

## Beverage consumption during television viewing and tooth sensitivity in Nigerian adolescents

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### Abstract

**Aim:** The study assessed the television (TV) viewing habits, preferred energy and acidic drinks consumed when watching television and the history of tooth sensitivity among adolescents who watched television >2 hours daily (HTV) and <2 hour daily. (LTV).

**Subjects and Methods:** This is a descriptive study conducted in Ife Central Local Government Area (LGA) of Osun State, Nigeria. The targeted respondents were secondary schools adolescents. Out of 13 public schools the LGA, 8 schools were randomly selected. In each School, 50 questionnaires were administered through the school counselors.

**Results:** 398 questionnaires were analyzed comprising of 52.3% males and 47.7% females. All the participants have access to television. 55.3% participants were the heavy viewers while 44.7% were low. 62% participants had more than one TV at home and 56.3% had access to TV in their bedrooms. HTV predominantly watch TV in the night; watch whatever they want and watch all day if allowed. The HTV have higher variable scores (VS) on all the evaluated drinks except beer. 70% of the participants with history of tooth sensitivity were HTV with a statistically significant difference from LTV with tooth sensitivity. 61.8% of those with tooth cavities were HTV.

**Conclusion:** HTV were found to have tendencies that enhance increased TV time more than the LTV. They also prevalently consumed high energy and acidic drinks during TV time. History of tooth sensitivity was common among the HTV. Oral health practitioners may need to inquire about long TV time in patients with intractable tooth sensitivity.

**Keywords:** Drinking habits, television viewing, tooth sensitivity

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### Introduction

Television is a prominent part of a child's life due to its widespread use and availability. It is ubiquitous in most developed countries, and evidence suggests that many young people exceed recommendations for television viewing (1). It is also an integral part of the family activity. In many instances, the central focus of the family room or living room is the television set. The furniture is arranged in order to allow each family member to have the "best seat in the house" to see the television. However, depending on the household, television viewing may not always be a family activity. For example, many families have more than one television set and some children may even have a set in their bedroom (2). Its combined effects of audio and visual makes it to be a potentially strong agent for children, adolescents and other family members. The impact is more on adolescents because they are more impressionable than adults. When children watch television, they

are not always alone or isolated from other activities. They often do other things while they watch television. For instance, children may play with toys, hold discussions on the day's activities, and eat meals or snacks (2)

Since most adolescents belong to secondary school age, they seem to be easily influenced by what they see or hear in their environment. They are a very mobile group gaining access to several television stations and programmes. By their use of television, there is every likelihood for an increase in their knowledge, career choices, and behaviour through the programmes they watch. A study by Johnson et al. (3) shows that average adolescent spends more time watching television than in the classroom. The time spent watching television, has been attributed to being one of the causes of the fallen standard of education in developing countries like Nigeria. The time spent viewing TV frequently limits the time for vital activities like

playing, reading, spending time with family and friends, developing other necessary physical, mental and social skills. (4)

During the time spent watching television, adolescents are exposed to numerous advertisements that can influence the type of food desired, requested and consumed (5). Television viewing behaviours may act as a complement to stimulate eating by potentially causing a distraction resulting in a lack of awareness of actual food consumption or overlooking food cues, which may lead to overconsumption and increased energy intake (6).

The amount of time the child spends watching television has been shown to be correlated with the proportion of TV advertised junk foods in a child diet (7). Coon and Tucker (8) found that high levels of TV viewing were associated with reduced nutritional quality in the diet of school-aged children. Cross-sectional studies showed that television viewing is associated higher energy-dense beverage consumption (9), and higher energy-dense snack consumption (10) in adolescents. Research examining longitudinal associations between television viewing and eating among adolescents has shown that television viewing is predictive of higher sugar-sweetened beverage and fast food intakes. (11).

