Published in final edited form as:

Subst Use Misuse. 2011 ; 46(6): 828–835. doi:10.3109/10826084.2010.538886.

Jello Shot Consumption among Older Adolescents: A Pilot Study of a Newly Identified Public Health Problem

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Abstract

We investigated the extent of jello shot consumption among underage youth. We conducted a pilot study among a non-random national sample of 108 drinkers, ages 16-20 years, recruited from the Knowledge Networks internet panel in 2010 using consecutive sampling. The prevalence of past 30-day jello shot consumption among the 108 16-20 year-old drinkers in our sample was 21.4% and among those who consumed jello shots, the percentage of alcohol consumption attributable to jello shots averaged 14.5%. We conclude that jello shot use is prevalent among youth, representing a substantial proportion of their alcohol intake. Surveillance of youth alcohol use should include jello shot consumption.

Keywords

youth alcohol use; jello shots; alcohol brands; surveillance; alcoholic beverages

Introduction

Alcohol use among underage youth is a major public health problem in the United States that contributes to 4,500 deaths each year (Roeber et al., 2005). In 2009, 41.8% of high school students consumed alcohol within the past 30 days and 24.2% reported drinking five or more alcoholic beverages in a row (within a couple of hours) at least once during the past month (Johnston, O'Malley, Bachman, and Schulenberg, 2009). Surveillance of the alcohol consumption practices of youth is important in order to develop effective interventions. Despite the importance of surveillance, there are no existing national surveys that comprehensively ascertain the specific types and brands of alcohol that youth consume. This is problematic not only because we lack an understanding of what underage youth are drinking, but also because we do not have an adequate appreciation of the vehicles youth are using to deliver alcohol. For example, youths may consume alcohol directly (e.g., beer or liquor shots), in combination with another beverage (e.g., mixed drinks, cocktails, mixing alcohol and energy drinks), by snorting alcohol vapor, by "eyeballing," or even as a "jello shot" (alcohol-infused gelatin). As an indication of the gaps in surveillance of the vehicles for alcohol delivery among youth, we are aware of no previous research that has assessed the use of jello shots among adolescents.

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Declaration of Interest None of authors have any financial conflicts of interest to disclose.

Despite the widespread appearance of information about jello shots on the internet (Drink Recipe, 2010; Drinks Mixer, 2010; Jello Shot Recipe Blog, 2008), the availability of numerous books outlining recipes for jello shots (Breidenbach, Calhoon, and Calhoon, 2004; Duarard, 2009; Wright, 2007), and even the presence of warnings on college web sites cautioning students to beware of the dangers of jello shots (Mbugua, 2008; Yale Health Plan, 2010), to the best of our knowledge, no national survey has ever measured jello shot consumption among underage youths. For this reason, the alcohol literature contains virtually no discussion of the phenomenon of jello shot consumption among youth. Essentially, jello shot consumption has not been recognized as a public health problem in the alcohol literature. One previous article anecdotally mentions that: “Gelatin ‘shots’ are widely used, particularly on college campuses, as a novel and fun way to ingest alcohol with the advantage of disguising the unpleasant effects of consuming alcohol (Ralevski et al., 2006). However, there is no existing research on the prevalence or nature of jello shot consumption among underage drinkers.

To the best of our knowledge, this is the first paper to report data on the prevalence and nature of jello shot consumption among underage youth. These data are derived from a pilot study in which we comprehensively measured the types and brands of alcohol consumed by a non-random, national sample of 108 underage youth ages 16-20 years, using consecutive sampling among a pre-recruited internet panel. Although this pilot study has a relatively small sample size and is not nationally representative, these findings provide the first data on youth jello shot consumption and have important implications for both youth alcohol surveillance and the development of effective interventions to reduce youth alcohol use.

