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RESEARCH ARTICLE

SCREEN TIME USE AND ITS HEALTH EFFECTS AMONG CHILDREN ATTENDING WELL BABY CLINIC AT PRIMARY HEALTH CARE CENTERS, MAKKAH, SAUDI ARABIA2020

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Abstract

Objectives: To determine prevalence of screen time use among children aged between less than 1 year to 5 years old, and to identify the association of screen time and obesity in this age group.
Methods: A cross-sectional study included 355 children from less than 1year of age to 5 years, that was conducted at well baby clinics primary health care in Makkah, kingdom of Saudi arabia, between July 2021 and august 2021. The data were collected by a validated questionnaire. SPSS version 21.0 was used to gather and analyse all data. There was statical analysis of the prevalence of excessive screen time. The Chi-Square and correlations were used to test associations where appropriate.
Results: The age groups were from less than 1 year to 5 years. The level of electronic device usage was excessive among 22.3 percent of children. There was a significant correlation between BMI and screen time, with a higher BMI related with increased screen time for overweight and obese children.
Conclusion: There is a high prevalence of screen use among children more than 1 year of age. Also, high levels of nutritional problems were shown to be associated with excessive screen time including overweight and obesity.

Introduction:-

Since the introduction of television screens into households, each family has struggled with the question of how long children should be permitted to watch. This problem has extended to numerous electronic screen gadgets as technology has advanced [1]. Screen time nowadays refers to the time a youngster spends watching television, playing computer games, surfing the web, or using a smartphone or tablet. These types of media can be used to provide educational material or to instill desirable behaviors such as positive attitudes, kindness, and compassion. However, excessive and inappropriate use of these devices has been associated with detrimental consequences [2].

It's recommended by American Academy of Pediatrics (AAP) to Avoid digital media use (except video-chatting) in children younger than 18 to 24 months. Limit screen time for children 2 to 5 years of age to one hour per day of high-quality programs with parental supervision [3]. The Canadian Pediatric Society issued similar guidelines in 2017 [4]. Children who use screens for an extended period of time have been discovered to be at an increased risk of developing a variety of significant diseases, including obesity, cognitive and behavioral problems [5]. Excessive screen time defined as spending more than two hours per day on screen [6]. Saudi Arabia has evolved as a developing country in recent years, undergoing tremendous changes in sedentary lifestyles as a result of its

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astounding economic progress[7]. Saudi Arabia's contemporary society increasingly comprises greater sitting time paired with physical immobility, which has expanded significantly over the last few decades [8]. The key factors influencing this transition include the proliferation of new devices that individuals already own and control, as well as the issue of inadequate infrastructure and places ideal for outdoor/indoor activities where children can play[9]. Saudi Arabia has a desert climate, which is often unsuitable for physical activity for a significant portion of the year. This lifestyle has led to an increase in children's media-related activity, not just on traditional screens such as televisions and computers, but also on emerging screen devices such as smartphones, tablet devices, and other mobile entertainment products. Globalization has enabled these mobile screen gadgets to be used everywhere and at any time. This phenomenon is accompanied by an acceleration in the development of technology apps and media that appeal to and are available to a large number of children and teenagers[10].

In Saudi Arabia, limited research has been undertaken on this subject, with no indication of variations in weight between normal-weight and obese children, with specific references to time spent on new screen devices. The purpose of this study was to determine the prevalence of screen use among children in Makkah. Additionally, it is intended to ascertain whether there aredifferences in the ownership and duration of time spent on various electronic screens and obesity among children aged less than one year to five years.

Methods:-

Study design and sample:-

Ananalytical cross-sectional study that was conducted at Well baby clinics (WBC) at Alnuwariah PHCC in Makkah from July 2021 to August 2021.Due to the COVID-19 pandemic and the lockdown, data collection has been postponed for one year.

Study population and sample size:-

The study was conducted at one clinic which was chosen due to its highest number of children's visits in the northern sector of Makkah city. The study included 355 children aged less than 1 year to 5 years who were presented to the clinic during the study period. The children with special needs and children more than 5 years were excluded from the study. The sample size was calculated according to the Raosoft sample size calculator using a 95 percent confidence level with a 5% absolute accuracy [11].