Interestingly, findings suggest that longer duration of TV watching influences the frequency of consumption of soft drinks, some sweets and snacks among children and young adolescents (12). Most high energy beverages are acidic and have dental erosive potential. No author was found to have assessed the risk of developing tooth sensitivity in this population of television viewers. It is the aim of this study to evaluate some of these television habits, preferred snacks and drinks consumed during television viewing and history of tooth sensitivity among heavy and light television viewers.

### Study subjects and methods

The survey was conducted among secondary schools adolescents in Ife Central local Government of Osun State, Nigeria. There are about 13 public secondary schools in the Local Government Area from which 8 were randomly selected. Information was collected by self-administered questionnaires through the school counselors. In each school, 50 students were

randomly selected by their counselors; they were made to complete the questionnaires anonymously and retrieved immediately. Some items in the questionnaires regarding television habits were modified from the one used by Harper-Gilmore. (2)

Questions were asked about availability of television in their homes and individual rooms. They were to indicate their daily television viewing time; less than 2 hours daily (low television viewers) and more than 2 hours (heavy television viewers). Television habits were evaluated with five questions and their responses ranged from very frequently to very rarely. Preferred energy and acidic drinks consumed when viewing television was evaluated with a list of common drinks and sweets. The extent to which television has influenced their choice of drink was also sought by this question "Television programmes/images influence your choice of drinks". It was rated from "strongly agree" to "strongly disagree". They were asked to answer in the affirmative 'Yes' or 'No' whether they have history of sensitive teeth and whether they have cavities in any of their teeth.

The data was analyzed based on the information provided by the respondents and SPSS Software Version 16.0 was used to run the frequencies and cross-tabulations. Manual computation was done to construct the variable scores. For the secondary analysis of the data, ratings for the evaluated variables were according to the Likert's scale of measurement and were assigned weight values of 5 for "very frequently"; 4 "frequently"; 3 "occasionally"; 2 "rarely" and 1 for "very rarely". Also employed were weight values of 5 for "strongly agree"; 4 "agree"; 3 "not sure"; 2 "disagree" 1 "strongly disagree".

The total weight value (TWV) for each variable was obtained through the summation of the product of the frequency of responses for each Likert scale rating and the respective weight value. This is also expressed mathematically below:-

$$TWV = \sum_{i=1}^5 F_i \cdot W_i$$

(where TWV is the total weight value,  $F_i$  is the frequency of respondents that rated the variable  $i$ ; and  $W_i$  the weight assigned to the rating of the variable  $i$ .)

The score for each variable was arrived at by dividing the TWV for each item by the total number of respondents (398).

Variable score (VS) =  $\frac{TWV}{N}$  where N=number of study population (398).

The variable scores ranged from 1 to 5; the closer the value to 5 the higher the significance of the variable among the participants. The percentages of the variable scores were also computed as follows; VS/5 multiplied by 100%.

This was calculated for variables measured for television viewing habits, preferred drinks and the extent to which television programmes determined their choice of drinks.

**Results**

Four hundred questionnaires were administered and retrieved but 2 were inadequate for analysis and interpretation leaving 398 (47.7% females) questionnaires for analysis. All the participants claimed to have access to television and 220

(55.3%) participants watched television more than 2 hours daily (Heavy Television Viewers; HTV) while 178 (44.7%) had daily television viewing time of less than 2 hours (Low Television Viewers; LTV). Nearly sixty percent (59.1%) of heavy television viewers were males. Proportionately there were more males heavy television viewers compared to females ( $\chi^2 =4.16$ ;  $df=1$ ;  $p=0.04$ ). A total of 250 (62%) participants had more than one TV at home and 57.6% of them were heavy viewers. Of the 224 (56.3%) who had had access to TV in their bedrooms 130 (58%) were heavy viewers (Table 1). Furthermore, 100 (25.1%) participants claimed to have history of sensitive teeth; 70 (70%) were heavy television viewers while 30 (30%) were low television viewers. This difference was statistically significant. ( $x=7.12$ ,  $df=1$ ,  $p=0.00$ ). Thirty four participants (8.5%) claimed to have cavities on their teeth; 21 (61.8%) being HTV while 13 (38.2%) were LTV.

