

Health Risks of Oregon Eighth-Grade Participants in the “Choking Game”: Results From a Population-Based Survey



WHAT'S KNOWN ON THIS SUBJECT: Estimates of youth participation in strangulation activity, commonly referred to as the “choking game,” range from 5% to 11%. Previous studies have documented correlations between youth choking game participation and health risks such as substance use and mental health issues.



WHAT THIS STUDY ADDS: Among Oregon eighth-graders surveyed, >6% had ever participated in the choking game. Participation was linked to poor nutrition and gambling among females, exposure to violence among males, and sexual activity and substance use among both genders.

abstract

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OBJECTIVE: To examine the risk behaviors associated with participation in the “choking game” by eighth-graders in Oregon.

METHODS: We obtained data from the 2009 Oregon Healthy Teens survey, a cross-sectional weighted survey of 5348 eighth-graders that questioned lifetime prevalence and frequency of choking game participation. The survey also included questions about physical and mental health, gambling, sexual activity, nutrition, physical activity/body image, exposure to violence, and substance use.

RESULTS: Lifetime prevalence of choking game participation was 6.1% for Oregon eighth-graders, with no differences between males and females. Of the eighth-grade choking game participants, 64% had engaged in the activity more than once and 26.6% >5 times. Among males, black youth were more likely to participate than white youth. Among both females and males, Pacific Islander youth were much more likely to participate than white youth. Multivariate logistic regression revealed that sexual activity and substance use were significantly associated with choking game participation for both males and females.

CONCLUSIONS: At >6%, the prevalence of choking game participation among Oregon youth is consistent with previous findings. However, we found that most of those who participate will put themselves at risk more than once. Participants also have other associated health risk behaviors. The comprehensive adolescent well visit, as recommended by the American Academy of Pediatrics, is a good opportunity for providers to conduct a health behavior risk assessment and, if appropriate, discuss the dangers of engaging in this activity. *Pediatrics* 2012;129:846–851

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KEY WORDS

adolescent medicine, adolescents, injury prevention and control, preventive health care visits, risk assessment

ABBREVIATIONS

AEA—autoerotic asphyxiation
CI—confidence interval
OHT—Oregon Healthy Teens
OR—odds ratio

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A strangulation activity, commonly referred to as the “choking game,” has been garnering more attention over the past few years from both the media^{1,2} and academia.³ The choking game refers to an activity where pressure is applied to the neck/carotid artery to limit oxygen and blood flow; once the pressure is released, a “high” or euphoric feeling might be achieved as blood and oxygen rush back to the brain. This is a non-sexual activity and therefore distinct from autoerotic asphyxiation (AEA) in its underlying motivations.^{4,5} Participation in this activity can lead to serious injury or death.

Scientific examination of the prevalence of this behavior has been extremely limited until recently. A handful of studies of youth conducted over the past few years have illustrated lifetime prevalence of between 5% to 11%.^{6–9} Some estimates have shown an increased likelihood of participation among males, older youth,⁴ and those living in rural areas.⁹ In the United States, between 1995 and 2007, there were 82 deaths in children ages 6 to 19 years attributed to participation in the choking game and identified through newspaper and other media accounts.³ This total is a likely underestimation of the true number because only those deaths covered by the media were included; in addition, stigma and a lack of accurate systems for identifying and coding deaths contribute to underreporting.

Little is known about the children participating in this dangerous activity. Researchers using data from the 2008 Oregon Healthy Teens (OHT) survey, which included a single question on prevalence among eighth-graders, reported a lifetime prevalence of 5.7% (95% confidence interval [CI]: 5.0%–6.5%).⁸ Rural youth had slightly higher rates than those in urban areas, but no gender difference was found. Having a mental health risk and/or substance use issue

was shown to be significantly associated with higher levels of participation in the choking game. A 2010 Ohio study suggested possible links between participation in the choking game and higher occurrences of other youth risk behaviors.⁷ This type of information can be useful in trying to identify children participating or at risk for participating.

For this study, we used data from the 2009 OHT survey to examine 3 research questions: (1) Given the newness of this area of surveillance, is the 2008 reported lifetime prevalence estimate stable? (2) How many times have participants undertaken this activity? (3) Which other risk behaviors are strong predictors of participation (and do these predictors vary according to gender)? We hypothesized that prevalence would remain stable from 2008 because the data collection period occurred in spring 2009, before much of the media attention to this issue. We also hypothesized that mental health issues and substance use would continue to be strong predictors of participation. Identification of additional predictors and the strength of the associations may help school personnel, clinicians, and others to identify children at risk and intervene.