Methods

Background

A major reason for the absence of comprehensive surveillance of all types of youth alcohol consumption practices is the lack of an established methodology to collect such data. Because there are more than 300 alcohol brands, researchers have assumed that it would take too long to comprehensively ascertain every type and brand of alcohol consumed. However, we developed a new internet-based survey instrument which can measure the use of hundreds of alcohol brands and multiple vehicles for alcohol delivery – including the use of jello shots – in a reasonable time frame. We accomplished this by using a combination of carefully crafted skip patterns, piping questions (using responses from previous questions on brand use to elicit more detailed information on alcohol consumption patterns for the identified brands), and internet forms that include lists of brands with check boxes.

In a previous pilot test, we used Craigslist to recruit 241 adolescents ages 16-18 years to complete our new, internet-based survey instrument. In that pilot test, youth were asked to identify brands from lists and if they had consumed brands not on the lists, to indicate those brands. We did not include jello shots on our original list, but several respondents indicated that they had consumed jello shots as an “other” brand. Therefore, in our second pilot study – which is the basis for the present paper – we included a specific assessment of jello shot consumption.

This paper describes data derived from our second pilot study, which was primarily designed to determine our ability to administer our online survey using a pre-existing, national internet panel of underage youth. A secondary, but significant, purpose of this study was to determine whether the use of jello shots reported by several respondents in the Craigslist study was merely an aberration or if it signified a prevalent aspect of youth drinking behavior.

Design

To conduct our survey, we utilized a pre-recruited internet panel developed by Knowledge Networks, the only U.S. company that maintains an internet panel (the Knowledge Panel®) that was created using a national probability sample. The company recruited households to its Knowledge Panel® sample through a combination of random digit dialing (RDD) and address-based sampling (ABS), which involves probability sampling of addresses from the U.S. Postal Service's Delivery Sequence File (Knowledge Networks, 2010).

KnowledgePanel® is an online panel in which potential panel members are chosen via a statistically valid sampling method and using known published sampling frames – both random digit dial frames and address-based sampling frames – that together cover 98% of U.S. households (Knowledge Networks, 2010). Sampled non-internet households are provided a laptop computer and free internet service. KnowledgePanel consists of about 50,000 U.S. residents, age 18 and older, including cell phone-only households. In addition, the Knowledge Networks panel includes approximately 3,000 teens age 13 to 17 whose parents or legal guardians have provided consent.

The Knowledge Networks internet youth panel provides high survey completion rates because of the ongoing relationship between the youth and the panel staff. To ensure adequate representation of panelists across race/ethnicity, telephone numbers from phone banks with higher concentrations of Blacks and Hispanics are over-sampled. To ensure adequate participation across levels of socioeconomic status, subjects agreeing to participate in the panel who do not have internet access are given WebTV and internet access and training for free.

Knowledge Networks minimizes panel attrition by keeping surveys short (no more than 20 minutes), not overburdening panelists with surveys, and maintaining a strong panel relations program. In a detailed study of the Knowledge Networks panel, Clinton (2001) showed that panel attrition is low and non-systematic and does not produce any change in the representativeness of the national sample.

Previous research has validated the alcohol data derived from adults in the Knowledge Networks internet panel. Heeren et al. (2008) compared the results of an alcohol survey conducted through Knowledge Networks with results from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). Estimates of current drinking were similar to those from NESARC, demonstrating that the Knowledge Networks panel is a less expensive, viable alternative to telephone and in-person surveys for assessing drinking behavior.

Sample

In April 2010, Knowledge Networks recruited 108 youth ages 16-20 years from its existing internet panel to participate in the study by sending an email invitation. The invitation did not disclose that the survey was related to alcohol consumption. Those who agreed to participate were provided a secure link to access the study site.

The initial screening question asked respondents to report on how many days out of the past 30 they had consumed at least one drink of alcohol. Included in the definition of a drink was the consumption of 1.5 ounces of liquor, whether in a mixed drink or as a shot. Respondents who had consumed at least one drink of alcohol in the past 30 days were provided with an online consent form, which described the details of the study, risks and benefits, and the procedures in place to protect the confidentiality of their responses. Participants who provided informed consent completed the internet-based questionnaire, which ascertained

the alcoholic beverage brands they consumed within the past 30 days. After completion of the survey, a \$25 gift was credited to the panel member's account.

