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Original Research Article

Screen exposure and health behaviors in Saudi adults: cross-sectional associations with physical activity and BMI

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ABSTRACT

Background: Prolonged screen time in the modern digital society, including television viewing, smartphone use, computer use, and video gaming, has emerged as a significant public health concern. Excessive screen exposure may reduce physical activity levels and contribute to obesity. This study aimed to evaluate the association between screen time, physical activity, and obesity among adults living in Saudi Arabia.
Methods: A cross-sectional online survey was conducted using a 26-item questionnaire assessing screen time behaviors, physical activity (Godin–Shephard Leisure-Time Physical Activity Questionnaire), and sociodemographic characteristics. Data were analyzed using SPSS version 29.
Results: A total of 1,282 participants completed the survey; 58% were female, and 57% were aged between 20 and 49 years. Overall, 36% of respondents were overweight, 27% were obese, and 64% were physically active. Screen time exceeding four hours per weekday was reported by 26% for television, 39% for computers, 7% for video games, and 77% for smartphones. Several demographic and socioeconomic factors were associated with increased computer and smartphone use. Smartphone use was significantly associated with insufficient physical activity or sedentary behavior, but not with overweight or obesity.
Conclusions: High levels of screen time were observed among adults in Saudi Arabia. While prolonged screen exposure was not associated with obesity, excessive screen time, particularly smartphone use, was significantly associated with lower physical activity levels. These findings highlight the need for public health strategies that promote physical activity and address excessive screen use among adults.

Keywords: Adults, Obesity, Physical activity, Saudi Arabia, Screen time, Vision 2030

INTRODUCTION

The increasing digitalization of modern life has fundamentally transformed how people live, work, and interact, with smartphones, computers, and other digital media assuming a central role in most adults' lives. While this digital connectivity brings many conveniences, it also raises significant public health concerns: prolonged screen exposure often replaces time that could be spent in physical activity, contributing to a more sedentary lifestyle.[1,2] This is concerning because physical inactivity has been identified as a leading risk factor for non-communicable diseases and is estimated to be the fourth-leading cause of mortality worldwide.[3] At the same time, the global prevalence of obesity has soared, with 2.5 billion adults aged 18 years and older being overweight, including over 890 million adults living with obesity.[4] This convergence of high sedentary screen time and rising obesity has become a critical focal point in current public health discussions, with emerging evidence suggesting that screen-based sedentary behavior may be independently associated with metabolic risks, even among individuals who meet physical activity guidelines.[5] The complex interplay between digital lifestyles and health outcomes represents a novel public

health challenge that requires urgent attention and targeted interventions. Nowhere are these issues more pronounced than in the Middle East, particularly in Saudi Arabia.

The Kingdom has undergone rapid socio-economic development and digital transformation, with internet penetration reaching 99.0% and 35.1 million social media users representing 94.3% of the total population.[6] This digital revolution has been accompanied by dramatic lifestyle changes, including reduced physical activity and increased caloric intake.[7] Recent estimates from the General Authority of Statistics show the obesity rate among the population aged 15 and above is 23.1%. In comparison, 45.1% of individuals in this age group are classified as overweight, placing the country among those with the highest obesity burdens.[8] At the same time, insufficient physical activity is extraordinarily prevalent.[9-11] The most recent national statistics report that only 58.5% of adults engage in the WHO-recommended 150 minutes of physical activity per week, indicating that over 40% of the adult population fails to meet basic physical activity guidelines.[12] These trends are further compounded by urban design, climate, and transport patterns that favor sedentary lifestyles. Cultural factors, including limited recreational facilities for women and social barriers to outdoor exercise, further compound these challenges.[9,13] These patterns may have been further reinforced during the post-COVID-19 period, as pandemic-related lockdowns and widespread shifts to remote work have entrenched sedentary habits globally, with studies showing that remote workers experience up to more hours of sitting time daily than in-person workers.[14,15] Against this backdrop, investigating how digital-age behaviors, particularly screen time, are associated with physical activity levels and obesity among adults in Saudi Arabia has become critically important. Although the health impacts of screen time have been extensively studied in children and adolescents, evidence regarding adult populations, who are equally susceptible to the harms of sedentary behavior, remains limited.[16-19] Moreover, there is a lack of comprehensive data addressing the intersection of screen time, obesity, and physical activity among adults in Saudi Arabia, highlighting a critical gap in the literature.