METHODS

We collected data on choking game awareness, lifetime prevalence, and participation frequency by using the 2009 OHT survey, a population-based survey of eighth- and 11th-graders designed to measure adolescent health and well-being. It is based on the Centers for Disease Control and Prevention’s Youth Risk Behavior Survey¹⁰ and includes questions about physical and mental health, sexual activity, substance use, physical activity/nutrition, and community characteristics. All Oregon public secondary schools were part of the sampling frame. For the 2009 survey, school districts were randomly sampled;

in larger districts, schools were also randomly sampled from within those districts. Knowing the number of students in each grade in each school, we weighted the data to achieve a statewide representative sample based on the probability of students being selected. Reported lifetime prevalence of participation in the choking game was examined among both eighth-graders and 11th-graders and found to be statistically similar, so the more complex analysis presented here was limited to eighth-graders.

The survey continued the same prevalence question from 2008, with an added question about lifetime frequency: “The next question refers to the ‘Choking Game,’ also called *Knock Out*, *Space Monkey*, *Flatlining*, or *The Fainting Game*.”

This is an activity that some youth participate in to get a high by cutting off blood and oxygen to the brain with a belt, towel, rope or other item. Which of the following is true for you? (Please mark all that apply.)

- a. I have never heard of the Choking Game
- b. I’ve heard of someone participating in the Choking Game
- c. I have helped someone else participate in the Choking Game
- d. I have participated in the Choking Game myself

How many times in your life have you participated in the ‘Choking Game’ yourself?

- a. None, I have never participated myself
- b. One time
- c. Two times
- d. 3–5 times
- e. More than 5 times”

All analyses were conducted by using Stata 11.0 (Stata Corp, College Station, TX), incorporating appropriate survey weighting and design variables. We ran

bivariate analyses on choking game participation with demographic characteristics and individual health risks by using χ^2 tests and logistic regression. Gender was shown to be a confounding variable, so we ran all analyses separately on females and males to create and analyze gender-specific “risk profiles.” Individual health risks fell into 1 of 8 categories: physical health, mental health, gambling, sexual activity, nutrition, physical activity/body image, exposure to violence, and substance use.¹¹

Variables with a significant bivariate association with choking game participation were then divided into appropriate topical categories (Table 1). Youth were included in a given risk category if they had at least 1 of the individual health risks within that category. All but 2 of the 8 original categories (physical health and physical activity) had significant bivariate associations with choking game participation. We then used the 6 broader health risk categories for multivariate logistic regression to predict choking game participation. We ran backward logistic regression separately for males and females by using the health risk categories and 2 demographic characteristics (urban/rural and school grades).

RESULTS

Of the 5595 youth who received the 2009 survey, 5348 eighth-graders (age range: 12–15 years) completed it (a 95.6%

response rate). Of these, 5164 (96.6%) answered the choking game lifetime prevalence question and 4918 (92.0%) answered the lifetime frequency question.

Overall, 22% (95% CI: 18.7%–25.7%) of eighth-graders said they have heard of someone participating in the choking game. Only 1.2% (95% CI: 0.7%–2.0%) indicated they have helped someone participate, and 6.1% (95% CI: 5.0%–7.5%) said they have ever participated in the choking game themselves. We found no significant gender differences. However, we did find differences in lifetime participation related to race and ethnicity (Table 2). Among males, black students (odds ratio [OR]: 3.47 [95% CI: 2.0–6.1]) and Pacific Islander students (OR: 4.95 [95% CI: 1.8–13.5]) had significantly higher rates of participation than white students (referent). Among females, Pacific Islander youth had significantly higher participation rates (OR: 5.77 [95% CI: 1.9–17.3]) than white females.

We found no statistically significant difference in participation according to urban/rural status. Youth with better self-reported grades were less likely to participate than those with lower grades.

On the question of lifetime frequency, 3.4% of youth reported participating more than once or approximately two-thirds of lifetime participants (Table 3). In addition, 26.6% of those who ever participated reported doing so on >5

occasions. Gender was not a significant variable.