Because this was a pilot study, with funding for surveys of only about 100 subjects, we used a consecutive sampling process, enrolling the first 100 adolescents who responded to the email invitation and were found to be eligible after they completed the screening questionnaire. A total of 1,028 email invitations were sent out to a sample that represents about 46% of the 2,247 current Knowledge Networks panelists ages 16-20 years. It took just one week to recruit the desired sample. During that week, 360 respondents (35%) completed the screening questionnaire: 108 were qualified (i.e., had consumed at least one drink of alcohol in the past 30 days) and completed the survey. We exceeded the desired sample size of 100 because closing the survey does not throw out subjects who are already online.

We engaged subjects to participate in the study with the following invitation, which offered a \$25 incentive to increase response: "You are being invited to be a part of a group of KnowledgePanel members in a study being conducted by a university. It will take about 15 minutes for you to complete. The survey will be quite similar to the kinds of surveys you have already been involved in as a KnowledgePanel member. If you are eligible to participate in this study and you complete the survey, you will receive a \$25 gift to thank you for your participation. If you would like to see if you are eligible to participate in this survey, please click on the link below." The protocol was approved by the Institutional Review Board of the Boston University Medical Center.

Survey Instrument

Jello shot consumption was assessed through a series of three questions. First, we asked "During the past 30 days, on how many days did you have at least one jello shot?" Second, for those who indicated having consumed jello shots on at least one day, we asked them to specify the usual number of jello shots they had on a day when they consumed jello shots. Third, we asked respondents to indicate the type of alcohol that was typically used in the jello shots they consumed.

To identify the brands of alcohol used in the jello shots consumed by respondents, we further inquired about the alcohol types and brands that respondents had consumed in the past 30 days. However, we did not specifically inquire about what brands were used when having jello shots. The survey included 61 brands of beer, 81 brands of wine or champagne, 19 brands of flavored alcoholic beverages (including flavored malt beverages, alcopops, wine coolers, and malt liquor), 35 types of mixed drinks, 38 brands of alcoholic energy drinks, 14 brands of bourbon, 3 brands of brandy, 8 brands of cognac, 9 brands of gin, 19 brands of rum, 15 brands of scotch, 13 brands of tequila, 30 brands of vodka, 8 brands of whiskey, and 27 brands of cordials and liqueurs. In total, the instrument assessed 380 brands of alcohol.

Analysis

In estimating the overall prevalence of jello shot consumption, we incorporated sampling weights that accounted for the different selection probabilities associated with the RDD- and ABS-based samples, the oversampling of minority communities, non-response to panel recruitment, and panel attrition. Post-stratification adjustments were based on demographic distributions from the Current Population Survey (CPS) conducted by the U.S. Bureau of the Census.

For each respondent, we estimated the total number of jello shots consumed in the past 30 days by multiplying the number of days the respondent had jello shots by the typical number of jello shots the respondent consumed on those days. We then translated the number of jello

shots consumed in the past 30 days to the equivalent number of drinks of the type of alcohol used in the jello shot (which was liquor in all cases). The standard amount of liquor that constitutes one drink is 1.5 ounces of liquor. While jello shots vary widely in the amount of liquor used, a review of the amounts typically used revealed a range of from 0.5 ounces to 1.0 ounce (Wright, 2007). Therefore, we used 0.75 ounces as an estimate of the amount of liquor in a typical jello shot. Since this is half of the amount of liquor considered to be one drink, we divided the number of jello shots by two to derive an estimate of the equivalent number of drinks of liquor.