Study tools and data collection:-

The data were collected using a questionnaire that was validated by 2 consultants in family medicine. The questionnaire was tested for its reliability using a pilot study conducted among 20 children who were excluded from the recent study. The questionnaire was edited and validated for the study purpose before the responses were collected by the researchers and trained data collectors at the selected PHCC from WBC visitors who met the inclusion criteria during study period.

Contents of questionnaire:-

1. Informed consent from parents**.**
2. Variables **:**

1. Dependent:-

Screen time during weekdays and weekends was classified as: "don't use", "30min- <1hour", "1-<2hours", "2-<3hours", "3-<4hours", "4>hours". Excusive screen time defined as spending more than 2 hours on screen regardless of the type, according to AAP recommendations **.**

Frequency of using device: "Daily", "Every other day", "Twice per week", "Only on weekends", "Rarely", "Don't use it **."**

2. **Independent**:-

Demographic data: Age "1-5 years", Gender: "male", "Female", Nationality "Saudi", "non-Saudi**."**

Anthropometric measurements: by using a single scale, their weight was measured to the nearest 0.1 kg, their height (excluding shoes) was measured to the nearest 0.1cm, and their waist circumference was measured at the level of the umbilicus to the nearest cm by using a measuring tape. The BMI (kg/m2) was calculated and the children are classified as either "normal (5-85th)", "overweight (85-95th)", "obese (>95th)", or "severely obese (>99th)" using Center for Disease Control and Prevention (CDC) growth charts **.(11)**

Screen device type: "smartphone", "tablets", "game consoles", "TV/DVD", "computer/laptop", "handled/computer games **."**

Owner of the device: "child", "parents", "other **"**

Time limit set by parents for devices use: "No", "Yes" how many hours**?**

Other activities: "reading", "playing outside", "playing non-screen games with friends", "playing board games", "craft activities", "Physical activity (swimming, riding a bike, jumping on trampoline)": how many days per week, how often during the day, how many minute " <30minute", " >30 minute**"**

Diet: junk food during device use. Junk food is defined as high-calorie foods with minimal nutritional value, mainly due to excessive sugar, fat, and salt. "Fast food," "sweetened beverages," "candy," and "salted crisps" are among them. The proportion of junk food consumed was determined by whether or not children "had them while utilizing these devices."

Ethical approval:
Each caregiver gave a written informed consent and the study was approved byMakkah joint program of family and community medicine**.** Also, permission from directorate of health affairs of Holy Capital Primary Care was obtained**.**

Statistical analysis*:*
IBM SPSS software for Windows version 21.0 was used to gather and analyze all data. Frequencies and percentages were used to represent the underlying variables. There was a statistical analysis of the prevalence of excessive screen time and the 95 percent confidence intervals (CIs). The chi-square test was used to assess factors related with excessive screen time; the relevant correlation (r) and 95% confidence intervals (CIs) were then determined. P-values less than 0.05 were statistically significant.

Results:-

Demographics of the studied subjects:
The study included 355 children, and their parents or caregivers were asked to consent to the study's use of their child's data. Mothers (76.1 percent) provided the majority of the data, followed by fathers (20.3 percent) and others (3.7 percent). 56.1 percent of the youngsters were female, while 43.9 percent were male. The age groups included those aged less than one year (6.5 percent), those aged one to less than two years (30.4 percent), those aged two to less than three years (25.1 percent), those aged three to less than four years (17.5 percent), and those aged four to less than five years (20.6 percent). The majority of children (74.6 percent) were Saudi, while 25.4 percent were non-Saudi. According to the body mass index (BMI), 46.2 percent were considered normal, 25.4 percent were considered overweight, 12.1 percent were considered obese, and 16.3 percent were considered underweight (Table.1). There was a significant correlation between BMI and screen time, with a higher BMI related with increased screen time for overweight and obese children (r =0.75, P value 0.05).

Table 1:- Demographics of included subjects.

