



Original Article

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Association of Parents Sociodemographic Factors and Seden-tary Behaviors with TV Screen Time Among Pre-School Children

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ABSTRACT

Screen time in young children is associated with emotional, behavioral, and sleep problems that impact children's growth and development. Data regarding television (TV) screen time among preschool-age children in Saudi Arabia are scarce. We aimed to assess the relationship between parents' sociodemographics, sedentary behaviors, and TV screen time among preschool-age children in Saudi Arabia. An online-based cross-sectional study using a previously validated survey was conducted through August and September 2021. Chi-square and binary linear logistic regression tests were used to examine the relationship between parents' sociodemographics and sedentary lifestyles with TV screen time among preschool-age children. Of 1269 parents who completed the survey, 1103 met the inclusion criteria. 761 (69%) were mothers, 1040 (94.3%) were married, 903 (81.9%) had at least a bachelor's degree, and 663 (57.7%) of the study participants' preschool-age children were not enrolled in any educational institution. 861 (78.1%) of preschool-age children watched TV for ≥ 1 hour daily. Children of university graduates and children who enrolled in full-time preschool programs were more likely to watch TV for ≥ 1 hour daily (OR 1.45, 95% CI 1.01–2.11, $p=0.049$; OR 2.22, 95% CI 1.45–3.41, $p=0.001$). Eating snacks while watching TV and leaving the TV on regardless of being watched or not are positively associated with TV screen time (OR 1.78, 95% CI 1.07–2.97, $p=0.026$; OR 1.41, 95% CI 1.29–1.54, $p=0.001$). This study showed significant TV screen time among preschool-age children in Saudi Arabia.

Key words: TV screen time, Children's growth, Sedentary behaviors, Pre-school children

INTRODUCTION

Screen time or digital screen exposure refers to the period spent by an individual on displaying or using screen-based entertainment such as television (TV), smartphones, tablets, digital video discs (DVDs), video games, or computers. It is known to be common among young children [1, 2]. Worldwide, electronic media utilization has demonstrated rapid development, and children are excessively involved in a wide range of media that has become an essential part of their everyday lives [3]. The prevalence of excessive screen time ranges between 10% and 93.7% in high-income countries and between 21% and 98% in middle-income countries [4]. Watching TV is one

of the most prevalent sedentary habits among children and adolescents [5]. It accounts for approximately 42% of daily screen usage in the pediatric age group below eight years [6].

Excessive screen time has various adverse health consequences, including emotional, sleep, and behavioral problems that affect the growth and cognitive development of children under the age of five [4, 7]. It is linked to an increased risk of cardiometabolic diseases, physical inactivity, obesity, and a wide variety of psychosocial disorders [8, 9]. Several studies have also correlated prolonged TV watching to various adverse outcomes such as poor academic performance, decreased sleep duration, sleep terrors, nightmares, and daytime tiredness [5, 6]. In addition, eating while watching TV has been linked to increased consumption of ultra-processed foods, a known risk factor for obesity [10]. For these serious adverse effects, the World health organization (WHO) along with several other countries, including Australia, Canada, the United States of America (USA), the United Kingdom (UK), and New Zealand, have established recommendations to limit young children's Screen time [2]. Saudi Arabia's Ministry of Health follows the American Academy of Pediatrics (AAP) recommendation, which restricts the screen time for children aged 2 to 5 years to one hour per day of high-quality programming with adults who can assist them in comprehending what they are viewing [11, 12]. And to limit screen use during meals as well as an hour before sleeping [4, 6, 13].

Children are influenced by the home environment in which they live and spend the majority of their time [14]. The home environment consists of parents interacting with their children through entertaining and educational activities [14, 15]. It also requires the consideration of important elements such as parental quality, which includes maternal warmth, sensitivity, and responsibility towards the child [16]. Parents play a significant role within the home environment, as they can influence their children's physical activity and sedentary behaviors [17-19]. For example, reducing parents' screen time may encourage and support their children to increase their physical activity and reduce their screen time [2, 20]. Overall, sedentary behavior and screen time were lower among children with fewer bedroom screen devices and more playground areas [21]. Regular physical activity has proven to improve health and quality of life for people of all ages [22]. A healthier lifestyle with less screen time benefits children's health in other ways, including increased bone density, improved motor skills, and increased physical fitness [23]. To our knowledge, there is limited evidence regarding parents' sociodemographic and sedentary behaviors and home environment characteristics associated with TV screen time among preschool-age children in Saudi Arabia [19, 24]. This study aims to assess the association between parents' sociodemographics and their sedentary behaviors with children's TV screen time. Also, to determine parents' rules and practices, the home physical environment, and children's daily TV watching to promote children's lifestyle in Saudi Arabia.