This cross-sectional study aims to examine how digital-age behaviors, particularly screen time, are associated with physical activity levels and obesity among Saudi adults. This research is especially timely given Saudi Arabia's Vision 2030 commitment to improving population health and quality of life, and the growing recognition that digital health interventions may play a crucial role in addressing these challenges. Such insights are vital for informing evidence-based, culturally appropriate public health strategies and interventions to promote active lifestyles in an increasingly digital world, particularly in rapidly developing nations undergoing similar digital health transitions.

METHODS

Study design

This was a cross-sectional study.

Inclusion criteria

The inclusion criteria included participants who were adults (≥18 years) residing in Saudi Arabia (Saudi or non-Saudi) at the time of the survey, who provided electronic informed consent by proceeding past the information page and were able to complete the online questionnaire in English.

Exclusion criteria

Participants who did not meet these conditions were excluded.

Sample size calculation and data collection procedures

Using the General Authority for Statistics' estimate of 32,175,224 adults in Saudi Arabia in 2022, the minimum required sample size was calculated to be 385, assuming a 95% confidence level, a 5% margin of error, and an expected outcome proportion of 50%.

A convenience sampling strategy was used. Participants were recruited via an online, self-administered questionnaire distributed across multiple social media platforms (WhatsApp, Telegram, Twitter, LinkedIn, and Facebook) following Institutional Review Board (IRB) approval from Alfaisal University. The data collection took place from November 2022 to December 2022.

Measures and instruments

Instrument used

The questionnaire comprised 26 items organized into three sections (Supplementary File 1) as follows:

Section 1 (Demographics/Health): age, gender, region of residence, marital status, employment, income, nationality, educational level, weight, height, and existing chronic conditions. For ease of selection, the region was presented as the five geographical regions of Saudi Arabia, with the 13 administrative provinces listed under each.

Section 2 (Screen Time): items were adapted from a validated adult Screen Time questionnaire 20. Respondents reported their exposure time and duration, the devices used, and their preferred platforms. Screen time was captured separately for watching television, using computers, using smartphones, and playing video games, with weekday and weekend durations recorded independently. Initial response options used two-hour increments (e.g., 0-2 hours) up to >10 hours. For analysis,

categories were collapsed into 0-4 hours vs. >4 hours for television, computer use, and video gaming; smartphone use was categorized as 0-8 hours vs. >8 hours, reflecting higher reported smartphone use.

Section 3 (Physical Activity): leisure-time physical activity was assessed using the validated Godin-Shephard Leisure-Time Physical Activity Questionnaire 21. Participants reported the frequency of activities lasting>15 minutes, classified as strenuous (heart rate rapid), moderate (not exhausting), or mild/light (minimal effort). Frequencies were weighted by 9, 5, and 3, respectively, and summed to generate the Godin score.

Exposure and outcome definitions

Primary exposures: domain-specific screen time categories (For analysis, categories were collapsed into 0–4 h vs >4 h for TV/computer/gaming; 0–8 h vs >8 h for smartphone).

Primary outcomes

Physical activity category: Consistent with guideline thresholds, scores ≥24 were classified as active, 14-23 as moderately active, and <14 as insufficiently active/sedentary.[21]

BMI derived from self-reported weight (kg) and height (m) using BMI = kg/m². BMI categories followed WHO thresholds: underweight (<18.5), normal (18.5-24.9), overweight (25.0-29.9), and obesity (≥30.0).

Statistical analysis

Analyses were conducted in SPSS version 29. Categorical variables were summarized using frequencies and percentages. Chi-square tests examined associations between screen-time categories and demographic/socioeconomic variables, BMI, and Godin physical-activity categories. Multiple logistic regression was used to identify variables independently associated with screen time. The dependent variables were (a) >4 hours/day of computer use on weekdays and (b) >8 hours/day of smartphone use on weekdays. All demographic and socioeconomic variables (gender, age, marital status, nationality, employment status, monthly income, education, and region) were entered simultaneously into the models using the enter method. Results are reported as odds ratios (ORs) with 95% confidence intervals (CIs). A two-sided p-value <0.05 was considered statistically significant. Regression analyses were conducted only for associations between computer or smartphone use and BMI or physical activity, for which significant bivariate relationships were observed. A two-sided p-value <0.05 was considered statistically significant for all tests.

