

Adults' attitudes toward non-alcoholic beer purchases and consumption by children and adolescents

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SUMMARY

Non-alcoholic beers have gained popularity in recent years offering an alternative to traditional alcoholic beverages. We investigated U.S. adults' attitudes towards non-alcoholic beer purchases and consumption by children and adolescents using a survey administered on Amazon Mechanical Turk with 141 participants, yielding 124 valid responses. Most respondents supported minors' non-alcoholic beer purchases and consumption. Notably, the degree of agreement was higher for non-alcoholic beers with a 0.0% alcohol by volume (ABV) limit than those with a 0.5% limit. Agreement rates for 0.0% ABV non-alcoholic beers ranged from 64.5% (consumption at school) to 75.0% (adults offering non-alcoholic beers to minors), while rates for 0.5% ABV beers ranged from 56.5% (consumption on public transportation) to 66.9% (consumption at home or purchases at a grocery/liquor store). Gender and age differences in attitudes were also observed, with males and younger adults showing higher agreement rates than females and middle-aged adults. Males showed an average agreement of 65.6% for 0.5% ABV non-alcoholic beers and 72.5% for 0.0% ABV beers, while females displayed rates of 55.4% and 55.0%, respectively. Similarly, young adults 18-34 years had an average prevalence of agreement of 66.1% for 0.5% ABV non-alcoholic beers and 71.8% for 0.0% ABV beers, compared to 54.9% and 58.3% among middle-aged adults, respectively. In conclusion, public opinion varies depending on the ABV limit and demographic factors, suggesting that a nuanced approach to policymaking may be necessary. Our study provides a starting point for a more holistic understanding of societal attitudes toward non-alcoholic beer consumption by minors and offers guidance for future policy development.

INTRODUCTION

The consumption of non-alcoholic beverages, particularly non-alcoholic beer, has emerged as a significant trend in the U.S., reflecting a shift in consumer preferences towards healthier and more responsible drinking options (1, 2). This trend is underscored by an increasing societal focus on health and wellness, coupled with a growing awareness of the risks associated with alcohol consumption (3, 4). This rise in popularity raises important questions about public perception, especially in the context of minors' access and consumption, and the regulatory landscape that governs these beverages.

Our study delves into these questions, examining U.S. adults' attitudes towards non-alcoholic beer, particularly in relation to purchases and consumption by minors, and exploring the implications of these attitudes for public policy and health promotion.

The Food and Drug Administration (FDA) defines non-alcoholic beverages as those containing less than 0.5% alcohol by volume (ABV) (1). Non-alcoholic beer is brewed in a manner similar to its alcoholic counterpart and often exhibits a comparable taste profile (2). The growing popularity of non-alcoholic beer in the U.S. can be attributed to the perception of non-alcoholic beer as a healthier, more socially acceptable, and flavorful alternative to traditional beer (3). The increasing health consciousness among consumers has driven demand for beverages with lower calorie and carbohydrate content, positioning non-alcoholic beer as an appealing option (4). Furthermore, advancements in taste and the expansion of non-alcoholic beer varieties have made it more accessible for individuals seeking a beer-like experience without the associated effects of alcohol such as impaired judgment, potential addiction, and health risks (5).

Non-alcoholic beers are frequently perceived as a healthier choice due to their significantly reduced alcohol content, which may contribute to reducing risks associated with heavy alcohol consumption, such as liver disease and certain types of cancer (6). Additionally, non-alcoholic beers often have lower caloric content compared to their alcoholic counterparts, which could contribute to weight control (7). Another advantage is their hydrating property, akin to water, due to the absence of alcohol, making them a popular choice among athletes (8). Importantly, non-alcoholic beers retain beneficial polyphenols derived from hops and malt, which have been associated with reduced inflammation and cardiovascular risk (9). However, these beers are not devoid of potential health risks. The "health halo" effect, a phenomenon where consumers perceive a particular food or product as "healthy" based on a single health claim or attribute, can lead to overconsumption, negating the initial benefits (10). Also, unlike beer, non-alcoholic beers often contain added sugars, potentially increasing the risk of developing metabolic diseases such as type 2 diabetes and cardiovascular disease (11). Individuals with gluten or yeast intolerance may also face adverse reactions, given the common ingredients with regular beer (12). Further, their consumption may trigger cravings in individuals recovering from alcohol addiction, potentially leading to relapse (13). Despite being lower in calories, non-alcoholic beers offer limited nutritional value, potentially leading to deficiencies in essential nutrients when overconsumed (14). Finally, discrepancies between the actual alcohol content in non-alcoholic beer and the information displayed on product labels may pose additional risks to

consumers such as overconsumption (15).