MATERIALS AND METHODS

Study design and participants

A cross-sectional analytical study was conducted in the western, southern, northern, eastern, and central regions of Saudi Arabia. The study included children aged from 3–to 5 years old who are free of any medical conditions that impair their growth and development. A validated questionnaire [2] was distributed through online platforms during the study period between August 2021 to September 2021. Exclusion criteria included parents who are unable to read the questionnaire in Arabic language.

Outcome

The study assessed the extent to which parents' sociodemographic and sedentary behaviors are related to children's TV screen time and determined the association between parents' rules and practices, the home physical environment, and children's daily TV watching in preschool-age children.

Sample size

The target sample size to achieve a 95% confidence interval and a 5% margin of error should be equal to or more than 385 participants.

Tool and measures

Data was collected using a validated self-administered questionnaire with closed-ended questions. The questionnaire had been used in a previous study [2]. It was used and customized to fit the Saudi population, and it was divided into six sections.

Section one Included general information on the children's and parents' characteristics. Child form contained "medically free or not, age, gender, attending pre-school, and children's TV screen time." The parent's form asked

about "relation to the child, age, marital status, education level, nationality, number of children in the household, parents' moderate to vigorous exercise, and parent's sedentary behavior."

Section two was designed to assess children's TV screen time. Parents were asked, "On average, how many hours a day does your child watch any sort of television, including DVDs and videos?" Answer choices included 1 = none; 2 = less than 30 min a day; 3 = 30 min to 1 hour a day; 4 = 1 to 1.5 h a day; 5 = 1.5 to 2 h a day; 6 = more than 2 h a day. In agreement with recent WHO recommendations for maximum screen time in children aged five years old, the responses were subdivided as (0) < 1 hour a day or (1) ≥ 1 hour a day.

Section three investigated parents' moderate and energetic physical activity levels. They responded to the following question: "How many days of the week do you exercise moderately for at least 30 minutes?" (moderate activity includes brisk walking, cycling at a slower pace, general gardening, tennis (doubles) medium, and paced swimming) or how many days a week do you indulge in strenuous exercise for at least 30 minutes? (Energetic workouts include jogging or running, as well as sports like football and squash aerobics, or fast cycling or heavy gardening)". Responses will be chosen from 1 to 5 (1 = less than one time a week; 2 = 1 to 2 times a week; 3 = 3 to 4 times a week; 4 = 5 or more times a week; 5 = never). These were subsequently recorded as 5 times per week, 1–4 times per week, or none.

Section four measured parents' Sedentary Behaviors, and they gave answers to the question: "How much time do you spend doing the following on a normal weekday (from when you get up to when you go to bed)? Watching TV, playing video games such as PlayStation, Nintendo, i-PAD, and computer games, sitting reading a book or magazine, sitting doing paperwork or computer work, listening to music, doing art or craftwork, traveling by car/public transportation. The parent's sedentary behaviors will be evaluated using a 6-point Likert scale (1 = none, 2 = 30 min or less, 3 = 1 to 2 h, 4 = 2 to 3 h, 5 = 3 to 4 h, 6 = 5 h or more). The weekday and weekend item scores were added together to create a continuous variable (2–12), with higher scores indicating more time spent sitting.

Section five was built to demonstrate the following variables that were used to analyze parents' guidelines about their children's TV screen time: (i) Parents imposed limits on their children's screen time; (ii) Parents used screen time as a reward or punishment, (iii) Child has access to game consoles, parents answered "yes" or "no" to these questions. (iv) Parents permitted their children to have meals or snacks while watching television, a 4-point Likert scale was used to evaluate responses (1 = frequently, 2 = sometimes, 3 = occasionally, and 4 = rarely/never). A new classification was constructed by collapsing replies 1 and 2 to "frequently" and responses 3 and 4 to "rarely/never." Parent's practices of leaving the TV on whether or not it is being viewed, as well as parents letting their children play inside and outside actively, were also evaluated using a 4-point Likert scale (1 = rarely/never; 2 = sometimes; 3 = most of the time; 4 = all of the time). Then, by reducing replies 1 and 2 to "not all the time" and responses 3 and 4 to "all the time" they were dichotomized.