	N	**%**
Consent taken by		
Mother	270	76.1
Father	72	20.3
Others	13	3.7
Gender		
Male	156	43.9
Female	199	56.1
Age		
Less than 1year	23	6.5
1- less than 2 year	108	30.4
2 - less than 3 years	89	25.1
3 - less than 4 years	62	17.5

4 -less than 5 years	73	20.6
Nationality		
Saudi	265	74.6
Non-Saudi	90	25.4
BMI		
Under weight	58	16.3
Normal	164	46.2
Overweight	90	25.4
Obese	43	12.1

Screen devices and screen time:

Children's most frequently used screen devices were cellphones (69.3 percent), televisions/DVDs (69.9 percent), tablets (25.6 percent), game consoles (22.3 percent), and laptops (7.3 percent), indicating that smart phones and televisions were the most frequently used gadgets. The owners of the devices were parents among the majority of subjects (77.2%) and 17.8% were children. On weekdays, the majority of children spent between 1 and 2 hours (33 percent), between half an hour and an hour (30.7 percent), between 2 and 3 hours (12.1 percent), between 3 and 4 hours (7.6 percent), and more than 4 hours (9.3 percent).The number of hours spent by children per day on weekend were 1-2 hours among (31.3 percent), half an hour – one hour among (30.1percent), 2-3 hours among (10.1 percent), 3-4 hours among (6.2 percent) and more than 4 hours among (8.5 percent). The majority of parents (70.1 percent) did not limit their children's device use. Only 29.9 percent put a limit on screen time, compared to 38.7 percent who set a limit of one hour, 37.7 percent who set a limit of two hours, and 11.3 percent who set a limit of three hours.

Table 2:- screen usage**.**

	N	**%**
Screen device type		
Smartphones	246	69.3
Tablets	91	25.6
Game consoles	79	22.3
TV/DVD	248	69.9
Computer/laptops	26	7.3
Owner of devices		
Child	63	17.8
Parents	274	77.2
Others	18	5.1
numbers of hours child spend time on these devices per day on weekday		
Don’t use	26	7.3
30min-< 1hour	109	30.7
1-<2hours	117	33.0
2-<3hours	43	12.1
3-<4hours	27	7.6
4>hours	33	9.3
numbers of hours child spend time on these devices per day on weekend		
Don’t use	49	13.8
30min-<1 hour	107	30.1
1-<2hours	111	31.3
2-<3hours	36	10.1
3-<4hours	22	6.2
>4 hours	30	8.5
Do the parents set a limit for screen time		
Yes	106	29.9
No	249	70.1
if yes add numbers of hours		
1	41	38.7
2	40	37.7

3	12	11.3
4	10	9.4
5	3	2.8

Activities time:

Children engaged in activities such as playing with friends (47 percent), reading (43.4 percent), playing outside (43.1 percent), physical activities (42 percent), and craft activities (25.6 percent). On weekdays, the youngsters spent between half an hour and an hour (43.9 percent), between one and two hours (23.4 percent), and more than four hours (20.3 percent). The number of hours spent being physically active during the weekend ranged from thirty minutes to an hour for 40.6 percent, from one to two hours for 22.8 percent, and more than four hours for 19.75 percent. With relation to the consumption of junk food when using electronic devices The majority of youngsters (41.7 percent) consume sweets, followed by sweetened beverages (38.3 percent), fast food, and salted crisps (32.1 percent).

Table 3:- Activities time.

	N	%
Does the child do any other activities?		
Reading	154	43.4
Playing outside	153	43.1
Playing non-screen games with friends	167	47.0
Playing board games	36	10.1
Craft activities	91	25.6
Physical activities (swimming, riding a bike, jumping on trampoline)	149	42.0
Numbers of hours does the child spend being physically active per day on weekday		
30min-< 1hour	156	43.9
1-<2hours	83	23.4
2-<3hours	25	7.0
3-<4hours	19	5.4
4>hours	72	20.3
Numbers of hours does the child spend being physically active per day on weekend		
30min-< 1hour	144	40.6
1-<2hours	81	22.8
2-<3hours	33	9.3
3-<4hours	27	7.6
4>hours	70	19.7
junk food during electronic device use		
fast food	114	32.1
Sweetened beverages	136	38.3
Candy	148	41.7
Salted crisps	114	32.1

Device's usage according to the type:-

Smartphones were used by 61.63 percent of respondents, with 54.6 percent reporting everyday use. TV/DVD usage was 61.07 percent, with 54.9 percent reporting everyday use. Tablets were used by 21.41 percent of youngsters, with the majority of children not utilizing them (66.2 percent).

Table 4:- Device's usage according to the type.