Ethical considerations

On the first page of the survey, participants received study information. Completing the survey was considered informed consent. Participation was anonymous; no direct personal identifiers were requested. IRB approval for the study was obtained from Alfaisal University.

RESULTS

Demographics

A total of 1,282 adults participated in the study (Table 1). The majority were women (58%), and most were aged 20-49 years. Two-thirds were married, 57% employed, and 54% held a bachelor's degree. Almost all respondents were Saudi nationals (93%), and 72% resided in the Central region. Based on BMI, 37% were underweight/normal, 36% pre-obese, and 27% obese. According to the Godin Leisure Activity score, 64% were classified as active, 17% moderately active, and 19% insufficiently active/sedentary.

Prevalence of screen-time

Screen time patterns are summarized in Figures 1 and 2. WhatsApp (79%), Snapchat (67%), and Twitter (46%) were the most commonly used social media platforms. Smartphones accounted for the dominant share of screen time, with nearly a quarter of respondents reporting use exceeding 8 hours per day and an additional 42% reporting 4-8 hours. Computer use was more prevalent on weekdays (39% >4 h/day) compared with weekends (20%), whereas television viewing was stable across weekdays and weekends (~26-27% >4 h/day). Video game use was relatively uncommon, with 85-86% reporting ≤2 h/day. Screen time patterns are illustrated in Figures 1 and 2.

Associations with computer use

The time spent on computers was grouped into two categories (0-4 hours and >4 hours per weekday). Prolonged computer use (>4 hours/day) was significantly associated with most demographic and socioeconomic variables (Table 2). The proportion of participants reporting >4 hours/day of computer use during weekdays varied significantly across demographic and socioeconomic groups (Table 2). Higher use was more common among males than females (46% vs. 35%, p<0.001), in younger adults compared with those ≥60 years (31-46% vs. 19%, p<0.001), and among single respondents compared with married or divorced/widowed participants (50% vs. 35-36%, p<0.001). Non-Saudis also reported higher use than Saudis (63% vs. 37%, p<0.001).

Socioeconomic differences were also observed. Prolonged computer use was most common in employed individuals (53%), those with monthly incomes ≥25,000 SAR (59%), and respondents with a master's degree

(56%) compared with their respective reference groups (all p<0.001). Regionally, higher use was observed in the Central, Eastern, and Western regions compared to the Northern/Southern regions (p<0.001).

Table 1: Demographic characteristics of the respondents (n=1282).

		N	%
Gender	Male	538	42
	Female	744	58
Age (years)	18-29	239	19
	30-39	418	33
	40-49	309	24
	50-59	214	17
	60 & above	102	8
Relationship status	Single	334	26
	Married	860	67
	Divorced	65	5
	Widowed	23	2
Student	No	1131	88
	Yes	151	12
Employment status	Employed	725	57
	Unemployed	293	23
	Own business	82	6
	Retired	182	14
Monthly income (SAR)	No monthly income	148	12
	9,999 or less	256	20
	10,000-14,999	258	20
	15,000-19,999	173	13
	20,000-24,999	100	8
	25,000 & above	160	12
	Prefer not to answer	187	15
Highest educational level	High school/ Diploma	309	24
	Bachelors	692	54
	Masters	179	14
	Ph.D. or equivalent	102	8
Nationality	Saudi	1189	93
	Non-Saudi	93	7
Region of Saudi Arabia	Central	925	72
	Eastern	62	5
	Western	168	13
	Northern	46	4
	Southern	81	6
Body mass index (kg/m²)	Underweight/ normal weight (<25)	477	37
	Overweight (25-29.9)	458	36
	Obesity class I (30-34.9	237	18
	Obesity classes II/III (35+)	110	9
Godin Leisure Activity category	Insufficiently active/ sedentary (<14 units)	251	19
	Moderately active (14-23 units)	213	17
	Active (24+ units)	818	64