Section six studied variables related to the home's physical environment. The following variables affect the home's physical environment: (i) the Presence of an outdoor garden (yes, or no), and parent's perceptions of the size of their outdoor garden and space (small, medium, or large); (ii) usable play equipment such as trampolines, swings, and slides, bicycles, tricycles, and scooters; (iii) the number of televisions in the home; (iv) presence of cable or satellite TV; (v) presence of a TV in a room where meals are eaten. As well as, (vi) the presence of a television or video game system in the child's room. These questions elicited a "yes" or "no" response from parents.

Statistical analysis

After data extraction and revision, they were coded and entered into the statistical software IBM SPSS version 22 (SPSS, Inc. Chicago, IL). All statistical analysis was conducted using the two-tailed tests. P value less than 0.05 was statistically significant. Bivariate analyses were first done by displaying the characteristics of study participants (children and caregivers), and the home environment including parents' rules and practices and home physical environment, and children's TV screen time. The relations between categorical variables were displayed using cross-tabulations, and Chi-squared tests were used to assess statistical significance and exact probability tests if there is a small frequency distribution. Adjusted binary logistic regression was used including the home environment-related factors associated with children's TV screen time in the bivariate analysis. The Forced Entry model was used, whereby all independent variables were tested in one block to assess their association while controlling for the effects of other variables in the model. The statistical significance level was set at $p < 0.05$. The adjusted exponentiation of the B coefficient-Exp (B) value or odds ratios (OR) and 95% confidence interval (CI) were displayed for each included variable.

Ethical consideration

Ethical approval was obtained from the Biomedical Ethics Committee at Umm Al-Qura University (UQU). Data were collected and extracted from an online-based questionnaire, and consent was taken from participants at the beginning of the questionnaire by requesting them to answer if they agree to participate in the study. The confidentiality of the study data was adequately ensured.

RESULTS AND DISCUSSION

A total of 1103 participants completed the study questionnaire. The children's ages ranged from 3 to more than 5 years, with a mean age of 4.6 ± 2.4 years old. The majority of the children were females 51.4%, and 57.7% did not attend any educational institution. Regarding TV watching, 78.1% of children watch TV for 1 hour or more daily. As for caregivers, the respondent was children's mothers among 69% of the sample. Respondent's ages ranged from 18 to more than 40 years, with a mean age of 33.2 ± 11.9 Years old. 94.7% of respondents were Saudi, and 94.3% were married and living with their spouses. In regards to educational level, 81.9% of the respondents were university graduates, and 50.8% had 3 or more children (**Table 1**).

Table 1. Personal characteristics of the study participants (children and caregivers)

Personal Characteristics	No	%
Child data		
Child age in years		
3-4	365	33.1%
4-5	295	26.7%
5	443	40.2%
Child gender		
Male	536	48.6%
Female	567	51.4%
Child attended any educational institution before entering school		
No	636	57.7%
Part-time	219	19.9%
Full time	248	22.5%
Duration that child watch TV		
< 1 hour	242	21.9%
≥ 1 hour	861	78.1%
Parent data		
Relation to the child		
Mother	761	69.0%
Father	223	20.2%
Others	119	10.8%
Guardian age in years		
< 30	368	33.4%
30-40	393	35.6%
> 40	342	31.0%
Nationality		
Saudi	1045	94.7%
Non-Saudi	58	5.3%
Marital status		
Married	1040	94.3%
Divorced / widow	63	5.7%
Educational level		
Below university	200	18.1%
University	903	81.9%
Number of children		

1 child	239	21.7%
2 children	304	27.6%
3 children / more	560	50.8%
How often parents do moderate to vigorous exercise/per week		
None	508	46.1%
1-4 times/week	517	46.9%
5 times / more	78	7.1%
The usual behaviors of the parents		
Watching TV	604	54.8%
Playing video games	75	6.8%
reading and listening to music	148	13.4%
Doing paperwork or using a computer	276	25.0%