Although the focus of the analysis was on the eighth-grade results for reasons cited earlier, the basic 11th-grade results are also reported here. Overall, 33.6% (95% CI: 30.6%–36.8%) of 11th-graders said they have heard of someone participating in the choking game. Only 1.7% (95% CI: 1.2%–2.4%) said they ever helped someone participate, and 7.6% (95% CI: 6.4%–9.0%) said they ever participated themselves. Girls were more likely than boys to have heard of someone participating (36.1% vs 30.9%; $P < .01$), but otherwise there were no significant gender differences.

When we assessed bivariate relationships between health risk categories and choking game participation by using logistic regression on eighth-grade males and females, choking game participation was significantly associated with the following health risk categories: poor mental health, substance use, poor nutrition, exposure to violence, sexual activity, and gambling. Physical activity and physical health were the only risk categories not associated with choking game participation for either males or females.

By using risk categories with significant bivariate results and controlling for geographic location (urban/rural) and school grades, multivariate logistic regression yielded slightly different predictive risk profiles for males versus females. Lifetime sexual activity and 30-

TABLE 1 Composition of Health Risk Categories for Bivariate and Multivariate Analyses

Substance use	Sexual activity	Poor nutrition	Exposure to violence	Gambling	Poor mental health
30-d alcohol use	Ever had sexual intercourse	Food insecure	Skipped school because felt unsafe	Ever gambled for money	Fair/poor mental health status ^a
30-d tobacco use		Low fruit/vegetable consumption	30-d gun use	30-d gambling	Unmet mental health need
30-d marijuana use		Low breakfast consumption	Been threatened with weapon		Contemplated suicide
			Been in physical fight in past 12 mo		Felt sad/hopeless for at least 2 wk

Youth respondents had to meet at least 1 of the criteria within a given category to be included in that risk category.

^a Respondents answering “fair” or “poor” to question about their overall mental health. <http://public.health.oregon.gov/BirthDeathCertificates/Surveys/OregonHealthyTeens/results/2009/8/Documents/healthcare8.pdf>.

TABLE 2 Prevalence of Eighth-Grade CG Participation According to Race/Ethnicity and Gender

Race/Ethnicity	Female			Male		
	CG %	OR	95% CI	CG %	OR	95% CI
White	5.6	Ref	Ref	4.0	Ref	Ref
Hispanic	7.5	1.36	0.8–2.2	6.1	1.56	0.9–2.9
Black	5.5	0.97	0.4–2.3	12.6	3.47	2.0–6.1
Asian	0.9	0.14	0.02–1.1	10.0	2.67	0.4–16.2
American Indian	7.9	1.43	0.8–2.7	5.7	1.45	0.8–2.5
Pacific Islander	25.6	5.77	1.9–17.3	17.0	4.95	1.8–13.5

CG, choking game; ref, reference.

TABLE 3 Lifetime Frequency of Eighth-Grade Choking Game Participation

How many times in your life have you participated in the "Choking Game" yourself?	Weighted %	Unweighted N
Missing ^a	0.9	42
Never	93.9	4670
1 time	1.9	91
2 times	1.0	56
3–5 times	0.9	46
>5 times	1.4	55
Subtotal (>1 time)	3.4	157

^a Forty-two eighth-graders who said they ever participated did not answer this question on frequency. This results in a lower prevalence rate when just looking at the lifetime frequency question.

day substance use were common predictors for both males and females. Eighth-grade females who had ever had intercourse were 4 times as likely to participate in the choking game as those who never had sex (OR: 3.97 [95% CI: 2.4–6.6]). The other significant health predictors among females were poor nutrition (OR: 2.42 [95% CI: 1.3–4.5]), 30-day substance use (OR: 2.11 [95% CI: 1.4–3.3]), and gambling (OR: 1.72 [95% CI: 1.3–2.3]). For eighth-grade males, 30-day substance use was the strongest predictor of choking game participation (OR: 3.87 [95% CI: 1.9–7.7]), followed by sexual activity (OR: 3.01 [95% CI: 1.9–4.7]), and exposure to violence (OR: 2.14 [95% CI: 1.5–3.1]). Full results are available in Table 4.