N=Frequency in each category; %= Percentage in each category

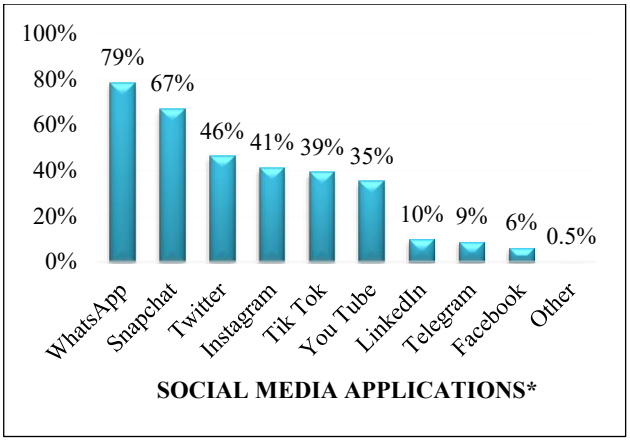

Figure 1: Use of social media applications (n=1282). Note: Respondents were allowed to select multiple social media applications; therefore, the percentages exceed 100%.

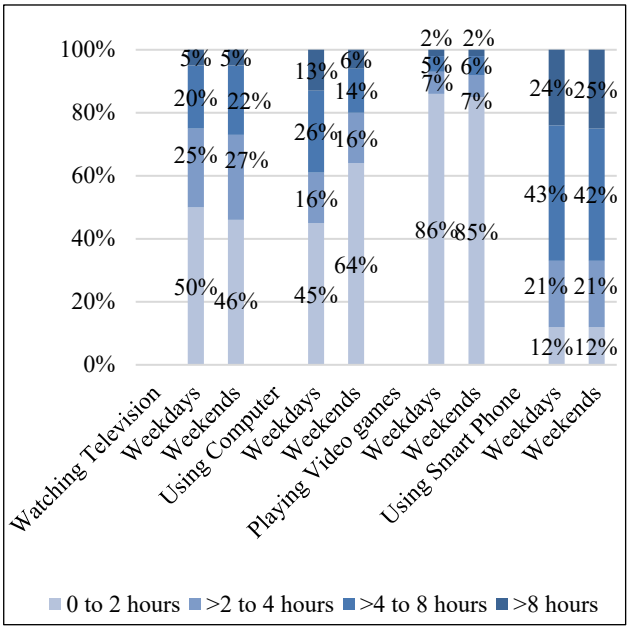

Figure 2: Screen time reported by respondents for weekdays and weekends (n=1282).

Associations with smartphone use

Weekday smartphone use was dichotomized as 0-8 vs >8 hours/day and then compared with demographic and socioeconomic variables. Use for>8 hours/day differed significantly by age, marital status, employment status, and income (Table 3). It was more common in younger adults (31% in 18-29 and 28% in 30-39 vs 15% in 50-59 and 9% in ≥60; p<0.001), in single vs married respondents (33% vs 20%; p<0.001), and among the employed or business owners vs retirees (27% and 27% vs 9%; p<0.001). By income, >8 hours/day was reported more often in those earning <10,000 SAR vs ≥25,000 SAR (38% vs 18%; p=0.018). No significant differences were observed by gender, nationality, student status, education, or region (all p>0.05).

Table 2: Association of demographic and socioeconomic variables with hours spent using a laptop/computer per day on weekdays.

Variables		Hours spent using a laptop/computer per day				
		0 to 4 hours		>4 hours		P value[a]
		N	%	N	%	
Gender	Male	293	54	245	46	<0.001*
	Female	487	65	257	35	
Age in years	18-29	128	54	111	46	<0.001*
	30-39	226	54	192	46	
	40-49	195	63	114	37	
	50-59	148	69	66	31	
	60 and above	83	81	19	19	
Relationship status	Single	167	50	167	50	<0.001*
	Married	557	65	303	35	
	Divorced/widowed	56	64	32	36	
Nationality	Saudi	746	63	443	37	<0.001*
	Non-Saudi	34	37	59	63	
Are you a student?	No	693	61	438	39	0.39
	Yes	87	58	64	42	
Employment status	Employed	340	47	385	53	<0.001*
	Unemployed	237	81	56	19	
	Own business	48	59	34	41	
	Retired	155	85	27	15	
Monthly income (SAR)	No monthly income	121	82	27	18	<0.001*
	<10,000	161	63	95	37	
	10,000-14,999	166	64	92	36	
	15,000-19,999	97	56	76	44	
	20,000-24,999	53	53	47	47	
	25,000 & above	65	41	95	59	
	Prefer not to answer	117	63	70	37	
Highest educational level	High school/Diploma	218	71	91	29	<0.001*
	Bachelor's degree	431	62	261	38	
	Master's degree	78	44	101	56	
	PhD or equivalent	53	52	49	48	
Region of Saudi Arabia	Central	546	59	379	41	<0.001*
	Eastern	38	61	24	39	
	Western	91	54	77	46	
	Northern/Southern	105	83	22	17	

[a]:P value determined using the chi-square test; *: P value <0.001

Table 3: Association of demographic and socioeconomic variables with hours spent using smartphones per day on weekdays.