Over more than half of the parents, 54% reported doing moderate to vigorous exercise/per week, 54.8% watch TV as one of the main activities, and 43.3% reported that they do at least 30 minutes of moderate exercise for less than one time per week while 25.8% do it for 1-2 times per week. Also, 36.9% reported that they do at least 30 minutes of hard exercise less than 1 time per week, and 48.5% do it 1-2 times per week. As for the duration of TV watching per day, 22.1% reported watching it for less than 30 minutes and 31.9% for 1-2 hours daily. A total of 64.5% of the parents reported they do not play video games, while 12.2% reported playing them for less than 30 minutes daily. An exact 24.3% reported they do not practice reading, but 35.4% read for less than 30 minutes daily. Paperwork or computer work was not done among 30.6% of the parents, while 20.4% practiced this duty for less than 30 minutes daily. Music listening for less than 30 minutes daily was reported by 28.5% of the parents, but 46.7% never listen to music at all. Doing arts or crafts was not practiced among 59.7% of the parents and practiced for less than 30 minutes among 17.8% of them. Also, 28.8% of the parents reported never using the car per day, while 27.7% use it for 1-2 hours daily (**Table 2**).

Table 2. Participant's lifestyle and behavior, Saudi Arabia

Participant's lifestyle	Count	Column N %
How many days a week do you do at least 30 minutes of moderate exercise?	< 1 time	478 43.3%
	1-2 times	285 25.8%
	3-4 times	249 22.6%
	5 times / more	91 8.3%
How many days a week do you do at least 30 minutes of hard exercise?	< 1 time	407 36.9%
	1-2 times	535 48.5%
	3-4 times	120 10.9%
	5 times / more	41 3.7%
Duration of watching TV/day	Never	153 13.9%
	< 30 minutes	244 22.1%
	1-2 hours	352 31.9%
	2-3 hours	192 17.4%
	3-4 hours	97 8.8%
	5 hours / more	65 5.9%
Duration of playing video games/day	Never	711 64.5%
	< 30 minutes	135 12.2%
	1-2 hours	129 11.7%
	2-3 hours	57 5.2%
	3-4 hours	34 3.1%
	5 hours / more	37 3.4%
Duration of reading/day	Never	268 24.3%
	< 30 minutes	391 35.4%
	1-2 hours	283 25.7%
	2-3 hours	84 7.6%

	3-4 hours	52	4.7%
	5 hours / more	25	2.3%
Sitting to do paperwork or computer work	Never	337	30.6%
	< 30 minutes	225	20.4%
	1-2 hours	242	21.9%
	2-3 hours	136	12.3%
	3-4 hours	87	7.9%
	5 hours / more	76	6.9%
Duration of music listening/day	Never	515	46.7%
	< 30 minutes	314	28.5%
	1-2 hours	168	15.2%
	2-3 hours	54	4.9%
	3-4 hours	28	2.5%
	5 hours / more	24	2.2%
Doing arts or crafts	Never	658	59.7%
	< 30 minutes	196	17.8%
	1-2 hours	155	14.1%
	2-3 hours	47	4.3%
	3-4 hours	27	2.4%
	5 hours / more	20	1.8%
Duration of driving/day	Never	318	28.8%
	< 30 minutes	182	16.5%
	1-2 hours	306	27.7%
	2-3 hours	173	15.7%
	3-4 hours	81	7.3%
	5 hours / more	43	3.9%

As for Parents' rules and practices around children's TV screen time, 76.1% of the parents Set rules around TV and game consoles, 46% reward good behavior with TV, 75.8% reduce TV time if the child misbehaves, and 51.9% reported that child has access to game consoles. As for sedentary behaviors, parents reported frequently allowing meals and snacks to be eaten in front of the TV 30.5% and 41.5%, respectively. Also, 32.1% allow children to play outside actively most or all time while 68.4% of the parents allow children to play inside actively most or all time. Regarding the home physical environment, 82.9% of the parents reported that TV is on whether or not it is being watched. Additionally, 55.4% of the parents had an outdoor garden and space, which was small among 30.2%. Also, 72.5% of the parents reported their children had usable play equipment, 91.6% had cable or a satellite TV receiver, 50.3% had a TV in the dining room, 14.8% reported that TV was available in the child's bedroom, and 20.8% of their children had game console available in their bedroom (**Table 3**).