DISCUSSION

The prevalence of participation in the choking game in 2009 was consistent with 2008 findings on the same survey (6.1% vs. 5.7% in 2008 [95%

CI: 5.0%–6.5%]), indicating that this may be a stable indicator of participation. When comparing prevalence rates of choking game participation, 11th-graders' lifetime prevalence of 7.6% (95% CI: 6.4%–9.0%) (OHT unpublished data) is statistically equivalent to the rate for eighth-graders reported here (6.1% [95% CI: 5.0%–7.5%]). This finding is in contrast to many other youth risk behaviors, where prevalence steadily increases with age (eg, alcohol use, unprotected sex).¹⁰ Other health risks, for example, inhalant use, show a similar pattern, where both annual and 30-day use are the same or higher among middle school students than among high school students.^{12,13}

Although some youth have only participated once, most (64% of participating eighth-graders) have tried it at least twice and approximately one-fifth indicated participating >5 times. Although the total participants were relatively few, this finding does suggest that if a provider identifies a youth who has already participated in the choking game, he or she may be likely to do so again. This finding, along with evidence that many youth have a limited understanding of the potential risks and dangers of the choking game,⁶ illustrates the importance of health education messaging. Clear, youth-friendly messages about the possible consequences of this activity are warranted.

Through this study, we sought to identify strong predictors of choking game participation and whether those predictors

vary according to gender. The intersection of race and gender may also be significant for choking game participation. The participation rates of Pacific Islander youth were dramatically higher than other races among both females and males, whereas rates among black males were also significantly higher than the participation rates among white males. Dake et al⁷ also looked at race/ethnicity but found no significant differences in participation rates for middle school youth and only a marginally higher participation rate among Hispanic high school youth. However, their findings were not stratified according to gender, and any differences may have been obscured by this fact. Unfortunately, given the relatively low numbers of non-white youth in our sample, we could not include race in the multivariate modeling to see how it interacted with the other health risks.

The results of this study reveal that choking game participation clusters with other risk behaviors and is not an activity, among those studied, that is more likely to be found among high-achieving, low-risk-taking youth. The latter idea is often reported in the popular press² and has also appeared in some case histories in academic studies of youth participants.^{14–16} The strong relationships found between health risks and choking game participation is similar to what Dake et al⁷ found in their middle school survey. However, it offers a more robust validation of the Ohio study findings, given this study's inclusion of 2 clear survey questions assessing choking game participation and prevalence.

Although sexual intercourse was a significant predictor of participation for both females and males, this finding should not muddle the distinction between the choking game and AEA. Research on AEA is scant, but although there is speculation that choking game participation may precede incidents of AEA,⁵ we were unable to find any evidence

TABLE 4 Eighth-Grade CG Participation According to Health Risk Category (2009 OHT Survey)

Health Risk Category	Females			Males		
	Unweighted <i>n</i>	Participated in CG, %	Multivariate OR (95% CI)	Unweighted <i>n</i>	Participated in CG, %	Multivariate OR (95% CI)
Total	2584	6.6	—	2376	5.7	—
Location						
Urban	1686	7.0	Reference	1521	5.6	Reference
Rural	898	5.8	0.86 (0.6–1.3)	855	6.0	1.06 (0.5–2.1)
Grades						
As or Bs	1942	5.1	Reference	1538	4.2	Reference
Cs, Ds, or Fs	484	11.6	1.0 (0.5–2.1)	660	9.0	1.72 (0.8–3.5)
Poor mental health						
No	1515	3.9	Reference	1759	4.0	Reference
Yes	1069	10.3	NS	613	10.6	NS
Substance use						
No	1805	3.5	Reference	1655	2.2	Reference
Yes	666	13.3	2.11 (1.4–3.3)	543	15.8	3.87 (1.9–7.7)
Sexual intercourse (lifetime)						
No	2132	3.7	Reference	1946	3.0	Reference
Yes	418	21.3	3.97 (2.4–6.6)	385	17.3	3.01 (1.9–4.7)
Poor nutrition						
Yes	1358	3.0	Reference	1063	3.7	Reference
No	1224	9.4	2.42 (1.3–4.5)	1297	7.9	NS
Exposure to violence						
No	1803	3.8	Reference	1311	2.1	Reference
Yes	781	12.1	NS	1064	9.8	2.14 (1.5–3.1)
Gambling						
No	1792	4.4	Reference	1301	3.3	Reference
Yes	784	10.9	1.72 (1.3–2.3)	1050	8.1	NS

CG, choking game; NS, not significant.

in the literature that links the 2 activities. The onset of sexual activity before high school is often connected with other health risks,¹⁷ and its emergence here is indicative of how younger adolescents with 1 health risk may be prone to other risks as well.