Understanding U.S. adults' perceptions and attitudes toward non-alcoholic beer purchases and consumption by minors is crucial for several reasons. First, it will help inform policymakers and community partners on the efficacy of current regulations and identify areas where improvements may be needed. Second, identifying adults' attitudes toward non-alcoholic beer can aid in developing targeted educational campaigns and interventions to address potential misconceptions and promote responsible consumption. Third, understanding societal perceptions can contribute to a broader discourse on the role of non-alcoholic beverages in fostering healthy and safe environments for minors. However, to our knowledge, no study has been conducted to document adults' attitudes toward minors' non-alcoholic beer purchases and consumption.

While most U.S. states permit minors to consume non-alcoholic beer with parental permission, the specific laws and regulations concerning minors' purchase and consumption of such beverages differ across states (16). Some states, including Georgia, Idaho, New York, South Carolina, and Tennessee, impose a strict 0.0% ABV limit for minors, thereby prohibiting their consumption of any alcohol-containing beverages (17). Conversely, other states allow minors to purchase and consume non-alcoholic beer without parental consent (17). Certain states also necessitate that minors be accompanied by a parent or legal guardian while consuming non-alcoholic beer (17).

In this study, we set out to explore U.S. adults' attitudes toward non-alcoholic beer purchases and consumption by minors. We posited that a majority of adults would be in favor of allowing minors to purchase and consume non-alcoholic beer, with a stronger preference for beverages with a 0.0% alcohol by volume (ABV) limit. Our results largely confirm this hypothesis. A significant proportion of adults expressed support for minors' engagement with non-alcoholic beer, particularly those varieties that eliminate alcohol content. Notably, we also uncovered demographic differences in these attitudes: males and younger adults were more likely to endorse minors' purchases and consumption of non-alcoholic beer compared to females and middle-aged adults. These results highlight two critical points: first, there is a general societal openness towards minors' interaction with non-alcoholic beverages, and second, this openness varies across different demographic groups. These insights are informative to policymakers and public health practitioners in shaping targeted educational campaigns and regulatory frameworks that address the nuances of public opinion on non-alcoholic beer consumption by minors.

RESULTS

We designed and administered a short survey on Amazon Mechanical Turk to assess U.S. adults' attitudes toward non-alcoholic beer purchases and consumption by minors. The survey includes two demographic questions about participants' gender and age, followed by 16 attitude-focused questions categorized by non-alcoholic beer ABV limits (0.5% or 0.0%) (Appendix 1). We screened survey answers for their eligibility to be included in the analysis. An eligible survey response has to answer the two demographic questions and at least 15 out of 16 questions concerning participants' attitudes toward non-alcoholic beer purchases and consumption by

children and adolescents. Of the 141 survey participants, 124 yielded eligible survey responses and were included in the data analysis.

Among the sample of 124 survey participants, males and females accounted for 75.8% and 24.2% of respondents (Table 1). Young adults (18-34 years) made up 69.5% of respondents and middle-aged adults (35-64 years) 30.5% (Table 1). Although the survey solicited participants 65 years and above, we received no response from that age group.

The majority of adult participants supported non-alcoholic beer purchases and consumption by children and adolescents (Figure 1). However, their degree of agreement, to some extent, differed across specific question items. For example, the agreement rates regarding non-alcoholic beers with a 0.0% ABV limit ranged from 64.5% (regarding minors' non-alcoholic beer consumption at school) to 75.0% (regarding whether adults should be allowed to offer minors non-alcoholic beers). By contrast, the agreement rates regarding non-alcoholic beers with a 0.5% ABV limit ranged from 56.5% (regarding minors' non-alcoholic beer consumption on public transportation) to 66.9% (regarding minors' non-alcoholic beer consumption at home or purchases at a grocery or liquor store). In addition, the agreement rates among participants were noticeably higher for non-alcoholic beers with a 0.0% ABV limit than a 0.5% limit except for the question concerning consumption at school.