Validation of Survey Findings

Since there has been no previously published survey of youth alcohol brand preferences, there is no true gold standard to which we could compare our findings. Instead, we validated our findings against GfK MRI's Survey of the Adult Consumer, a written survey of a representative sample of approximately 10,000 U.S. adults used to ascertain the prevalence of use of various consumer products, including past 30-day consumption of 132 spirits brands. Since GfK MRI defines adults as age 18 years or older, their findings on types of alcohol used can be applied as a validity check on our own findings for the 18- to 20-year-olds in our internet panel. Data on past 30-day use of various types of liquor among 18- to 20-year-olds from the 2007 Survey of the American Consumer and we used these data to validate our survey findings. Estimates of beverage category preferences among the 18- to 20-year-old respondents in our study were similar to those from the GfK MRI national survey for most of the alcoholic beverage types. The correlation between our estimates and those from GfK MRI was high ($r = 0.86$, $p = 0.0006$), and the correlation between prevalence rank was similarly high (Spearman's $\rho = 0.82$, $p = 0.0021$).

Results

Description of Sample

Slightly more than half of the sample consisted of males (55.6%) and respondents were evenly distributed across the age range from 16-20 (ages 16 – 18 years: 49.1%; ages 19 – 20 years: 50.9%) (Table 1). By race/ethnicity, 66.7% of respondents were non-Hispanic white, 22.2% were Hispanic, 8.3% were Black, and 2.8% other race/ethnicity. The mean number of days in the past month on which alcohol was consumed was 4.9, and the median was 3. Approximately two-thirds of the respondents (65.7%) reported drinking no more than an average of once per week. The proportion of respondents who consumed five or more drinks in a row during the past 30 days was 63.9%.

Prevalence of Jello Shot Use

Of the 108 youth drinkers in our sample, 22 (20.4%) reported having consumed jello shots during the past 30 days. The weighted prevalence of past 30-day jello shot consumption among 16-20 year-old drinkers was 21.4% (95% confidence interval [CI], 11.0%-31.8%) (Table 2). The prevalence of jello shot consumption was similar among males (17.6%; 95% CI, 6.3%-29.0%) and females (26.1%; 95% CI, 7.4%-44.8%). The prevalence of jello shot consumption among 16-18 year-olds was 27.4% (95% CI, 11.4%-43.4%) and among 19-20 year-olds was 17.3% (95% CI, 3.7%-30.9%).

There were no significant differences between jello shot users and nonusers in terms of age, sex, race/ethnicity, or education. However, jello shot users were significantly more likely to come from households with lower median incomes, to drink more frequently, and to engage in heavy episodic drinking (five or more drinks in a row). For example, while 58.5% of nonusers of jello shots reported heavy episodic drinking, 92.9% of jello shot users reported heavy episodic drinking.

Frequency and Quantity of Jello Shot Use

Among respondents who used jello shots, the mean frequency of use was two days in the past 30, with a median of one day, and a range of one to 15 days (Figure 1). The number of jello shots consumed by respondents on a typical day when they used jello shots ranged from one to 13, with a mean of 5.3 and a median of five (Figure 2). The total number of jello shots consumed in the past 30 days ranged from one to 150, with a mean of 16.0 and a median of 5.5.

Types of Alcohol Used in Jello Shots

The usual types of alcohol used in jello shots were vodka (N=12), tequila (N=3), rum (N=1), and gin (N=1). No other alcohol type was reported.

Drink Equivalents

The total number of alcoholic drink equivalents for jello shots consumed by respondents in our sample during the past 30 days was 177. In other words, the respondents in our sample consumed the equivalent of 177 drinks of liquor through jello shots. This represents an average of 8.0 liquor drinks per person per month among those who consumed jello shots.

Among those who consumed jello shots, the percentage of their total alcohol consumption attributable to jello shots ranged from 1.2% to 92.6%, with a mean of 14.5%. The proportion of jello shot users who derived at least 10% of their overall alcohol consumption from jello shots was 61.9%.

Alcohol Brand Preferences Among Jello Shot Users

Among respondents who used jello shots, the most frequently reported brand of liquor was Smirnoff Vodka (N=6), followed by Absolut Vodka (N=2), Grey Goose Vodka (N=2), Skyy Vodka (N=2), and UV Vodka (N=2).

