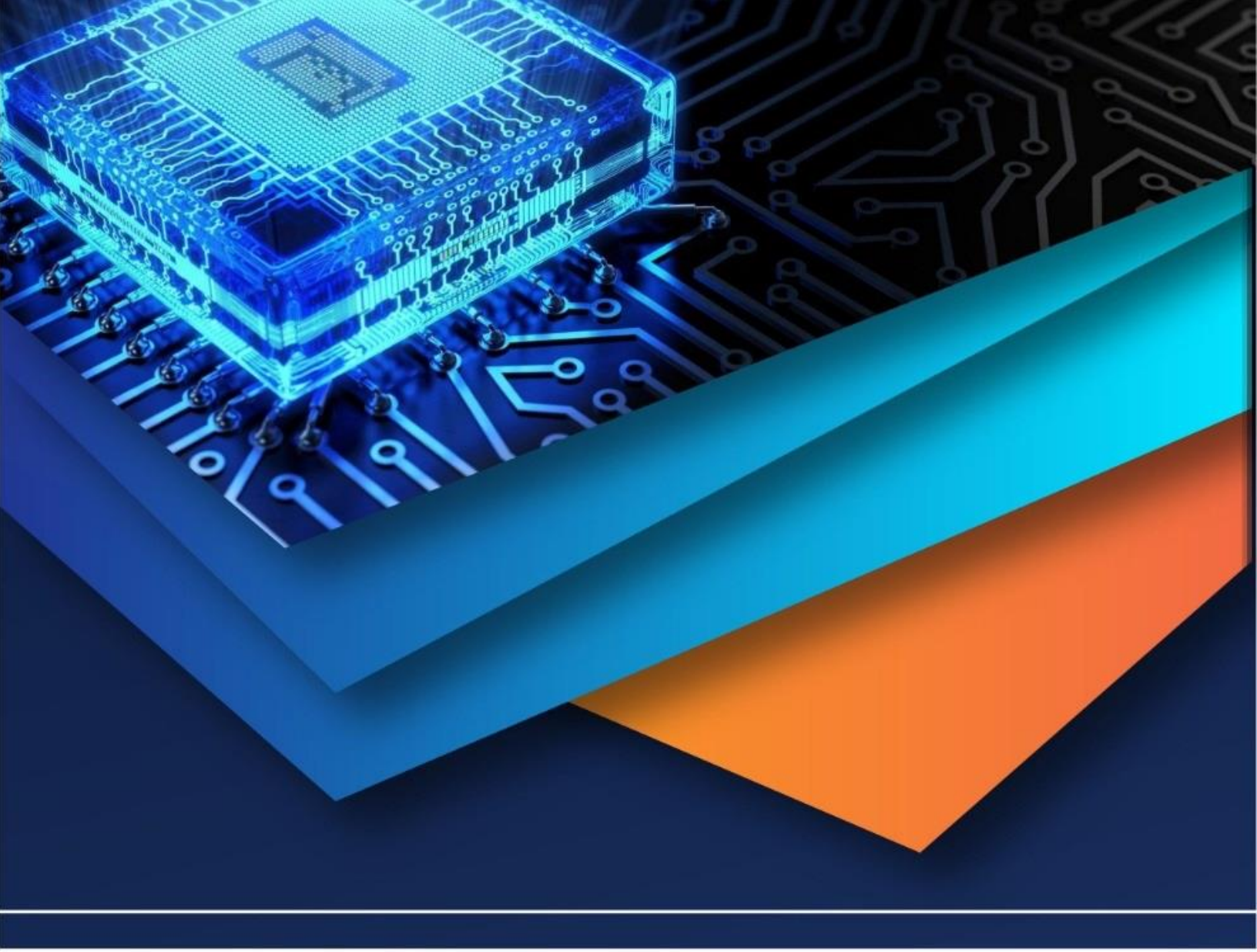

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