To assess the overall degree of agreement, we calculated the average prevalence of agreement across all 16 attitude-related questions for each participant. The agreement rates among males and younger adults were noticeably higher than among females and middle-aged adults. The average prevalence of agreement was 65.6% and 72.5% concerning 0.5% and 0.0% ABV non-alcoholic beers among males, compared to 55.4% and 55.0% among females, respectively (Figure 2). Similarly, the average prevalence of agreement was 66.1% and 71.8% concerning 0.5% and 0.0% ABV non-alcoholic beers among young adults, compared to 54.9% and 58.3% among middle-aged adults, respectively (Figure 3).

DISCUSSION

Non-alcoholic beer has gained popularity in the U.S. due to its perceived health benefits and broader acceptance (18). We

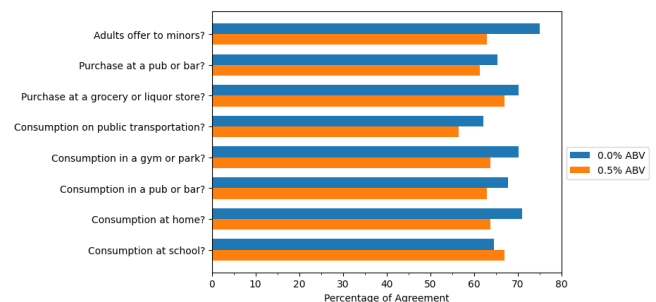


Figure 1. Percentages of participants supporting non-alcoholic beer purchases and consumption among minors. The majority of adult participants supported non-alcoholic beer purchases and consumption by children and adolescents. However, their degree of agreement, to some extent, differed across specific question items. In addition, the agreement rates among participants were noticeably higher for non-alcoholic beers with a 0.0% ABV limit than a 0.5% limit (except for the question concerning consumption at school).

assessed U.S. adults' attitudes toward non-alcoholic beer purchases and consumption by children and adolescents. Our results revealed that the majority of adults supported minors' non-alcoholic beer purchases and consumption, with a noticeable preference for 0.0% ABV non-alcoholic beer. Males and younger adults tended to show higher agreement rates than females and middle-aged adults.

The fact that most adults favor allowing minors to purchase and consume non-alcoholic beers raises several questions. It is necessary to consider to what extent adults understand the health implications of non-alcoholic beer consumption by children and adolescents (6-14). The social and ethical impact of non-alcoholic beer consumption by minors should also be considered, as adults' endorsement may inadvertently create an environment where minors feel pressure to partake in such behaviors, leading to a normalization of alcohol-like experiences. Furthermore, the potential gateway effect should be examined, namely, the possibility that non-alcoholic beer consumption could lead to alcohol consumption by minors (19). Additionally, the marketing and advertising strategies employed by non-alcoholic beer producers should be scrutinized, as they may play a role in shaping adults' attitudes and perceptions toward minors' non-alcoholic beer consumption (20).

The observed differences in agreement rates among males and younger adults compared to females and middle-aged adults concerning minors' non-alcoholic beer purchases and consumption may be attributed to several underlying factors. These differences could stem from varying personal experiences, cultural backgrounds, or beliefs about alcohol and non-alcoholic beer consumption. Males and younger adults may be more open to the idea of minors consuming non-alcoholic beer due to their own experiences, social norms, or a perception that it is a healthier alternative to alcoholic beverages (21, 22). It is crucial to consider the implications of these findings, as they suggest the need for targeted educational campaigns and interventions tailored to different demographic groups. By understanding and addressing the underlying reasons for these varying attitudes, policymakers and community partners may promote responsible consumption and foster healthier environments for minors.