Variables		Hours spent using smartphones per day				
		0 to 8 hours		>8 hours		P value[a]
		N	%	N	%	
Gender	Male	410	76	128	24	0.82
	Female	571	77	173	23	
Age in years	18-29	165	69	74	31	<0.001*
	30-39	301	72	117	28	
	40-49	240	78	69	22	
	50-59	182	85	32	15	
	60 and above	93	91	9	9	
Relationship status	Single	225	67	109	33	<0.001*
	Married	689	80	171	20	
	Divorced/widowed	67	76	21	24	

Continued.

Variables		Hours spent using smartphones per day				
		0 to 8 hours		>8 hours		P value[a]
		N	%	N	%	
Nationality	Saudi	915	77	274	23	0.19
	Non-Saudi	66	71	27	29	
Are you a student?	No	865	76	266	24	0.93
	Yes	116	77	35	23	
Employment status	Employed	527	73	198	27	<0.001*
	Unemployed	228	78	65	22	
	Own business	60	73	22	27	
	Retired	166	91	16	9	
Monthly income (SAR)	No monthly income	114	77	34	23	0.018*
	<10,000	174	68	82	32	
	10,000-14,999	206	80	52	20	
	15,000-19,999	134	77	39	23	
	20,000-24,999	77	77	23	23	
	25,000 and above	132	83	28	18	
	Prefer not to answer	144	77	43	23	
Highest educational level	High school/Diploma	233	75	76	25	0.08
	Bachelors degree	518	75	174	25	
	Masters degree	143	80	36	20	
	PhD or equivalent	87	85	15	15	
Region of Saudi Arabia	Central	693	75	232	25	0.16
	Eastern	51	82	11	18	
	Western	133	79	35	21	
	Northern/Southern	104	82	23	18	

a: p-value determined using the Chi-Square test; *: p-value <0.001

Table 4: BMI and Godin leisure activity vs. hours spent using laptops/computers and smartphones.

		Hours spent using your laptop/computer per weekday			
		0 to 4 hrs		>4 hrs	
		N	%	N	%
BMI (4 categories)	Normal/underweight (<=24.9)	280	59	197	41
	Overweight (25-29.9)	292	64	166	36
	Obesity class I (30-34.9)	145	61	92	39
	Obesity class II/III (35+)	63	57	47	43
	P value	0.37			
Godin Leisure Activity category	Insufficiently active/sedentary (<14 units)	143	57	108	43
	Moderately active (14-23 units)	128	60	85	40
	Active (24+ units)	509	62	309	38
	P value	0.32			
		Hours spent using your smartphone per weekday			
		0 to 8 hrs		**>8 hrs**	
		N	**%**	**N**	**%**
BMI (4 categories)	Normal/underweight (<=24.9)	352	74	125	26
	Overweight (25-29.9)	362	79	96	21
	Obesity class I (30-34.9)	185	78	52	22
	Obesity class II / III (35+)	82	75	28	25
	P value	0.25			
Godin Leisure Activity category	Insufficiently active/sedentary (<14 units)	174	69	77	31
	Moderately active (14-23 units)	159	75	54	25
	Active (24+ units)	648	79	170	21
	P value	0.004*			

*: p-value <0.001

Table 5: Logistic regression analysis for using a laptop/computer for more than 4 hours per day during weekdays.