Other Alcohol Consumption Among Jello Shot Users

Among respondents who used jello shots, the prevalence of past 30-day use of alcoholic beverage types was as follows: beer – 80.1%, flavored alcoholic beverages – 72.3%, mixed drinks – 71.3%, vodka – 55.6%, rum – 39.0%, bourbon – 35.5%, alcoholic energy drinks – 31.7%, cordials and liqueurs – 27.4%, tequila – 23.9%, wine – 20.3%, brandy – 19.8%, whiskey – 17.1%, scotch – 16.0%, cognac – 14.9%, and gin – 14.1%.

Discussion

To the best of our knowledge, this is the first paper to report the prevalence of jello shot consumption among a national sample of adolescents. We found a past 30-day prevalence of jello shot consumption of 21.4% among 16-20 year-olds in this pilot study. While the frequency of jello shot use was low, the number of jello shots youth consumed on drinking occasions was considerable, resulting in liquor consumption equivalent to an average of 8.0 liquor drinks per person per month among those who consumed jello shots.

This amount of liquor consumption – derived through jello shots – makes up a substantial proportion of the overall amount of liquor consumed by the youths in our sample. Among youths who consumed liquor, but not jello shots, the average number of liquor drinks per person during the past 30 days was 18.6 drinks. Among youth who consumed jello shots, the average monthly liquor consumption per person through their jello shots was 8.0 drinks. Thus, through jello shot consumption alone, youths ingested nearly half (43%) of the amount of liquor of those who drank liquor but did not use jello shots.

We found that jello shot consumption was significantly more prevalent among youths from lower income households and among youths who drank more frequently and/or engaged in heavy episodic drinking. It appears, then, that jello shot use is a phenomenon associated with higher risk drinking behavior.

Our finding that jello shot consumption is common among older adolescents is concerning for several reasons. First, there is strong evidence that gelatin is an effective alcohol delivery device. Peris et al. (2006) demonstrated that jello shots are an effective way of administering alcohol to rats. The voluntary consumption of jello shots by rats resulted in brain ethanol levels comparable to those achieved using similar amounts of ethanol drinking, but did not require the usual procedure of starving the rats or depriving them of water to induce ethanol consumption as the rats readily self-administered the jello shots. Peris et al. (2006) also demonstrated that ethanol levels in jello shots are stable over time. Ralevski et al. (2006), in a human study, demonstrated that the ingestion of jello shots resulted in similar blood and breathalyzer alcohol levels as the consumption of alcoholic beverages, as well as similar mood effects.

Second, youth are particularly vulnerable to intoxication from jello shots because gelatin has been found to be effective in masking the bitter taste of alcohol thereby making it less apparent that considerable amounts of alcohol are being ingested. Ralevski et al. (2006) showed that jello shots were effective in masking the knowledge that alcohol had been consumed; compared to standard alcohol drinks, human subjects who were given jello shots were substantially more likely to believe they had ingested placebo. Furthermore, alcohol delivery vehicles that impart sweetness and flavor may mitigate the unpleasant bitterness of alcohol among early alcohol experimenters (Copeland, Stevenson, Gates, and Dillon, 2007).

Third, by combining a familiar, widely available, and generally appealing product—jello—with alcohol, jello shots may enhance the initiation of alcohol use among novice drinkers. Stevenson, Copeland, and Gates (2007) reported that when alcohol is delivered through a familiar, appealing vehicle, the similarity between the beverages allows the positive perception of the non-alcoholic beverage to carry over to the alcoholic beverage, thereby enhancing the transition to alcohol consumption among novice drinkers.