How often does the child use		**Daily**	**Every other day**	**Twice per week**	**Only on weekend**	**Rarely**	**Don't use it**	**Level of use (%)**
smartphones	**N**	194	30	16	9	24	82	61.63
	%	54.6	8.5	4.5	2.5	6.8	23.1	
Tablets	**N**	55	12	15	6	32	235	21.41
	%	15.5	3.4	4.2	1.7	9.0	66.2	

Game consoles	**N**	40	15	13	18	24	245	17.92
	%	11.3	4.2	3.7	5.1	6.8	69.0	
TV/DVD	**N**	195	25	9	14	25	87	61.07
	%	54.9	7.0	2.5	3.9	7.0	24.5	
computer/ laptop	**N**	6	5	5	7	16	316	4.73
	%	1.7	1.4	1.4	2.0	4.5	89.0	

The level of devices usage, level of physical; activity and diet habits:
77.7 percent of children used electronic devices within the recommended limit, whereas 22.3 percent used them excessively. Although 69.6 percent of children were physically active, the majority of youngsters (78.6 percent) had healthy eating habits.

Table 5:- The level of devices usage, level of physical activity and diet habits.

				Scoring	
		N	**%**	**Range**	**Mean±SD**
Level of use	**Within the recommended limit**	276	77.7	0-34	13.017±6.974
	excessive	79	22.3		
Level of physical activity	**Active**	247	69.6	2-16.	6.890±3.911
	Inactive	108	30.4		
Diet habits	**Unhealthy Diet habits**	76	21.4	0-4.	2.557±1.514
	Healthy Diet habits	279	78.6		

The relation between the demographics with level of use of included subjects:
The relationship between the amount of use and the characteristics of the subjects included in the study revealed a statistically significant relationship between excessive use and ages more than one year. The other characteristics, such as gender and country origin, had no effect on the level of utilization (Table. 6). Physical activity at a healthy level was substantially associated with younger age, female gender, and a low BMI (Table.7). Additionally, healthy eating habits were found to be significantly associated with younger age groups (Table. 8).

Table 6:- Relation between different studied basic demographic data and level of use.

		Level of use				**Total**		**Chi-square**	
		Within recommended limit		**Excessive**					
		N	**%**	**N**	**%**	**N**	**%**	**X^2**	**P-value**
Gender	**Male**	121	43.8%	35	44.3%	156	43.9%	0.005	0.942
	Female	155	56.2%	44	55.7%	199	56.1%		
Age	**Less than 1year**	22	8.0%	1	1.3%	23	6.5%	26.752	<0.001*
	1- less than 2 year	97	35.1%	11	13.9%	108	30.4%		
	2 - less than 3 years	68	24.6%	21	26.6%	89	25.1%		
	3 - less than 4 years	42	15.2%	20	25.3%	62	17.5%		
	4 -less than 5 years	47	17.0%	26	32.9%	73	20.6%		
nationality	**Saudi**	197	71.4%	68	86.1%	265	74.6%	7.709	0.06
	Non-Saudi	79	28.6%	11	13.9%	90	25.4%		

Table 7:- Relation between different studied basic demographic data and level of physical activity.

		level of physical activity				Total		Chi-square	
		Active		Inactive					
		N	%	N	%	N	%	X^2	P-value
Gender	Male	98	39.7%	58	53.7%	156	43.9%	5.978	0.014*
	Female	149	60.3%	50	46.3%	199	56.1%		
Age	Less than 1year	23	9.3%	0	0.0%	23	6.5%	20.970	<0.001*
	1- less than 2 year	71	28.7%	37	34.3%	108	30.4%		
	2 - less than 3 years	63	25.5%	26	24.1%	89	25.1%		
	3 - less than 4 years	46	18.6%	16	14.8%	62	17.5%		
	4 -less than 5 years	44	17.8%	29	26.9%	73	20.6%		
nationality	Saudi	180	72.9%	85	78.7%	265	74.6%	1.380	0.240
	Non-Saudi	67	27.1%	23	21.3%	90	25.4%		

Table 8:- Relation between different studied basic demographic data and diet habits.