**Table 1 Association of heavy and low television viewers with Gender; Household with >1Television; Bedroom television; presence of tooth sensitivity and hole on the teeth**

Participants	Males	Female	Household with >1 Television	Bedroom TV	Presence of tooth sensitivity	Presence of cavities	
398	200	190	250	224	100	34	
<b>Heavy Television Viewers</b>	220	128 (64%)	90 (47%)	144 (57.6%)	130 (58%)	70 (70%)	21 (61.8%)
<b>Low Television Viewers</b>	178	72 (36%)	100 (52.6%)	106 (42.4%)	94 (42%)	30 (30%)	13 (38.2%)
	4.16;1;0.04*		0.34;1;0.56	0.44;1;0.51	7.12;1;0.00*	0.54;1;0.47	

\*statistically significant difference

On televisions habits (Table 2), higher variable scores (VS) for HTV were found in participants that watch television in the night; watch whatever they want and watch television all day if allowed. The LTV have higher variable scores in watching

television with parents and with other children. Heavy and light television viewers have equal variable score value on eating meals while the television is on.

Table II: Variable scores of television habits

S/N	Television habits		5	4	3	2	1	Total Weight Value (TWV)	Variable score (VS) (TWV/398)
1	Do you watch television in the night	<2h/d	180	144	132	56	34	546	3.07 (61.4%)
		>2h/d	230	264	78	92	36	700	3.18 (63.6%)
		<b>Total</b>	<b>410</b>	<b>408</b>	<b>210</b>	<b>148</b>	<b>70</b>	<b>1246</b>	<b>3.13 (62.6%)</b>
2	Do you watch whatever you want on the television?	<2h/d	140	144	138	72	32	526	2.96 (59.2%)
		>2h/d	200	192	156	108	26	682	3.1 (62%)
		<b>Total</b>	<b>340</b>	<b>336</b>	<b>294</b>	<b>180</b>	<b>58</b>	<b>1208</b>	<b>3.04 (60.8%)</b>
3	Do you watch TV all day if you are allowed?	<2h/d	130	176	84	100	30	520	2.92 (58.4)
		>2h/d	250	192	120	88	38	688	3.13 (62.6%)
		<b>Total</b>	<b>380</b>	<b>368</b>	<b>204</b>	<b>188</b>	<b>68</b>	<b>1208</b>	<b>3.04 (60.8)</b>
4	Do you watch Tv with your parent?	<2h/d	170	176	138	64	22	570	3.20 (64%)
		>2h/d	160	216	162	104	28	670	3.05 (61%)
		<b>Total</b>	<b>330</b>	<b>392</b>	<b>300</b>	<b>168</b>	<b>50</b>	<b>1240</b>	<b>3.12 (62.4)</b>
5	Do you watch television with other children in the family	<2h/d	270	184	120	28	24	626	3.51 (70.2%)
		>2h/d	240	256	138	80	22	736	3.35 (67%)
		<b>Total</b>	<b>510</b>	<b>440</b>	<b>258</b>	<b>108</b>	<b>46</b>	<b>1362</b>	<b>3.42 (68.4%)</b>
6	The TV is usually on when I'm eating meals	<2h/d	170	136	90	72	44	512	2.88
		>2h/d	200	160	126	92	52	630	2.86
		<b>Total</b>	<b>370</b>	<b>296</b>	<b>216</b>	<b>164</b>	<b>96</b>	<b>1142</b>	<b>2.87</b>

On the preferred energy and acidic drinks consumed when watching television (Table 3), soft drink was the most preferred drink with VS of 3.32 (66.4%). More than the LTV, the HTV have higher VS in all the evaluated refreshments (soft drinks, energy drinks, fresh orange juice, yoghurt, ice cream and sweets) except beer. Regarding television programmes' influence on choice of drinks, the heavy television viewers had variable score of 3.42 (68.4%) and low television viewers had 2.15 (43%).