While this study provides valuable insights into U.S. adults' attitudes toward non-alcoholic beer purchases and consumption by children and adolescents, several limitations should be considered. First, our study relies on a convenience sample recruited through Amazon Mechanical Turk, which does not represent the general US adult population. This limitation can potentially introduce sampling

	Total Sample (N = 124)
<i>By gender</i>	
Female	34 (24.2%)
Male	94 (75.8%)
<i>By age group</i>	
18-34 years	86 (69.5%)
35-64 years	38 (30.5%)

Table 1. Demographics of the study sample.

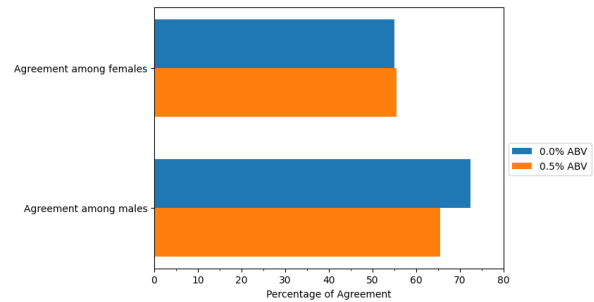


Figure 2. Average prevalence of agreement on non-alcoholic beer purchases and consumption among minors by gender. Among male survey respondents, there was more support for purchasing and consuming 0.0% ABV than 0.5% ABV beverages. In contrast, there was about equal support for purchasing and consuming 0.0% ABV and 0.5% ABV beverages among female respondents. Male respondents showed higher support for purchasing and drinking non-alcoholic beers than female respondents.

bias and affect the generalizability of the findings. Second, the survey only provides binary response options for attitude-related questions, which might not capture the nuances in participants' opinions or preferences. Incorporating a Likert scale or open-ended questions could have provided a more detailed understanding of adults' attitudes. Their attitudes may have played an essential role in our study as they could be biased by the media, marketing strategies employed by non-alcoholic beer producers, or the influence of social networks. Further research is needed to identify and understand these factors. Finally, our study's cross-sectional nature limits the ability to establish causal relationships or examine attitude changes over time. Longitudinal studies could help provide a deeper understanding of the dynamics underlying adults' attitudes towards non-alcoholic beer consumption by minors and the potential influence of changing social norms and evolving public health policies.

In conclusion, our study sheds light on U.S. adults' attitudes towards non-alcoholic beer purchases and consumption by children and adolescents, revealing majority support and noticeable differences between demographic groups. The findings emphasize the importance of understanding the underlying factors driving these attitudes and tailoring

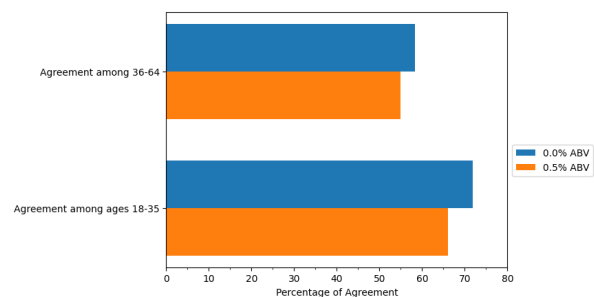


Figure 3. Average prevalence of agreement on non-alcoholic beer purchases and consumption among minors by age groups. Among both age groups, there was more support for purchasing and consuming 0.0% ABV than 0.5% ABV beverages. Younger survey respondents showed higher support for purchasing and drinking non-alcoholic beers than older survey respondents.

educational campaigns and interventions accordingly. Policymakers and community partners must consider these insights when designing policies and regulations around non-alcoholic beer consumption by minors. Further research is needed to explore the reasons behind adults' attitudes, the role of marketing and advertising strategies, and the potential long-term effects of non-alcoholic beer consumption on minors' health and well-being.

MATERIALS AND METHODS

Human Subjects Review

Washington University in St. Louis' Institutional Review Board reviewed and approved the survey to ensure ethical considerations were addressed (IRB# 202303050).