	OR	95% C.I. for OR		P value
		Lower	Upper	
Gender				
Female	1.00			
Male	1.15	0.87	1.52	0.33
Age in years				
18-29	2.25	0.98	5.16	0.05
30-39	1.55	0.74	3.21	0.24
40-49	1.30	0.63	2.69	0.48
50-59	1.55	0.78	3.06	0.21
60 and above	1.00			
Relationship status				
Married	1.00			
Single	1.61	1.10	2.36	0.01*
Divorced/widowed	1.47	0.87	2.48	0.15
Nationality				
Saudi	1.00			
Non-Saudi	2.64	1.61	4.34	<0.001*
Employment status				
Retired	1.00			
Employed	4.40	2.45	7.90	<0. 001*
Unemployed	1.12	0.57	2.20	0.74
Own business	2.76	1.35	5.62	0.01*
Monthly income				
Don't have a monthly income	1.00			
9,999 SAR or less	1.21	0.66	2.21	0.53
10,000-14,999 SAR	1.15	0.60	2.20	0.67
15,000-19,999 SAR	1.64	0.84	3.23	0.15
20,000- 24,999 SAR	2.02	0.98	4.19	0.06
25,000 and above SAR	2.73	1.35	5.52	0.01
Prefer not to answer	1.61	0.87	2.97	0.13
Highest educational level				
High school/Diploma	1.00			
Bachelor’s degree	1.09	0.78	1.53	0.62
Master's degree	1.60	1.01	2.54	0.046
Ph.D. or equivalent	1.02	0.56	1.84	0.96
Region of Saudi Arabia				
Northern/Southern	1.00			
Central	2.69	1.60	4.52	0.0002
Eastern	2.31	1.09	4.89	0.03
Western	3.43	1.87	6.31	<0.001

Variable(s) entered on step 1: Gender, Age, Relationship status, Nationality, Employment status, Monthly income, Highest educational level, Region of Saudi Arabia; *p<0.05

BMI and physical activity associations

Weekday computer use (more than 4 hours/day) was not associated with BMI categories (p=0.37) or Godin physical activity categories (p=0.32). Weekday smartphone use (more than 8 hours/day) was associated with lower physical activity: 31% of participants who were insufficiently active/sedentary reported using their smartphones for more than 8 hours/day, compared to 21% of those classified as active (p=0.004). Smartphone use was not associated with BMI (p=0.25). Results are summarized in Table 4.

Logistic regression

Variables with significant bivariate associations were included in the multivariable logistic regression (Table 5). Independent predictors of prolonged computer use included relationship status, nationality, employment, income, education, and region. Single respondents were more likely than married participants to use computers >4 h/day (OR 1.61, 95% CI: 1.10-2.36). Non-Saudis were

more likely than Saudis (OR 2.64, 95% CI: 1.61-4.34). Compared with retirees, employed individuals (OR 4.40, 95% CI: 2.45-7.90) and business owners (OR 2.76, 95% CI: 1.35-5.62) had significantly higher odds of prolonged use. Respondents with monthly incomes ≥25,000 SAR were more likely than those with no income to report prolonged computer use (OR 2.73, 95% CI: 1.35-5.52). Education was also associated with master's degree holders, who were more likely than those with high school/diploma education to report >4 h/day (OR 1.60, 95% CI: 1.01-2.54). Regionally, participants in the Central (OR 2.69, 95% CI: 1.60-4.52), Eastern (OR 2.31, 95% CI: 1.09-4.89), and Western regions (OR 3.43, 95% CI: 1.87-6.31) were more likely than those in the Northern/Southern region to report prolonged computer use.

Table 6: Logistic regression analysis for using smartphones for more than 8 hours per day during weekdays.

	OR	95% C.I. for OR		P value
		Lower	Upper	
Age in years				
18-29	1.57	0.59	4.15	0.36
30-39	1.92	0.79	4.67	0.15
40-49	1.60	0.66	3.86	0.30
50-59	1.33	0.57	3.11	0.51
60 and above	1.00			
Relationship status				
Married	1.00			
Single	1.64	1.10	2.43	0.01*
Divorced/widowed	1.53	0.88	2.67	0.13
Nationality				
Saudi				1.00
Non-Saudi	1.31	0.80	2.16	0.29
Employment status				
Retired	1.00			
Employed	2.63	1.31	5.28	0.01*
Unemployed	1.67	0.78	3.55	0.19
Own business	2.51	1.10	5.72	0.03*
Monthly income				
Prefer not to answer	1.00			
Don't have a monthly income	1.11	0.62	2.00	0.73
9,999 SAR or less	1.34	0.85	2.11	0.21
10,000-14,999 SAR	0.77	0.47	1.27	0.31
15,000-19,999 SAR	0.96	0.56	1.63	0.87
20,000-24,999 SAR	0.99	0.54	1.84	0.99
25,000 and above SAR	0.66	0.36	1.18	0.16
Highest educational level				
PhD or equivalent	1.00			
High school/Diploma	1.50	0.74	3.03	0.26
Bachelors degree	1.45	0.76	2.78	0.26
Masters degree	0.97	0.48	1.96	0.92
Region of Saudi Arabia				
Northern/Southern	1.00			
Central	1.78	1.08	2.94	0.02*
Eastern	1.27	0.55	2.89	0.58
Western	1.63	0.87	3.05	0.13
Godin Leisure Activity category				
Insufficiently Active / Sedentary (<14 units)	1.52	1.10	2.12	0.01*
Moderately Active (14-23 units)	1.32	0.91	1.90	0.14
Active (24+ units)	1.00			