Fourth, there exists a culture that supports the underage consumption of jello shots. For example, countless recipes for making jello shots are easily available on the internet (Drink Recipe, 2010; Drinks Mixer, 2010; How to Make Jello Shots, 2010; Jellophile, 2010; Jello Shots and Shooters, 2010). There are a number of books that provide instructions and recipes for making jello shots (Calhoon and Calhoon, 2004; Facebook Jello Shot Search, 2010; Sullivan, 2006). There are at least 88 jello shot groups on Facebook (Facebook Jello Shot Search, 2010). Restaurants and bars often promote jello shots by including them as part of their drink specials (Halligan's Restaurant and Bar Facebook Page, 2010; Menu Pages Restaurant Search, 2010). There are numerous videos on YouTube showing young people making and consuming jello shots (Youtube Jello Shot Search, 2010). One video shows a popular television personality, Kelly Ripa, having three jello shots within 30 seconds (Kelly Ripa Does Jello Shots, 2010). The Yale University Health Services web site describes the use of grain alcohol in jello shots (Yale Health Plan, 2010). There has been at least one report of a death attributable to jello shots. In 2007, a 20 year-old who consumed jello shots at an off-campus party at Penn State University was convicted of vehicular homicide after striking two pedestrians (Schackner, 2007). In general, the consumption of liquor shots has been associated with a higher risk of severe negative consequences (Usdan et al., 2008).

This research is limited because of the pilot study's small sample size and the relatively low precision of our prevalence estimates, as well as the non-random nature of the sample,

which was obtained by consecutive sampling. Therefore, the specific estimate of the prevalence of jello shot consumption should be interpreted with caution and viewed only as a preliminary estimate. Despite this limitation, however, the study reveals that jello shot consumption among older adolescents is a significant phenomenon that should be recognized in the alcohol literature. Jello shot use is not only prevalent among underage youth but it represents a substantial proportion of their overall alcohol intake. This phenomenon is particularly concerning because of evidence that jello is an effective vehicle for alcohol delivery that masks the bitter taste of alcohol and makes it easier for youth to consume larger quantities.

Future surveillance of youth alcohol use should include jello shots, as they appear to be an important source of youth alcohol intake. Further research on jello shots should quantify the nature and extent of its use among a large, nationally representative sample of youth and examine the potential association of jello shot use with high risk drinking behaviors.

Acknowledgments

This study was supported by the National Institute on Alcohol Abuse and Alcoholism Center Grant P60AA1375905S1.

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Glossary

Internet panel	An internet panel is a sample of individuals who agree to participate in online survey research. The panel may be recruited by probability or non-probability sampling methods
Jello shots	An alcoholic “beverage” made by preparing jello using a conventional recipe, but substituting alcohol for some of the water in the recipe

Figure 1.
Frequency of jello shot consumption among jello shot users by number of days consumed in the past month.

Figure 2. Typical number of jello shots consumed by respondents on days they had jello shots.

Table 1

Background characteristics of study sample

	Number	Proportion
Total	108	
Sex		
Male	60	55.6%
Female	48	44.4%
Age		
16 – 18 years old	53	49.1%
19 – 20 years old	55	50.9%
Race/Ethnicity		
White, non-Hispanic	72	66.7%
Hispanic	24	22.2%
Black	9	8.3%
Other	3	2.8%
Household Income		
Less than \$25,000	9	8.3%
\$25,000-\$49,999	26	24.1%
\$50,000-\$99,999	43	39.8%
\$100,000 or more	30	27.8%
Education		
Less than high school	51	47.2%
High school graduate	31	28.7%
Some college	26	24.1%
Frequency of Drinking, Past Month		
1 or 2 days	44	40.7%
3 to 6 days	36	33.3%
7 or more days	28	25.9%
Frequency of Heavy Episodic Drinking (five or more drinks in a row), Past Month		
0 days	39	36.1%
1 day	30	27.8%
2 or more days	39	36.1%

Table 2

Past 30-days consumption of jello shots among 16 – 20 year-old drinkers

	Prevalence	95% Confidence Interval
Overall (N=22)	23.1%	11.0% - 31.8%
Sex		
Male (N=11)	17.6%	6.3% - 29.0%
Female(N=11)	26.1%	7.4% - 44.8%
Age		
16 – 18 years old (N=12)	27.4%	11.4% -43.4%
19 – 20 years old (N=10)	11.2 %	3.7% - 31.0%