Table 3. Home environmental characteristics: Parents' rules and practices and home physical environment

Home environment characteristics	No	%
Parents' rules and practice around children's TV screen time		
Set rules around the TV and game console	Yes	839 76.1%
	No	264 23.9%
Reward good behavior with TV	Yes	507 46.0%
	No	596 54.0%
Reduce TV time if the child misbehaves	Yes	836 75.8%
	No	267 24.2%
Child has access to game consoles	Yes	573 51.9%
	No	530 48.1%

Allow meals to be eaten in front of the TV	Never / rare	243	22.0%
	Sometimes	524	47.5%
	Frequently	336	30.5%
Allow snacks to be eaten in front of the TV	Never / rare	101	9.2%
	Sometimes	544	49.3%
	Frequently	458	41.5%
Allow children to play outside actively	Never / rare	201	18.2%
	Sometimes	548	49.7%
	Most times	300	27.2%
	All times	54	4.9%
Allow children to play inside actively	Never / rare	49	4.4%
	Sometimes	299	27.1%
	Most times	513	46.5%
	All times	242	21.9%
Home physical environment			
TV on whether or not it is being watched	Never / rare	189	17.1%
	Sometimes	548	49.7%
	Most times	299	27.1%
	All times	67	6.1%
Presence of an outdoor garden and space	No	493	44.7%
	Small	333	30.2%
	Intermediate	187	17.0%
	Large	90	8.2%
Usable play equipment	Yes	800	72.5%
	No	303	27.5%
Have a cable or a satellite TV receiver	Yes	1010	91.6%
	No	93	8.4%
TV in the dining room	Yes	555	50.3%
	No	548	49.7%
TV available in child's bedroom	Yes	163	14.8%
	No	940	85.2%
Game console available in child's bedroom	Yes	229	20.8%
	No	874	79.2%

The exact 86.3% of children who attended any educational institution before entering school full-time watch TV for more than 1 hour per day compared to 74.5% of those who didn't with recorded statistical significance ($P=.001$). Also, 79.4% of children with university-graduated parents watch TV for more than 1 hour daily compared to 72% for lower-educated parents ($P=.022$). Additionally, 86% of children who frequently allowed meals to be eaten in front of the TV watch TV for more than 1 hour daily compared to 68.3% of those who never allowed it ($P=.001$). Watching TV for more than 1 hour per day was reported among 84.5% of children who frequently allowed snacks to be eaten in front of the TV compared to 60.4% of those who never allowed it ($P=.001$). Also, 88.1% of children who had a TV on, whether or not it was being watched, watched TV for more than 1 hour daily compared to 53.4% of others who had not that phenomenon ($P=.001$). Besides, 81.4% of children of families with TV in the dining room watch TV for more than 1 hour daily compared to 74.6% of those who do not ($P=.006$) (Table 4).

Table 4. Participant characteristics and home environmental characteristics associated with children's TV screen time

Factors	How long does your child watch TV?				P-value	
	< 1 hour		> 1 hour			
	No	%	No	%		
Children						
Has your child attended any educational institution before entering school?	No	162	25.5%	474	74.5%	.001*
	Part-time	46	21.0%	173	79.0%	
	Full time	34	13.7%	214	86.3%	
Parents						
Educational level	Below university	56	28.0%	144	72.0%	.022*
	University	186	20.6%	717	79.4%	
How many days a week do you do at least 30 minutes of moderate exercise?	< 1 time	102	21.3%	376	78.7%	.559\$
	1-2 times	63	22.1%	222	77.9%	
	3-4 times	61	24.5%	188	75.5%	
	5 times / more	16	17.6%	75	82.4%	
How many days a week do you do at least 30 minutes of hard exercise?	< 1 time	102	25.1%	305	74.9%	.121\$
	1-2 times	105	19.6%	430	80.4%	
	3-4 times	23	19.2%	97	80.8%	
	5 times / more	12	29.3%	29	70.7%	
Sitting to do paperwork or computer work	Never	80	23.7%	257	76.3%	.913
	< 30 minutes	47	20.9%	178	79.1%	
	1-2 hours	49	20.2%	193	79.8%	
	2-3 hours	32	23.5%	104	76.5%	
	3-4 hours	18	20.7%	69	79.3%	
	5 hours / more	16	21.1%	60	78.9%	
Set rules around the TV and game console	Yes	186	22.2%	653	77.8%	.743
	No	56	21.2%	208	78.8%	
Child has access to game consoles	Yes	122	21.3%	451	78.7%	.588
	No	120	22.6%	410	77.4%	
Allow meals to be eaten in front of the TV	Never / rare	77	31.7%	166	68.3%	.001*\$
	Sometimes	118	22.5%	406	77.5%	
	Frequently	47	14.0%	289	86.0%	
Allow snacks to be eaten in front of the TV	Never / rare	40	39.6%	61	60.4%	.001*\$
	Sometimes	131	24.1%	413	75.9%	
	Frequently	71	15.5%	387	84.5%	
Allow children to play outside actively	Never / rare	44	21.9%	157	78.1%	.466\$
	Sometimes	111	20.3%	437	79.7%	
	Most times	75	25.0%	225	75.0%	