Variable(s) entered on step 1: Age, Relationship status, Nationality, Employment status, Monthly income, Highest educational level, Region of Saudi Arabia, Godin Leisure Activity category; * p<0.05

For smartphone use, significant predictors included relationship status, employment, region, and physical activity (Table 6). Single respondents were more likely than married participants to use smartphones >8 h/day (OR 1.64, 95% CI: 1.10-2.43). Compared with retirees, both employed individuals (OR 2.63, 95% CI: 1.31-5.28) and business owners (OR 2.51, 95% CI: 1.10-5.72) had higher odds of prolonged use. Respondents in the Central region were more likely than those in the Northern/Southern region to report more than 8 hours per day (OR 1.78, 95% CI: 1.08-2.94). Finally, participants who were insufficiently active/sedentary were more likely than active individuals to report prolonged smartphone use (OR 1.52, 95% CI: 1.10-2.12).

DISCUSSION

Screen time prevalence

The prevalence of screen time among adults in Saudi Arabia is high. National estimates indicate that adults in Saudi Arabia spend an average of approximately 8 hours per day engaged in screen-based activities, exceeding recommended limits, although slightly lower than global averages.[22] Consistent with these reports, screen time exposure in our study was also high and aligned with findings from previous regional and international studies.[23] The widespread availability of high-speed internet and digital platforms in Saudi Arabia, particularly among younger adults and students, likely contributes to increased smartphone and computer use for entertainment, communication, and social media engagement. These factors may partially explain the high levels of screen exposure observed among study participants.

Screen time and demographics

Prolonged computer use was more common among employed, single, and highly educated adults, suggesting that occupational demands and greater digital access play a key role in shaping screen-based behaviors. These patterns are consistent with findings from a 2020 study conducted in Bangkok, which reported significantly higher computer and internet use among single, well-educated, and employed individuals ($p<0.001$).[24] Similar associations have been observed in Australia, where higher income, educational attainment, and employment status were significantly associated with extended computer use and sedentary behavior among adults ($p<0.01$).[25] Another Australian study further confirmed a positive relationship between educational level and computer usage across multiple sedentary contexts ($p=0.001$).[26]

Regarding smartphone use, single individuals in our study reported higher usage than married participants. This may reflect differences in time allocation and competing family responsibilities. Consistent with this pattern, a Saudi study conducted at King Saud University found significantly higher levels of smartphone addiction among single students compared with married individuals ($p=0.001$).[27] Similar trends have been reported in the United States, where married individuals demonstrated lower smartphone use and were less likely to use their smartphones before bedtime.[28] In addition, employed participants in our study were more likely to report prolonged smartphone use than retirees, aligning with findings from an American study that identified employment status as a significant predictor of smartphone overuse ($p<0.01$).[29]

Screen time and obesity

In this study, no significant association between screen time and obesity was observed among adults in Saudi Arabia. These findings are consistent with several regional and international studies. A Malaysian university-based study by Kalirathinam et al (2019; n=399) reported no significant association between smartphone screen time and BMI ($p=0.36$).[30] Similarly, Raque et al (2022) found no significant correlation between excessive screen use and BMI among students at Imam Abdulrahman Bin Faisal University in Saudi Arabia (n=1,877; $p=0.37$).[31] Comparable results were also reported in studies conducted at King Abdulaziz University in Jeddah (n=203) [32] and among Moroccan university students (n=438), where excessive screen time, including computer and laptop use, was not associated with obesity ($p=0.497$).[33]

In contrast, some studies have reported positive associations between screen-related behaviors and obesity. Alotaibi et al (2022; n=545) observed that smartphone addiction was more prevalent among students with poorer physical health and higher BMI ($p=0.046$).[34] Similarly, Vandelanotte et al (2009; n=2,650) reported that high leisure-time internet and computer use was associated with increased odds of being overweight or obese.[35] Differences in study populations, age groups, behavioral measures, and methodological approaches may partly explain these inconsistencies. Differences in sample characteristics and study design may explain inconsistencies across studies.