Survey Design

We developed a brief survey to evaluate U.S. adults' attitudes toward non-alcoholic beer purchases and consumption by children and adolescents (Appendix 1). The survey comprises two demographic questions related to participants' gender (i.e., male, female, or other) and age (18-35, 36-64, and 65 years and above), followed by 16 attitude-focused questions. These questions are divided into two categories based on non-alcoholic beer ABV limits: 0.5% or 0.0%. The survey provided definitions for each ABV limit, clarifying that a 0.5% ABV limit means the beverage contains no more than 0.5% alcohol by volume, while a 0.0% limit indicates the beverage is completely non-alcoholic. For both categories, participants were asked about their attitudes regarding minors' non-alcoholic beer purchases (from grocery/liquor stores or pubs/bars), attainment (from adults), and consumption (at school, home, pubs/bars, gyms/parks, or public transportation).

Survey Administration

The survey was conducted using Amazon Mechanical Turk, a crowdsourcing platform that enables researchers to reach a diverse pool of participants by outsourcing small tasks to a large workforce. A total of 141 participants provided consent and participated in the survey. On average, respondents took approximately five minutes to finish the survey. Participants were compensated \$0.50 upon survey completion.

Survey Data Analysis

We calculated the prevalence of agreement (i.e., the percentage of participants answering "Yes") on each of the 16 attitude-related questions. In addition, we performed subgroup analysis by gender and age groups. We first calculated the average prevalence of agreement across all 16 attitude-related questions for each participant. We then compared the average prevalence of agreement between gender and age groups. We used Python version 3.11 and Pandas version 2.0.0 for data analysis and Matplotlib version 3.7.0 for data visualization.

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Appendix

Appendix 1. Survey Questionnaire on U.S. adults' attitudes toward non-alcoholic beer purchases and consumption by children and adolescents

Purpose of the Survey:

We are interested in your attitudes toward non-alcoholic beer purchases and consumption by children and adolescents in the U.S.

Definitions:

- Non-alcoholic beer has little to no alcohol content, typically less than 0.5% ABV, while still maintaining the taste and characteristics of traditional beer.
- ABV, or alcohol by volume, measures the amount of alcohol in a beverage as a percentage of the total volume.
- An ABV limit of 0.5% means that the beverage contains no more than 0.5% alcohol by volume.
- An ABV limit of 0.0% means the beverage contains no alcohol, making it completely non-alcoholic.

Questions:

Your gender: Female Male Other

Your age: 18-35 36-64 65+

Now we will ask you some questions about your attitudes toward non-alcoholic beer consumption and purchases by children and adolescents, namely minors.

Should minors be allowed to consume non-alcoholic beer with an ABV limit of 0.5% at school?

Yes No

Should minors be allowed to consume non-alcoholic beer with an ABV limit of 0.0% at school?

Yes No

Should minors be allowed to consume non-alcoholic beer with an ABV limit of 0.5% at home?

Yes No

Should minors be allowed to consume non-alcoholic beer with an ABV limit of 0.0% at home?

Yes No

Should minors be allowed to consume non-alcoholic beer with an ABV limit of 0.5% in a pub or bar?

Yes No

Should minors be allowed to consume non-alcoholic beer with an ABV limit of 0.0% in a pub or bar?

Yes No

Should minors be allowed to consume non-alcoholic beer with an ABV limit of 0.5% in a gym or park?

Yes No

Should minors be allowed to consume non-alcoholic beer with an ABV limit of 0.0% in a gym or park?

Yes No

Should minors be allowed to consume non-alcoholic beer with an ABV limit of 0.5% while on public transportation?

Yes No

Should minors be allowed to consume non-alcoholic beer with an ABV limit of 0.0% while on public transportation?

Yes No

Should minors be allowed to purchase non-alcoholic beer with an ABV limit of 0.5% at a grocery or liquor store?

Yes No

Should minors be allowed to purchase non-alcoholic beer with an ABV limit of 0.0% at a grocery or liquor store?

Yes No

Should minors be allowed to purchase non-alcoholic beer with an ABV limit of 0.5% at a pub or bar?

Yes No

Should minors be allowed to purchase non-alcoholic beer with an ABV limit of 0.0% at a pub or bar?

Yes No

Should adults be allowed to offer non-alcoholic beer with an ABV limit of 0.5% to children or adolescents?

Yes No

Should adults be allowed to offer non-alcoholic beer with an ABV limit of 0.0% to children or adolescents?

Yes No

Thank you for your participation! Have a wonderful day!