	All times	12	22.2%	42	77.8%	
Home physical environment						
TV on whether or not it is being watched	Never / rare	88	46.6%	101	53.4%	.001*
	Sometimes	104	19.0%	444	81.0%	
	Most times	42	14.0%	257	86.0%	
TV in the dining room?	All times	8	11.9%	59	88.1%	.006*
	Yes	103	18.6%	452	81.4%	
TV available in child's bedroom	No	139	25.4%	409	74.6%	.283
	Yes	41	25.2%	122	74.8%	
Have a cable or a satellite TV receiver	No	201	21.4%	739	78.6%	.916
	Yes	222	22.0%	788	78.0%	

P: Pearson X2 test; \$: Exact probability test; * P < 0.05 (significant)

Among all included factors, children of parents with bachelor's degrees recorded 1.45 times more likelihood to watch TV for more than 1 hour daily than others for lower educated parents' children (OR=1.45; 95% CI: 1.01-2.11). Also, children who attended preschool education institutions reported a doubled likelihood of watching TV for more than 1 hour compared to those who did not (OR=2.2; 95% CI: 1.45-3.41). Children who allowed snacks to be eaten in front of the TV had a 1.78 more likelihood of watching TV for more than 1 hour than those who were not allowed (OR=1.78; 95% CI: 1.07-2.97). Whether or not it was being watched, children who had a TV on recorded 1.4 times more likely to watch TV for more than 1 hour (OR=1.41; 95% CI: 1.29-1.54) (**Table 5**).

Table 5. Association between participant characteristics, home environment, and children's TV screen time based on the logistic regression model

Participant Characteristics	p-value	OR A	95% CI	
			Lower	Upper
Attended educational institution				
Part-time vs. None	.195	1.30	0.87	1.93
Full-time vs. None	.001*	2.22	1.45	3.41
University-educated parents vs. below	.049*	1.45	1.01	2.11
Parents practice moderate activity vs. None	.317	0.92	0.78	1.08
Parents practice vigorous activity vs. None	.115	1.18	0.96	1.46
Sitting to do paperwork or computer work vs. None	.697	1.02	0.92	1.13
Did not Set rules around TV and game consoles vs. Yes	.707	0.93	0.65	1.34
Child has no access to game consoles vs. Yes	.737	1.05	0.77	1.44
Allow meals to be eaten in front of the TV vs. No	.081	1.42	0.96	2.10
Allow snacks to be eaten in front of the TV vs. No	.026*	1.78	1.07	2.97
Allow children to play outside actively vs. Yes	.654	0.91	0.61	1.36
TV on whether or not it was being watched vs. No	.001*	1.41	1.29	1.54
TV in a not in the room where meals are eaten vs. Yes	.074	0.75	0.54	1.03
TV in not on child room vs. Yes	.085	1.45	0.95	2.20
Cable or satellite TV vs. No	.292	1.36	0.77	2.42

OR A: Adjusted odd ratio; CI: Confidence interval; * P < 0.05 (significant)

35.7% of children of university-educated mothers watch TV for more than 2 hours compared to 33.5% of children of mothers with lower levels of education. Also, 1.6% of children of university-educated mothers never watch TV versus 3.5% of children of mothers with lower levels of education. Moreover, 4.8% of children of university-educated mothers watch TV for less than 30 minutes daily versus 7.0% of children of mothers with lower levels of education. These differences were statistically insignificant ($P=.191$) (**Table 6**).