### Discussion

This study may be limited in its applicability because clinical observation was not performed to determine the presence of tooth sensitivity, caries

and erosive lesions capable of triggering tooth sensitivity as claimed. Also the amount of drinks consumed was not quantified

Research shows that on an annual basis, children spend more time in front of the television than any other activity except for sleep (13). All the participants in this study claimed to have access to television in their homes and majority (62%) of them had more than one television at home. Of the latter category, they were predominantly heavy television viewers. Although not in Nigeria, this is similar to the report of New York Times of May 2011 (14) that United States household ownership of television is 96.7% and most American children are heavy television viewers with each of the households having more than one.

Table III: Variable scores of energy and acidic drinks

S/N	Refreshments		5	4	3	2	1	Total Weight Value (TWV)	Variable score (VS) (TWV/398)
1	Beer	<2h/d	60	104	24	64	152	404	1.84 (36.8%)
		>2h/d	90	32	18	40	126	300	1.72 (34.4%)
		<b>Total</b>	<b>150</b>	<b>136</b>	<b>42</b>	<b>104</b>	<b>278</b>	<b>710</b>	<b>1.78 (35.6%)</b>
2	Soft drink	<2h/d	240	160	114	36	34	584	3.28 (65.6%)
		>2h/d	350	144	138	76	30	738	3.35 (67%)
		<b>Total</b>	<b>590</b>	<b>304</b>	<b>252</b>	<b>112</b>	<b>64</b>	<b>1322</b>	<b>3.32 (66.4%)</b>
3	Energy drink	<2h/d	190	120	72	48	62	492	2.76 (55.2%)
		>2h/d	300	112	78	88	62	640	2.91 (58.2%)
		<b>Total</b>	<b>490</b>	<b>232</b>	<b>150</b>	<b>136</b>	<b>124</b>	<b>1132</b>	<b>2.84 (56.8%)</b>
4	Fresh orange juice	<2h/d	260	128	108	24	46	566	3.18 (63.6%)
		>2h/d	420	104	108	68	40	740	3.36 (67.2%)
		<b>Total</b>	<b>680</b>	<b>232</b>	<b>216</b>	<b>92</b>	<b>86</b>	<b>1306</b>	<b>3.28 (65.6)</b>
5	Yoghourt	<2h/d	250	136	78	56	40	560	3.15 (63%)
		>2h/d	380	136	126	60	38	740	3.36 (67.2)
		<b>Total</b>	<b>630</b>	<b>272</b>	<b>204</b>	<b>116</b>	<b>78</b>	<b>1300</b>	<b>3.26 (65.2%)</b>
6	Ice cream	<2h/d	210	88	156	52	36	542	3.04 (60.8%)
		>2h/d	360	136	120	56	46	718	3.26 (65.2%)
		<b>Total</b>	<b>570</b>	<b>224</b>	<b>276</b>	<b>108</b>	<b>82</b>	<b>1260</b>	<b>3.17 (63.4)</b>
7	Sweets	<2h/d	270	96	54	32	66	518	2.9 (58%)
		>2h/d	320	136	84	68	60	668	3.04 (60.8%)
		<b>Total</b>	<b>590</b>	<b>232</b>	<b>138</b>	<b>100</b>	<b>126</b>	<b>1186</b>	<b>2.98 (59.6)</b>
Mean of variables score ( $\bar{VS}$ )								<b>2.91 (58.2%)</b>	