Screen time and physical activity

Our findings demonstrate a significant association between screen time and physical activity levels. These results are consistent with a Chinese study that reported that excessive smartphone and social media use among adults was associated with lower physical activity levels ($p=0.03$).[36] Similar findings have been reported locally; Deyab et al identified excessive screen exposure and inappropriate social media use as significant barriers to physical exercise among university students in Saudi Arabia.[37] Likewise, a recent study by Alotaibi et al (2022; n=545) at Umm Al-Qura University found that smartphone addiction was significantly associated with poorer physical health ($p=0.002$).[34]

Several studies have further demonstrated that prolonged screen exposure is associated with reduced physical activity and increased sedentary behavior.[38,39] In contrast, a Saudi nationwide survey by Alkhateeb et al (2020; n=1,941) reported no significant association between smartphone addiction and physical activity, although a strong relationship with musculoskeletal complications was observed.[40] Differences in study populations, outcome measures, and methodological approaches may partly explain these inconsistencies.

Policy implications

From a public health and policy perspective, these findings highlight the need for integrated strategies that address sedentary behavior within Saudi Arabia's rapidly digitalizing society. Interventions should move beyond advocating screen time reduction and instead emphasize promoting regular physical activity across multiple settings, including workplaces, communities, and digital environments. Workplace wellness programs that encourage movement breaks, active commuting initiatives, and urban planning policies that support walkable and accessible public spaces may play an essential role in reducing sedentary time among adults.

Given the widespread use of smartphones, digital platforms also offer opportunities for intervention. Incorporating physical activity prompts, step-count reminders, and behavior-change messaging into commonly used applications may help counterbalance prolonged screen exposure. Community-based programs that expand access to culturally appropriate, gender-inclusive recreational facilities are vital for addressing existing barriers to physical activity. Aligning these efforts with Saudi Vision 2030 priority can strengthen national initiatives to reduce physical inactivity, improve population health, and mitigate the long-term burden of non-communicable diseases.[42]

This study has several notable strengths. Data were collected across multiple screen-based devices, including televisions, computers, smartphones, and video games, providing a comprehensive assessment of overall screen exposure rather than focusing on a single platform. The relatively large sample size compared with prior local studies enhances statistical power and supports more reliable subgroup analyses. In addition, the use of standardized, validated instruments to assess screen time and physical activity improves measurement reliability and facilitates comparisons with the existing literature. Importantly, this study addresses an increasingly relevant public health issue among Saudi adults, providing updated evidence on the relationships among screen time, physical activity, and obesity.

Several limitations should also be acknowledged. Screen time and physical activity were self-reported, which may have introduced recall or social desirability bias, leading participants to underreport screen time or overreport physical activity. The use of a convenience sampling strategy in an online survey may have introduced selection bias, as individuals with greater digital access or interest in the topic may be overrepresented, while less technologically engaged populations may be underrepresented. Furthermore, the cross-sectional study design limits the ability to infer causal relationships or temporal sequencing between screen time, physical activity, and obesity. Although the sample size was large (n=1,282), the study population was not nationally representative, with a predominance of participants from the Central region and Saudi nationals, which may limit generalizability to all adults in Saudi Arabia. Finally, the absence of detailed dietary data and information on the context of screen use (e.g., occupational versus leisure-related use) may have limited the ability to capture factors that could modify the observed associations.

CONCLUSION

This study demonstrates a high prevalence of screen-based behaviors among adults in Saudi Arabia, with smartphones and computers being the most commonly used devices. Although prolonged screen exposure was not associated with overweight or obesity, excessive smartphone use was significantly associated with lower levels of physical activity. These findings suggest that the health implications of screen use in adults may primarily operate through reduced physical activity rather than through direct effects on body weight. Public health efforts should therefore prioritize reducing sedentary behavior by promoting regular physical activity and encouraging balanced, responsible use of digital technologies.

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