Table 6. Distribution of detailed TV watch duration of the children by their parents' educational level

TV watching hours by the child	Educational level				p-value
	Below university		University		
	No	%	No	%	
Never	7	3.5%	14	1.6%	.191
< 30 minutes	14	7.0%	43	4.8%	
30 Min - 1 hour	35	17.5%	129	14.3%	
1-1.5 hours	47	23.5%	231	25.6%	
1.5-2 hours	30	15.0%	164	18.2%	
> 2 hours	67	33.5%	322	35.7%	

P: Pearson X2 test

A 41.1% of children who attended an educational institution before school age watch TV for more than 2 hours compared to 31.5% who attended part-time and 34.3% who never attended any institution. Also, 26.2% of those who attended the institution full-time watched TV for 1-1.5 hours versus 28.3% of others who attended part-time and 23.7% of others who never attended with recorded statistical significance ($P=.003$) (**Table 7**).

Table 7. Distribution of detailed TV watch duration of the children by their attend any educational institution before entering school

How many hours a day does your child spend watching TV/video?	Has your child attended any educational institution before entering school?						p-value
	No		Part-time		Full time		
	No	%	No	%	No	%	
Never	17	2.7%	3	1.4%	1	.4%	.003*
< 30 minutes	44	6.9%	12	5.5%	1	.4%	
30 Min - 1 hour	101	15.9%	31	14.2%	32	12.9%	
1-1.5 hours	151	23.7%	62	28.3%	65	26.2%	
1.5-2 hours	105	16.5%	42	19.2%	47	19.0%	
> 2 hours	218	34.3%	69	31.5%	102	41.1%	

P: Exact probability test

The study aimed to assess the extent to which parents' sociodemographics and their sedentary behaviors were related to children's TV screen time and determined the association between parents' rules and practices, home physical environment, and children's daily TV watching in pre-school age children. Overall, the majority of our study participants were children of 5 years of age (40.2%). Our study indicated that 78.1% of pre-school-age children watch TV for one hour or more per day compared to other studies that showed 73.2% [25]. According to the Malaysian National Health and Morbidity Survey (2016), (52.2%) of their children had excessive screen time exposure [26].

In the present study, 22.5% of children attended a full-time educational institution before starting school. Interestingly, we found that children who attended a full-time educational institution before entering school had almost one hour more TV watching time than 84.3% of those who only attended part-time or did not attend at all. Parallely, a systematic review reported that preschoolers in general engage in moderately high levels of daily screen viewing while in childcare, though there is considerable variation [27]. On the contrary, a cross-sectional

study of 149 preschoolers reported that children who attended more than 4 hours a day at daycare were less likely to watch TV or play video games than children who were supervised at home by their parents [28]. Opposing the previous cross-sectional study, a study revealed that children who attended less than 5 hours a day were more likely to watch more TV each day [2].

The parental educational level in our study has significantly impacted their children's TV screen time. It is worth mentioning that most parents in our study had bachelor's degrees (81.9%). A similar observation was found by Carson V in their study where most of the parents had a bachelor's degree (39.6%) while post-graduated parents were (23.5%) [28].

Although the majority of parents in our study had a university degree, their children had the highest TV watching hours ranging from one hour to one hour and a half. On the other hand, Bassul C concluded that children of parents with an undergraduate and postgraduate educational level had less than one hour of TV watching per day [2]. Conversely, Jusienė R revealed that a lower level of parental education is associated with increased daily screen time and background television [29]. Matthew A. reported that background TV refers to periods when the TV is on in the child's nearby area while he or she is engaged in other activities [30]. We found that children of parents with a university degree were more likely to watch TV for more than one hour per day compared to children of lower-educated parents. These findings could partly be attributed to the fact that parental educational level might influence TV screen time in their children.

Watching TV is considered the most common sedentary behavior among parents in our study. Similarly, Carolina Bassul revealed that parents who watched more TV daily had children who watched more TV [2]. As both mothers' and fathers' media parenting practices influence the amount of time their children spend in front of screens [31]. It is worth mentioning that the majority of parents in our study had set rules around TV and game consoles, but there was no significant effect on children's TV screen time. On the other hand, other studies were diverse. For example, a study observed that stricter rules or being aware of screen time recommendations were linked to less TV/video/DVD time [32]. Versus that, Kesten JM reported that individuals who established limits 'always' had a higher likelihood of watching TV, using a computer, playing a gaming console, or using a smartphone than those who did not [33].