		Diet habits				Total		Chi-square	
		Unhealthy diet habit		Healthy diet habit					
		N	%	N	%	N	%	X^2	P-value
Gender	Male	39	51.3%	117	41.9%	156	43.9%	2.121	0.145
	Female	37	48.7%	162	58.1%	199	56.1%		
Age	Less than 1year	0	0.0%	23	8.2%	23	6.5%	18.121	0.001*
	1- less than 2 year	16	21.1%	92	33.0%	108	30.4%		
	2 - less than 3 years	22	28.9%	67	24.0%	89	25.1%		
	3 - less than 4 years	17	22.4%	45	16.1%	62	17.5%		
	4 -less than 5 years	21	27.6%	52	18.6%	73	20.6%		
nationality	Saudi	60	78.9%	205	73.5%	265	74.6%	0.973	0.324
	Non-Saudi	16	21.1%	74	26.5%	90	25.4%		

Discussion:-

At the moment, the majority of epidemiological researches has explored this theory, particularly in relation to the concept of "television (TV) viewing and screen time**".**

Excessive screen time sitting is associated with a significantly higher body mass index (BMI) in children and young adults aged 2 to 18 years[1]**.** There is a high prevalence of screen usage more than 2 hours among children from 2 to 8 years old [12]. It is critical to determine whether excessive media-based sedentary lifestyle is unique to obese children who are normally inactive, before concluding that this high frequency of sitting in front of a screen as "a single marker of inactivity" may unfairly implicate school-aged children's increasing weight[13]**.**Thus, examining the disparities in screen-based inactivity between normal-weight and obese children may aid in our understanding of this link and its implications for children's weight status**.**However, the majority of studies have not explored extensively the ownership of modern electronic screen devices, notably smartphones and tablets, and their use by children**.**By incorporating this relatively new piece of equipment, current research advances earlier findings**.**New screen devices, such as smartphones and tablets, may eventually supplant television viewing in children, necessitating an assessment of their association with obesity**.**It is clear that additional study is necessary to better understand the relationships between measures of media-based inactivity and adverse health consequences such as obesity, feeding behavior and physical exercise time[14]**.**

The American Academy of Pediatrics' Council on Communication and Media (2013) advised a maximum of two hours of screen usage per day for children and adolescents, and none at all for children under the age of two. However, the present study showed higher levels of usage (22.3%) among younger children than 5 years than recommended but those results are lower than other studies [12, 15]. Also, the levels of TV usage in the recent study

were in the same level of smartphones levels with close durations which is different than other studies showing that there's a decline in using TV nowadays when compared with using smartphones, computers and tablets as the other countries [16-20].

The level of physical activity (69.6%) and healthy diet habits (78.6%) were within recommended levels among most of the children which is comparable with other studies showing higher obesity rates associated with longer screen time and lack of physical activity. It is critical that timing must be observed across all screen devices as total screen time is the time spent on all types of screen devices [1]. Only a few research have analyzed the connection between obesity and smartphones/tablets in a systematic manner, despite evidence that childhood obesity is associated with excessive TV watching of five or more hours per day[21]. We have demonstrated that increasing children's time spent in front of electronic display devices, including television, increases their risk of obesity.

In the present study, more than half of the children were having weight problems differing from being underweight, overweight to obesity. In accordance, children who use screen gadgets for an extended period of time have been discovered to be at an increased risk of getting a number of serious disorders. Excessive screen time has been linked to obesity in other countries[22-26]. Excessive screen time has been linked to irregular sleeping patterns, an elevated incidence of respiratory disorders and other sensitivities, and lack of performance on cognitive screening methods [27-29].

The study used a limited sample of children and the information on child inactive behaviors and physical activity were collected from parents thus the results can't be generalized due to recall bias. There's a lack of investigations affecting the cognitive status and sleeping behavior of children. Also, there's a lack of data contents of media use with online school these days.

This study has some strength points as it's one of the least studies conducted to evaluate the effect of screen time on child's activity, diet habits and BMI status. Also, little studies were conducted in KSA about screen time usage among younger children than 5 years.

Conclusion:-

This study showed a high prevalence of screen usage among children more than 1 year. Also, high levels of nutrition problems were shown to be associated with screen use including overweight and obesity. The level of physical activity was good among the children which indicated a high level of responsibility of caregivers regarding the importance of other activities than using screens among children. A significant relation was found between the excessive usage and children older than 1 year. The healthy level of physical activity was significantly associated with younger age, female gender and low BMI.More emphasis should be placed on smartphone and tablet device use, particularly among children and studying their cognitive, diet habits, activity and sleeping behaviors.

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Conflict of interest:-
No conflict of interest.

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