Considering these findings, how can we decrease participation in this dangerous activity? Little is understood about effective choking game prevention messaging or how best to screen for this behavior. Previous research has shown that youth may have a poor understanding of the risks inherent to strangulation activities, although age-specific prevention has been identified as important.⁶ Furthermore, pediatricians and family practitioners have limited awareness of this activity.¹⁸ Thus, increasing awareness among health providers who can then counsel patients and families is important. Information from studies like this, that help identify

children who may be at-risk of participating, is a first step.

We cannot, within the scope of this research, provide specific recommendations as to the types of prevention messages or screening tools that may be most effective in preventing and/or curbing this activity. However, we do believe that the routine adolescent well visit, as recommended by the American Academy of Pediatrics,¹⁹ offers a strong vehicle for clinicians to address this issue. During the physical examination, providers can look for any potential signs of participation (eg, unexplained bruising or red marks on the throat, petechiae, frequent headaches). The American Academy of Pediatrics specifically recommends that the adolescent well visit also be a time to address emotional well-being, risk reduction (including substance use and sexual activity), and violence prevention. A provider who encounters an adolescent with some

of the risk behaviors most associated with choking game participation may want to consider asking about awareness of and participation in the choking game. A good place to insert these questions may be while addressing risk reduction via the substance use questions.¹⁹ Regardless of the level of youth awareness, clinicians who see adolescents are in a unique position to offer clear messaging about the risks and consequences of choking game participation. Further research is needed to determine the most appropriate and effective methods for screening patients and counseling adolescents and their families.

Appropriately describing this activity for research and reporting purposes has been challenging. Because the choking game can lead to injuries and death, the term “game” downplays its associated risks and glamorizes the behavior. To that end, some experts have recommended referring to this exclusively as a “strangulation activity.”²⁰ However, given clinical providers’ low recognition of this activity¹⁸ and the importance for youth to understand exactly what the activity is, we continue to use “choking game” here. We recognize the limitations of this terminology and emphasize that it should be used carefully and with an appropriate description of its consequences.

Although this study offers additional insights into the characteristics of youth who have participated in the choking game, it does have several limitations. First, the survey questions were not tested for reliability or validity. We do not know how well or consistently students understood the questions and response categories. Another limitation relates to a lack of sufficient numbers for in-depth analysis. It would have been interesting to explore the differences among youth with differing levels of participation, as well as how differences in participation rates according to race/ethnicity related to other health

risks. In particular, it would have been preferable to include race and ethnicity in the multivariate models to see how increased participation rates among some black and Pacific Islander youth were affected. Unfortunately, small numbers precluded these analyses. Thirdly, analysis of cross-sectional survey data is methodologically limited and does not allow an examination of the temporality of risk behaviors.

Lastly, we present a general note of caution. This study, as with any involving a cross-sectional survey, is based on data from a specific population (Oregon eighth-graders). Results should not be generalized to the broader youth population until data from other studies (preferably using additional methods) are available.

Additional OHT surveys will continue to monitor lifetime prevalence and awareness of strangulation activities.

Further research is necessary to explore how recently participation has occurred, how well youth understand the risks of participation, potential race or ethnic disparities, how best to screen for this activity, and what messages are effective in preventing it.

CONCLUSIONS

Previous research has shown that pediatricians and family practitioners have limited recognition of youth participation in the choking game; youth themselves lack an understanding of the risks of participation. With a prevalence rate of ~6% among Oregon eighth-graders, this study reinforces previous data about participation prevalence. It also adds that most of those who participate will put themselves at risk more than once. Finally, it provides important information about markers

that clinicians might use in assessing youth risk for participation in the choking game. Associated risk behaviors primarily include substance use and sexual activity, with poor nutrition, gambling, and exposure to violence also possibly relevant. As with other adolescent health risks, identification and intervention are important in averting health consequences. Providers should consider asking youth about their awareness of and participation in the choking game, particularly if other risk markers are present. We recognize that providers are pressured because of the limited time allotted to a comprehensive well visit and that some may feel that other issues are more relevant to a particular patient. However, we hope that some anticipatory guidance may be a first step toward reducing youth participation in the choking game and its associated injury and death.

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