Our findings coincide with a cross-sectional study of 847 children aged from 2 to 5 year-olds found that children's screen time during mealtimes was associated with overall excessive screen time and TV exposure [29]. Similarly, our study revealed that the child's TV-watching hours increase significantly when parents allow their children to eat snacks or meals in front of the TV. Indeed, Screen time during meals in early childhood is related to overall screen time and the use of TV as a background, and it is also associated with more frequent use of junk foods [29]. We also found that allowing TV in the dining room significantly increases the hours of TV watching in children. Likewise, it was observed in another study that allowing children to have snacks in front of the TV and having the TV in the same room as meals were also associated with increased daily TV watching in children [2]. A previous study disclosed that screen time in young children is associated with the number of TVs in the home and TV in the children's rooms [34]. Additionally, another study reported that having a TV in the bedroom increases the likelihood of excessive screen time [35]. In light of these previous studies, we found that the majority of parents in our study did not allow TVs in their children's bedrooms (85.2%), we also observed that a large number of children with no TVs in their bedrooms showed a high TV watching hours (78.6%). Specifically, the ownership of a bedroom television, as well as, predictably, leaving the television on while no one is watching, are both associated with greater background TV exposure [30].

Background TV acts as an audiovisual distraction that, in theory, has the potential to disturb young children's continuing behavior, such as toy play [36]. Our results revealed that a large number of parents leave the TV on whether it is being watched or not (49.7%). Relatively, we also found that leaving the TV on whether it is being watched or not was linked to higher TV-watching hours among children. Likewise, a study found that children from television-heavy households watched more TV than other children, and they also spent more time playing video games and listening to music [37]. Also, when children are exposed to background television, they are less attentive during playing, their parents have less quality time together, and their cognitive abilities suffer [30].

The majority of parents in our study sometimes allow their children to play outside (49.7%), and there was no significant association between outdoor activity and TV screen time. A recent study revealed that most parents reported having an outdoor garden or space with play equipment (e.g., trampoline, slide, bicycle, and scooter) [2]. Regardless, most of the parents in our study did not have an outdoor garden. Thus, we hypothesized that this may contribute to a higher percentage of TV screen time. For instance, a study found that parental restriction of outdoor play was associated with increased TV viewing [2]. Additionally, a recent cross-sectional study found that

children who had strict outdoor play rules were more likely to engage on screen [38]. Also, another study found a significant relationship between active play equipment and less screen time for toddlers [39]. Particularly, when the amount of time spent playing outside decreases, children and adolescents grow increasingly reliant on the usage of electronic media [40].

In light of our results and with technology and screen time habits becoming more integrated into modern life, such behaviors in children are becoming a growing challenge [2]. We recommend parents target their children's screen time to meet the recommendations by enhancing the home environment to control such sedentary behaviors by providing more enjoyable alternatives and promoting more physical activity. Especially when there is evidence that physical activity habits developed in childhood may persist into adulthood [22]. Also, it is essential to highlight the importance of parents being more engaged in their children's day, for example, to discuss the proper limiting rules with their children in a simpler manner to effectively reach a middle ground and this may contribute to improving decision-making skills in children. Particularly that parents have a significant effect on their children's screen time development [31]. Additionally, given the high number of children with increased watching hours in full-time preschool educational institutions, we also recommend teachers who play a key role in preschool incorporate more enjoyable activities for children to effectively lower their screen time. It is also essential for healthcare practitioners and public health planners to raise parents' knowledge of the risks and benefits of screen usage in the early years of their children's lives, and give practical plans for controlling such sedentary behaviors.

CONCLUSION

This study has several limitations, including convenience sampling that may constitute a sample representational challenge. The study's design can only demonstrate associations between the variables examined but cannot demonstrate cause and effect and recall bias, which cannot be eliminated due to the study's cross-sectional design. In conclusion, we found that preschool-age children in Saudi Arabia spent significant amounts of time watching TV. Therefore, we suggest incorporating the national and international recommendations on screen time restrictions according to age group into the educational programs to enhance parents' and children's knowledge, preferences, and willingness from early life. As well as raising the pediatricians' awareness of their primary role in influencing parents' behaviors and attitudes toward screen time restrictions regulations and encouraging young children to participate in manual and outdoor activities.

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