Slightly more than half of adolescents who are the participants in this study spent more than 2 hours daily (heavy television viewers) watching television. Recent research suggests that children are now watching more television than ever (15). Various reasons have been adduced for this trend; television has more impact on adolescents because they are more impressionable than adults. Therefore, television programmes are used to assist children and adolescents in various subject areas and are used along with other teaching materials, to give a well rounded approach to learning materials. This has proved successful as children prefer learning visually at a young age. (16) Also, adolescence is a period during which teenagers feel the pressure of constructing an adult identity. One way of dealing with this pressure is to assemble a set of aspirations for the future. Young viewers therefore watch television as a way of wishful identification and preference for television portrayals (17). In the US, the American Academy of Pediatrics has expressed concerns about the amount of time children and adolescents spend

viewing television and the content of what they view. Accordingly, AAP (18) suggested that "pediatricians recommend to parents that they limit children's total media time (with entertainment media) to no more than 1 to 2 hours of quality programming per day".

59.1% of the heavy viewers were noticeably boys which was similar to the study of Filippou et al. in 2010. (19) Generally, in Nigeria girls do more house chores than boys. They are less aggressive and more pliable than boys which may have taken them away from the front of the television. Significant percentage (56.3%) of participants has bedroom television and prevalently watches television more than two hours daily. Adolescents who have bedroom television as found by some University of Minnesota School of Public Health researchers (11) have been categorized as heavy television watchers and opined they consumed larger quantities of sweetened beverages and fast food than teens without television in their bedrooms. This is also similar to the claim of Dennison et al. (15) that children with a television in their bedroom had more television viewing time and snack more than children without. Of recent in

2013, a television in the bedroom was found to be positively associated with time spent watching television and soft drink consumption (20). Previous evidence has been used by the AAP (18) to advise parents to remove television sets from children's bedrooms.

This study also shows that the heavy television viewers prevalently watch television in the night, watch whatever they want and have the tendency to watch television all day if allowed. It is plausible that this category of viewers were found to possess these habits.

Gerbner et al. described them as "viewers that watch more of everything" (21)

More than the low television viewers, all evaluated energy and acidic drinks were prevalently consumed by the heavy television viewers. A strong relationship has been found between high soft drink consumption and television viewing (22). This relationship was explained by Giammattei et al. (22) that they either eat sweets or drink soft drinks more often while they are watching television or as a result of the advertisements they see when watching television. Our findings show that more heavy television viewers claimed programmes watched on the television influenced their choice of drinks. Cariogenic food advertisements have been described as popular on children's favorite channels and television advertisements may strongly influence children's food preferences and eating habits. (23)

Further to the findings above, 31.8% of the heavy television viewers had history of tooth sensitivity which has a statistically significant difference from that reported by the low television viewers. The predominant use of erosive and cariogenic foods by this category of viewers might probably explain this finding. Suffice to say that most of the drinks evaluated have the potential to erode teeth and also cause dental caries. (24,25)

Luo et al. (26) showed a positive relationship between the consumption of soft drinks, caries and dental erosion. Soft drinks containing inherent acids and sugars have both acidogenic and cariogenic potential. Dental caries may result from a long-term high intake of soft drinks. In other cases, slowly progressed caries may suddenly become rampant. This may result from frequent exposure to erosive acids (27). Also carbonated

drinks have the potential to reduce surface hardness of enamel, dentine, microfilled composite, and resin-modified glass ionomer (28). It is generally acknowledged that caries and tooth wear often bring pain and tooth sensitivity especially at the slightest stimulation of exposed dentine. Tooth sensitivity or achy feeling, particularly during or after tooth brushing; eating sweet, hot, or cold foods and drinks is a well known complication of dental erosion and/or caries. On the strength of this, we suspected that this may have accounted for the sizable number of participants that have history of sensitive teeth among the heavy television viewers.

### **Conclusion**

Heavy television viewers had higher variable score (VS) in all the evaluated refreshments except beer and more of them reported tooth sensitivity.

### **Recommendations**

It is recommended that dentist and oral health practitioners should educate youngsters to limit sipping of acidic drinks because this may cause tooth erosion and ultimately tooth sensitivity.

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